Price controls for wholesale ISDN30 services

Consultation of the form and level of price controls on Openreach wholesale ISDN30 services

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Consultation

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Section 1

Summary

Introduction

1.1 In this consultation we set out Ofcom's proposals to regulate Openreach's prices for wholesale ISDN30 services.

1.2 ISDN30 is a digital telephone line service that provides up to 30 lines over a common digital bearer circuit. These lines provide digital voice telephony, data services and a wide range of ancillary services. Retail ISDN30 exchange line services are used by businesses which need multiple lines (typically 8 lines or more) at a particular site.

1.3 Wholesale ISDN30 services are supplied by Openreach to other communications providers (OCPs) who use them to provide retail ISDN30 services to businesses. Openreach's charges for wholesale ISDN30 services are a significant cost input for OCPs competing to provide retail ISDN30 services. Simply put, the level of the wholesale price is likely to be reflected in the level of the retail price and therefore a high wholesale charge is likely to lead to a high retail price.

1.4 The intention behind our proposals is to ensure wholesale ISDN30 prices are set at an efficient level going forward, where charges are reflective of the underlying costs of provision. This would reduce retail ISDN30 prices and reduce the consumer harm caused by retail ISDN30 prices that are significantly above cost.

Background

1.5 On 20 August 2010, we published the statement entitled *Review of retail and wholesale ISDN30 services*[1] (the Market Review) in which we carried out an analysis of competition in the provision of retail and wholesale ISDN30 services. In this, we concluded that Openreach[2] had significant market power (SMP) in the provision of wholesale ISDN30 services.

1.6 In the Market Review we imposed a number of regulatory remedies on Openreach to address its SMP in the provision of wholesale ISDN30 services. These included the requirement to supply these services and on terms which did not discriminate unduly between downstream BT businesses and their competitors.

1.7 The Market Review also concluded that Openreach's profitability in the provision of wholesale ISDN30 services appeared excessive and that, on the evidence available at that time, there was a relevant risk of adverse effects arising from price distortion and therefore the imposition of a price control was appropriate.

1.8 There is a widely held view (amongst analysts, OCPs and users) that internet protocol (IP) based services are likely to supersede ISDN30 services in the longer term and that ISDN30 services have a limited life. However, in the Market Review,

[1] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/statement/statement.pdf

[2] Openreach is the access division of BT established by the Undertakings in 2005. Whilst the proposed SMP services conditions in this document apply to British Telecommunications plc (i.e. BT), Openreach is the division of BT which provides the wholesale ISDN30 services which we are proposing to regulate. Therefore, throughout this document, we refer to Openreach as the supplier of wholesale ISDN30 services. For retail markets, we refer to BT.

we concluded that IP based services were not in the same market as ISDN30 and that Openreach's wholesale ISDN30 prices were not sufficiently constrained by alternative means of provision such as these.

Summary of proposals

1.9 We have now carried out a detailed analysis of the costs incurred by Openreach in the provision of wholesale ISDN30 services and, as part of this, we have considered the likely longevity of ISDN30 services and the reasonableness of present prices.

Our preliminary conclusion is that Openreach's returns from wholesale ISDN30 services are well above its weighted average cost of capital (WACC)

1.10 BT's regulatory financial statements (RFSs) report a return on capital employed (ROCE) of 62.1% for wholesale ISDN30 services in 2009/10.[3] Openreach has argued that the returns reported are artificially inflated as some of the ISDN30 specific assets (line-cards and access electronics) are heavily depreciated and therefore reflect end-of-life asset valuations and investment levels.

1.11 We propose that ROCE, measured after adjusting Openreach's depreciated assets to approximate a steady state level (adjusted ROCE), remains the appropriate measure to determine the profitability for wholesale ISDN30 services. Our initial calculations suggest that the adjusted ROCE in 2009/10 would have been 24%.This would have been well in excess of the relevant WACC of 11% in the same year.[4]

1.12 Our analysis (including the work carried out for the Market Review) has further confirmed that Openreach does not face sufficient competitive pressure to reduce wholesale ISDN30 prices towards the competitive level. The (nominal) wholesale ISDN30 rental price has remained constant at £141/channel since the introduction of the wholesale product in 2004, despite potential constraints from other regulated wholesale inputs that OCPs can purchase from BT, such as Partial Private Circuits (PPCs).

1.13 In addition, our analysis also suggests that a potentially large base of retail ISDN30 channels will remain by 2013/14, which underlines the importance of this product to end-users. In June 2010 there were around 2.9m retail ISDN30 channels. Our analysis suggests a decline of around 19% in retail ISDN30 channels by 2013/14, with 2.3m retail channels remaining by then.

1.14 As a result of the above concerns we propose that a price control on wholesale ISDN30 services would be appropriate at this stage of the product's life.

We believe an RPI-X control is appropriate

1.15 Our key concern is that the price of core wholesale ISDN30 services (i.e. connections, rentals and transfers) is likely to be above the competitive level. We believe that we should introduce an RPI-X type of control with the aim of reducing prices to cost by the end of the charge control period (i.e. 2013/14). This approach

[3] The reported profitability including BT's revaluation of duct is 69.7%. This is because the re-valuation of duct gives rise to a holding gain which increases BT's overall profits in 2009/10.
[4] We believe that the appropriate cost of capital for ISDN30 services is the "rest of BT rate". For a full discussion see Annex 7 of this document. Table A7.1 shows our previous and revised estimates of the cost of capital for BT Group and the disaggregated estimates for copper access services and the rest of BT.

would promote efficiency by setting a control based upon the costs of an efficient network at steady state. It will also provide an incentive for Openreach to beat the control by reducing its costs more than the level predicted.

1.16 The level of the control (i.e. the value of X) will be driven by the level of Openreach's costs at the start (2009/10) and end (2013/14) of the proposed control period and whether we propose to make any adjustments to the starting charges of wholesale ISDN30 services.

We are proposing a number of adjustments to Openreach's base year costs

1.17 We propose to make a number of adjustments to Openreach's base year costs in 2009/10. The impact of these is to increase base year costs by **£71m**.

1.18 The most material adjustment we propose to make is the steady state adjustment where we uplift the values of the heavily depreciated ISDN30 assets (line-cards and access electronics) in order to base the proposed controls on the costs of a hypothetical on-going network at steady state. The impact of this adjustment is to increase base year costs **£71.2m**.

We have forecasts costs to 2013/14

1.19 Having identified the base year costs for wholesale ISDN30 services, we propose to forecast these to 2013/14 using a range of assumptions which include the following:

- **Volume forecasts.** We have forecast volumes for core wholesale ISDN30 rental, connection and transfer services. Our preliminary view is that the volumes of the core rental product will decline by around 19% by 2013/14.

- **Efficiency gains.** As part of the WLR/LLU charge controls[5], we have estimated the target efficiency gains for Openreach as a whole to be within the range 3.5% to 5.5%. We propose to use the same efficiency range for wholesale ISDN30 services.

- **Openreach's WACC for wholesale ISDN30 services**. We are of the view that wholesale ISDN30 services should be classified within BT's core network for the purposes of an assessment of risk levels and should be subject to the "rest of BT" rate. The range for the rest of BT rate as proposed in the WBA charge control consultation[6] is 8.5% to 10.0% with a mid-point of 9.3%.

We are not proposing any one-off adjustments to starting prices

1.20 We are not proposing to make any one-off adjustments to the starting prices of wholesale ISDN30 services. This is particularly relevant for the price of wholesale ISDN30 connections and transfer services which are currently below Openreach's indicative estimates of the long-run incremental costs.

[5] We rely on the reasoning in the WLR/LLU charge control consultation for the purposes of this consultation.
http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

[6] We rely on the reasoning in the WBA charge control consultation for the purposes of this consultation.
http://stakeholders.ofcom.org.uk/consultations/wba-charge-control

1.21 In the case of wholesale ISDN30 connections we are of the view that we are not well placed to identify an optimal balance between the per-site and per-channel charges. Therefore, in the absence of any clear anti-competitive effect from these charges we do not believe that it would be appropriate to require Openreach to make any one-off adjustments to these charges. We therefore propose to allow Openreach to change relative prices within the overall basket constraint as long as there are no anti-competitive effects resulting from its charging structure.

1.22 In the case of wholesale ISDN30 transfers we do not propose to bring charges into line with FAC on the basis that it would amount to a large increase over the period of the proposed control and because we do not consider it necessary for efficiency. Such a large price adjustment would carry a risk of disruption in the market and downstream in the retail market. We are therefore consulting on two options for transfer charges:

- Option 1: apply a safe-guard cap of RPI-0%; and
- Option 2: allow charges to rise over the life of the control to a level consistent with distributed long run incremental costs (DLRIC).

We are proposing a price cap of RPI-8% to RPI-12% for the main basket of ISDN30 rentals and connections

1.23 Our proposed baskets and the ranges for the values of X are shown below. We propose a price cap of RPI-8% to RPI-12% for the main basket of rental and connection services. This range is informed by the sensitivity analysis we have conducted on key assumptions (discussed in more detail in section 5 and Annex 6).

Table 1.1 Proposed values of X for core wholesale ISDN30 services

Baskets	Services included	Proposed control	Proposed safe-guard cap
Wholesale ISDN30 Rentals & Connections	Rental per channel per year Connections - Fixed - Per channel Enhanced care services - Service Level 3 - Service Level 4	RPI-8% to RPI-12%[7]	RPI+5% (on the average connection charge) RPI-0% (on each enhanced care service)
Wholesale ISDN30 transfers	Charge per 30 channel access bearer	RPI-0%	N/A
Wholesale ISDN30 Direct Dial-In (DDI)	Wholesale ISN30 DDI - Planning - Connection per DDI - Rental per DDI	RPI-0% (on each DDI service charge)	N/A

1.24 Our proposed charge controls will ensure that the incentive for businesses to migrate to IP based alternatives in the future will be driven by the underlying characteristics of the products, rather than by ISDN30 prices which are too high. In addition:

- We have based the proposed values of X on Openreach's ISDN30 asset base which we have adjusted to reflect an on-going steady state network. This approach will ensure that the prices of wholesale ISDN30 services are not unduly depressed and will maintain the incentives for Openreach to invest in IP based technologies.

- A combined wholesale ISDN30 rental and connection basket would allow Openreach pricing flexibility such that it can adjust its prices to better meet end-user demand. At the same time, our proposed safe-guard cap of RPI+5% on the average connection price will ensure that end-users are protected against excessive increases in the price of these services.

- Around 25% of Openreach customers use enhanced care services, which highlights the importance of these products to them. Unlike WLR services, we have no evidence confirming that the standard care product (which is part of the core wholesale ISDN30 rental product) would constrain the price of enhanced care services. Therefore our proposal is to include these services in the wholesale ISDN30 connections and rentals basket. Our approach will ensure that Openreach has the right incentives to set the relative prices of these services in an efficient manner, whilst protecting customers against excessive increases in prices.

[7] Note that the price cap for the first year will be modified to take account of the fact that the control will come into effect after the 1 April 2011 i.e. part way through the charge control year. This is explained in more detail in section 6.

- Direct Dial-in (DDI) is purchased almost on a one-to-one basis with wholesale ISDN30 rental services. Our proposal to subject each DDI charge to an RPI-0% safe-guard cap will limit Openreach's incentive to recoup lost revenues in core ISDN30 rental services via increases in these charges.

Consultation

1.25 Comments on the issues set out in this consultation are sought by **10 June 2011**. We would be particularly interested in views on the assumptions and analysis set out in sections 3, 4 and 5. Subject to respondents' views, we would then aim to publish a statement in the summer and implement the proposed charge controls shortly thereafter.

Section 2

Introduction

Scope of this consultation

2.1 This consultation considers the costs and charges of wholesale ISDN30 and sets out Ofcom's proposals to regulate Openreach's prices for wholesale ISDN30 services.

2.2 We have recently carried out a market review of retail and wholesale ISDN30 services (the Market Review)[8] and found, among other things, that Openreach had significant market power (SMP) in the provision of wholesale ISDN30 services. The Market Review also identified that:

- Openreach maintained a high and stable market share in the provision of wholesale ISDN30 services (71%);
- There was limited demand- and supply-side substitution; and
- Openreach's profitability as reported in BT's regulatory financial statements (RFSs) for 2008/09[9] was a 74.3% return on capital employed (ROCE).

2.3 The Market Review imposed a number of regulatory remedies on Openreach which included the requirement to provide wholesale ISDN30 services on terms which do not discriminate unduly between downstream OCPs, including downstream BT businesses.

2.4 The Market Review also concluded provisionally that Openreach's returns were, at first view, excessive and that, although price regulation appeared appropriate, we needed to explore this further to understand whether Openreach's costs and therefore charges were reasonable. This consultation sets out our provisional conclusions and proposals to regulate the pricing of wholesale ISDN30 services.

ISDN30 can be provided in a number of ways

2.5 ISDN30 is a BT product name for ISDN Primary Rate Interface (ISDN PRI) which is a digital telephone line service that provides up to 30 lines over a common digital bearer circuit. These lines support a wide range of services including basic telephony with additional features to those available on analogue exchange lines, and data services.

2.6 ISDN30 is used exclusively by businesses and is most commonly used to provide exchange line connectivity to on-site Private Branch Exchanges (PBXs). ISDN30 is generally used by businesses with a need for 8 or more lines at a particular site.

2.7 From a technical perspective, ISDN30 consists of two main components:

- a 2 Mbit/s digital bearer circuit connecting the customer premises to the exchange; and

[8] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/statement/statement.pdf

[9] http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2009/CurrentCostFinancialStatements.pdf

- call control and switching functions provided by the exchange.

2.8 Digital bearer circuits are normally provided over optical fibre cables or copper cables using a variety of transmission technologies (e.g. High bit-rate Digital Subscriber Line (HDSL) over copper or Synchronous Digital Hierarchy (SDH) over fibre). Exceptionally in remote locations point-to-point microwave links are sometimes used to provide digital bearer circuits.

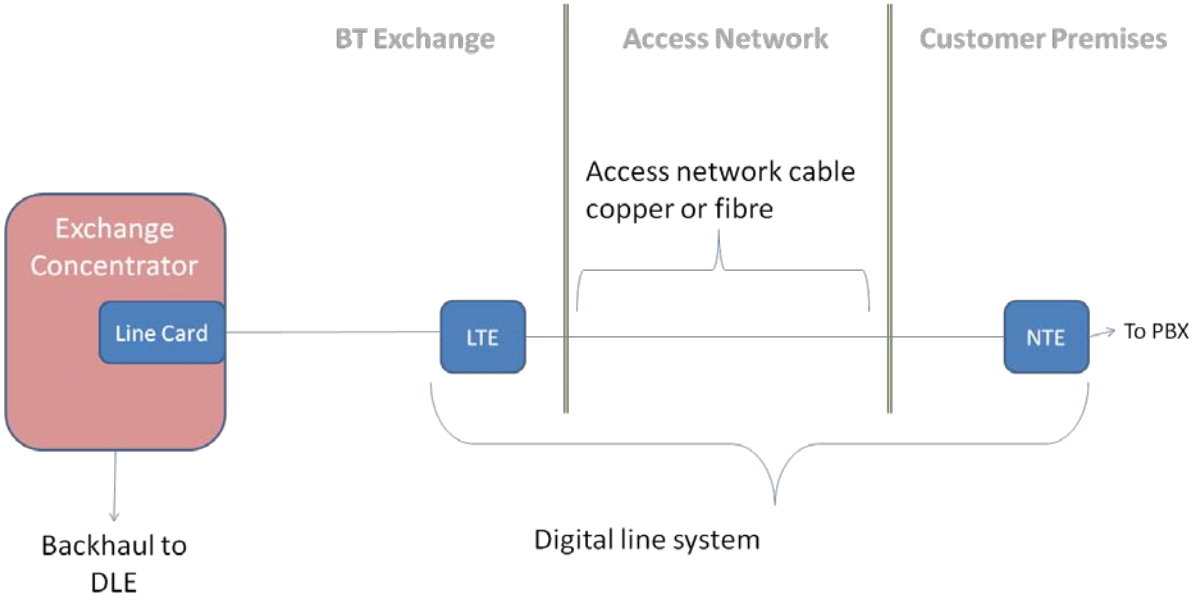
2.9 The call control and switching functions are generally provided by Time Division Multiplexing (TDM) based exchange equipment such as System X and AXE10 as used by BT and other operators. With these systems, the bearer circuit is connected to an ISDN PRI line-card in a Remote Concentrator Unit (RCU). The RCU concentrates traffic from a group of lines for transmission to a local exchange processor which provides the switching functionality (called a Digital Local Exchange (DLE) in BT's network).

2.10 Most of BT's exchanges are equipped with System X or AXE10 equipment (which support ISDN PRI services) and therefore most BT ISDN30 services are provided from an RCU housed at the local exchange with a short-range digital bearer circuit connecting the customer premises to the exchange (i.e. within the local exchange area). In a small minority of cases, ISDN30 services are provided from exchange concentrators that are located in remote exchanges rather than the serving exchange.[10]

2.11 OCPs also provide ISDN PRI services. Generally OCPs provide bearer circuits over their own access networks where possible or they rent Partial Private Circuits (PPCs) from BT for sites that are not connected to their access networks. It is also possible for OCPs to provide bearer circuits for ISDN PRI services over BT's access network using Metallic Path Facilities (MPF), however we are not aware of any OCPs providing ISDN30 services in this way.

[10] See Annex 5 for a discussion of the reasons.

Figure 2.1 ISDN30 Service Provision



Line Terminating Equipment (LTE): transmission equipment sometimes including a multiplexing function.

Network Terminating Equipment (NTE): transmission equipment located at the customer premises. Performs similar function to LTE and also provides the customer interface.

Exchange Concentrator: provides line interface and traffic concentration.

2.12 We have provided a more detailed description of each of these components in Annex 5.

We have set our proposals in light of the legal framework

2.13 This consultation follows the Market Review which concluded on 20 August 2010. As part of the 2010 ISDN30 market review process, on 4 May 2010 we published a consultation document (the Market Review Consultation)[11], where at Annex 7 (entitled "Market review process") we set out an overview of the market review process, including the imposition of remedies, to provide appropriate context and understanding to the matters discussed in that review.

2.14 This consultation does not seek to repeat all of the information provided in that annex, which remains relevant to understanding the context for the proposed charge control for wholesale ISDN30 services.

2.15 This review does, however, consider each of the relevant legal tests that apply when imposing a charge control as an SMP condition under section 87(9) of the Act. In particular, in section 5, we set out our reasoning as to why we consider our proposed charge control condition meets each of those relevant tests.

2.16 Firstly, section 88 of the Act prohibits the setting of SMP conditions under section 87(9) of the Act except where it appears, from the market analysis, that there is a relevant risk of adverse effects arising from price distortion; and it appears that the setting of the condition is appropriate for the purposes of promoting efficiency,

[11] http://stakeholders.ofcom.org.uk/consultations/isdn30/

promoting sustainable competition and conferring the greatest possible benefits on end users. We are also required to take into account the extent of Openreach's investment in wholesale ISDN30.

2.17 Secondly, we consider whether the proposed condition meets the test set out at section 47 of the Act. In summary, section 47 requires that any SMP condition must not be imposed unless it is:

- objectively justifiable in relation to the services to which it relates;
- not such as to discriminate unduly against particular persons;
- proportionate to what the condition is intended to achieve; and
- in relation to what it is intended to achieve, transparent.

2.18 Thirdly, we need to ensure that the condition proposed remains consistent with our general duties under section 3 of the Act and our duties for the purpose of fulfilling our Community obligations as set out under section 4 of the Act.

2.19 Under section 3, our principal duty in carrying out functions is to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition.

2.20 In so doing, we are required to secure a number of specific objectives and to have regard to a number of matters set out in section 3 of the Act. As to the prescribed specific statutory objectives in section 3(2), we considered in the Market Review Consultation that the objective of securing the availability throughout the UK of a wide range of electronic communications services was particularly relevant to the market review, and therefore to the proposed regulation in this review.

2.21 In performing our duties, we are also required to have regard to a range of other considerations, as appear to us to be relevant in the circumstances. In the Market Review Consultation, we considered that a number of such considerations were relevant to the market review, namely the desirability of promoting competition in relevant markets and the desirability of encouraging investment and innovation in relevant markets.

2.22 Section 4 of the Act requires us to act in accordance with six European Community requirements for regulation. In the Market Review Consultation, we considered that the first and fifth of those requirements were of particular relevance to the market review, namely to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories and to encourage, to such extent as Ofcom considers appropriate for certain prescribed purposes, the provision of network access and service interoperability, namely securing efficient and sustainable competition and the maximum benefit for customers of communications providers.

2.23 We also considered that no conflict arose in this regard with those specific objectives in section 3 that we consider are particularly relevant in this context.

We have taken into account a number of policy objectives when developing our proposals

2.24 Our specific policy objectives in proposing the charge controls for wholesale ISDN30 services are:

- to prevent Openreach from setting excessive charges for wholesale ISDN30 markets where it has SMP while providing incentives for it to increase its efficiency;
- to ensure that Openreach still has incentives to maintain service quality, investment and innovation in the provision of wholesale ISDN30 services;
- to promote efficient and sustainable competition in the delivery of wholesale ISDN30 services and such replacement services as may emerge in future, in particular to ensure that there is no distortion between such markets;
- to ensure that competition and investment and innovation are not distorted in related markets (such as those for IP products);
- to provide regulatory certainty for Openreach and its customers and to avoid undue disruption; and
- to ensure that the delivery of the regulated services is sustainable, in that the charge controls allow Openreach opportunity to recover all of its relevant costs (where efficiently incurred), including its cost of capital.

2.25 We have adopted these policy objectives when developing our charge control proposals.

We have taken into account our policy proposals in other markets

LLU and WLR charge controls

2.26 On 31 March 2011 we published a consultation document containing our proposals for new charge controls for Local Loop Unbundling (LLU) and Wholesale Line Rental (WLR) services to replace the existing controls which will expire on 31 March 2011.[12]

2.27 There are a number of links between the WLR/LLU charge control consultation document and our proposals for ISDN30:

- In order to assess the costs of WLR/LLU products, we have used two models to establish base year costs and forecast these to 2013/14 for all Openreach services. As wholesale ISDN30 services are provided by Openreach, we have used the models developed for the WLR/LLU charge controls as our starting point when establishing the costs of these services.
- As part of the WLR/LLU charge controls we have reviewed BT's valuation methodology of its duct assets and considered alternative valuation methodologies. We have reflected the same policy position when establishing the base year costs for wholesale ISDN30 services.

[12] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

- In the WLR/LLU charge controls we have proposed forward looking efficiency savings of 3.5% to 5.5% for Openreach as a whole. We propose to apply the same range for wholesale ISDN30 services.

2.28 We rely, as necessary, on the reasoning in the WLR/LLU charge control consultation for the purposes of this consultation. Throughout this consultation document we provide references to the WLR/LLU charge control consultation document where appropriate.

Wholesale Broadband Access charge controls

2.29 We have also published a consultation document on the Wholesale Broadband Access (WBA) charge controls which summarises our proposals in relation to the charge control framework for BT's WBA products.[13] In the WBA charge control consultation we have also set out our latest estimates of BT's weighted average cost of capital (WACC). We have estimated two rates, one to apply to the copper access services provided by Openreach and one to apply to the "rest of BT". We have used the proposed amended cost of capital for the "rest of BT" to estimate some elements of ISDN30 costs and we rely on the reasoning in the WLR/LLU charge control consultation for the purposes of this consultation. We discuss the reasons for this approach in section 5 and in more detail in Annex 7.

We have taken into account our policy on model disclosure

2.30 In developing our proposals for the ISDN30 charge controls explained in this document, we have considered carefully the confidential nature of certain of the data which inform our proposals and the need to ensure appropriate transparency, including in relation to the financial modelling of our proposals. We have also taken full account of Ofcom's '*Framework for Disclosure of Charge Control Models*' (the Framework) published in October 2010.[14]

2.31 In our review we have used and relied upon a number of different models:

- Models used in WLR/LLU charge controls (the Ofcom models)
  - The Cost Forecast model;
  - The RAV model; and
  - The Cost Allocation model.
- Models specific to and developed for this charge control (the ISDN30 models)
  - The Steady State model;
  - The Volumes Forecast model;
  - The Switching model; and
  - The Incremental Cost model.

[13] http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf
[14] http://stakeholders.ofcom.org.uk/binaries/consultations/784024/Charge_control.pdf.

2.32 The models used in the WLR/LLU charge controls forecast and allocate Openreach's cost and are therefore "common" to both that review and to this review. The disclosure of these models is explained in detail in section 6 of the WLR/LLU charge control consultation and certain modelling will be made available in a non-confidential form as part of that review.

2.33 The ISDN30 specific models are specific to this review, with each model aiding our analysis. We discuss the Steady State model at Annex 6, the Volumes Forecast model at Annex 8, the Switching model at Annex 9 and the Incremental Cost model at Annex 10.

2.34 The modelling undertaken as part of this review contains data supplied by Openreach and OCPs with respect to their businesses, who provide ISDN30 services which has been obtained under the Act. There is a general restriction on Ofcom disclosing such information without consent unless an exception applies[15]. Consequently, we have engaged closely with Openreach and those CPs in relation to model disclosure to obtain consent to allow underlying data to be disclosed, including testing assertions on confidentiality. However, as the models contain detailed data, much of which is commercially confidential or, in some cases, outside the scope of these charge control reviews, we have not been able to obtain consent to disclose certain data underlying the models.

2.35 One of the exceptions under the Act permits Ofcom to disclose data without consent for the purpose of facilitating the carrying out of its functions, including its functions as to consultation.[16] In light of the level of disclosure consented to by Openreach and OCPs, Ofcom has considered whether any further disclosure is required, including considering whether confidentiality concerns can be addressed by masking and/or aggregating data. We consider that, in relation to the ISDN30 specific models, as they relate to very specific issues within the overall review, and given the qualitative explanation that we have been able to provide about the purpose and function of each model, no further disclosure is required.

Steady State model

2.36 As described in Annex 6, this model shows our adjustment to NRC/GRC ratios as part of developing a "steady state" ISDN30 network. We have discussed the content of the data with Openreach, and they have indicated that certain data is commercially confidential. They have consented to the publication of other data. We do not think it would be appropriate to publish the full model as we accept that some data is confidential, and we are able to sufficiently describe our process for stakeholders to appropriately consider and respond to this aspect of the consultation. We have considered whether any data could be aggregated or partially removed. In this model, we considered that this would not be appropriate as to retain a meaningful level of data would still place confidential data at risk of disclosure through, for example, reverse engineering of the model. Therefore, we consider it appropriate to publish a "stripped out" version of the model alongside a qualitative explanation which sets some of the data that Openreach has agreed to publish. We consider that this approach will allow stakeholders to understand our methodology and, with the explanation, understand key data that drives the results.

[15] Section 393 of the Act.
[16] Section 393(2)(a) of the Act.

Volume Forecast model

2.37 As described in Annex 8, this model forecasts volumes for ISDN30 rentals, connections and transfers for the duration of the proposed control. The data we have used comes from various sources, including stakeholder forecasts that are confidential, in that they take into account current volume levels. We have liaised with these stakeholders and they have consented for their forecast data to be presented in the form of a range. We consider that this allows the model to be published in a form that will allow stakeholders to understand our methodology and the input data from which we derive our conclusions.

Switching model

2.38 As described in Annex 9, this model considers the effect of our charge control proposals on the choice of provision of ISDN30. This model contains data from a number of OCPs who have indicated that certain aspects of this data are commercially confidential. We do not think it would be appropriate to publish the full model as we accept that some data is confidential, and we consider that a redacted model will allow stakeholders to appropriately consider and respond to this aspect of the consultation. In particular we have agreed with stakeholders that certain confidential data can be aggregated in such a way as to preserve confidentiality.

Incremental Cost model

2.39 As described in Annex 10, this model considers the difference in incremental costs of wholesale ISDN30 and PPCs, given that ISDN30 provision over PPCs is an alternative to the purchase of Openreach's WLR product. This model's data derives from Openreach submissions that are very similar to the ones used in the WLR/LLU models to derive ISDN30 costs, and therefore its disclosure is in part, tied to the disclosure of those models. We have separately considered, with Openreach, whether the other data that we have used in the model, including that relating to 2Mbit/s PPC costs. Openreach have indicated that ePPC data, which is not otherwise published, is confidential. We consider that it would not be possible to meaningfully aggregate this data, nor would it be possible to remove this data. However, we consider that it would be appropriate to publish a "stripped out" version of the model alongside a qualitative explanation which quotes some of the data that Openreach has consented to publish. As this comparison is not an input into the control itself, but a cross check on the incremental cost difference of services, we consider that it is important for stakeholders to understand our methodology in making that comparison, and that this approach will allow a full understanding of our approach.

2.40 We believe that our methodology ensures that stakeholders are able to respond effectively to this consultation. We believe that we have properly and appropriately taken account of stakeholder's positions on confidentiality of data for the purpose of disclosure of data in this consultation and in the models we have published with this consultation and intend to publish in the next few weeks.

Impact assessment

2.41 The analysis presented in this document represents an impact assessment, as defined in section 7 of the Act. In sections 3, 4 and 5 we discuss all of the relevant considerations and options that we have considered, including their impact.

2.42 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making. This is reflected in section 7 of the Act, which requires Ofcom to carry out impact assessments where its proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. However, as a matter of policy Ofcom is committed to carrying out and publishing impact assessments in relation to the great majority of its policy decisions. For further information about Ofcom's approach to impact assessments, see the guidelines, *Better policy-making: Ofcom's approach to impact assessment*, which are on the Ofcom website.[17]

2.43 Specifically, pursuant to section 7of the Act, an impact assessment must set out how, in our opinion, the performance of our general duties (within the meaning of section 3 of the Act) is secured or furthered by or in relation to what we propose.

Equality Impact Assessment

2.44 Ofcom is separately required by statute to assess the potential impact of all our functions, policies, projects and practices on race, disability and gender equality. Equality impact assessments (EIAs) also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity. Unless we otherwise state in this document, it is not apparent to us that the outcome of our review is likely to have any particular impact on race, disability and gender equality. Specifically, we do not envisage the impact of any outcome to be to the detriment of any group of society.

2.45 Nor are we envisaging any need to carry out separate EIAs in relation to race or gender equality or equality schemes under the Northern Ireland and Disability Equality Schemes. This is because we anticipate that our regulatory intervention will affect all industry stakeholders equally and will not have a differential impact in relation to people of different gender or ethnicity, on consumers in Northern Ireland or on disabled consumers compared to consumers in general. Similarly, we are not envisaging making a distinction between consumers in different parts of the UK or between consumers on low incomes. Again, we believe that our intervention will not have a particular effect on one group of consumers over another.

Outline of the rest of this document

2.46 The rest of the main part of this document is structured as follows:

- Section 3 – considers the profitability of wholesale ISDN30 services and sets out our provisional conclusions on the reasonableness of Openreach's returns;
- Section 4 –sets out the economic principles which underpin the charge control framework for wholesale ISDN30 services;
- Section 5 – sets out the details of our proposed charge control framework for wholesale ISDN30 services and in particular our forecasts of costs going forward; and
- Section 6 – sets out the way in which we would implement our proposals.

[17] http://www.ofcom.org.uk/about/policies-and-guidelines/better-policy-making-ofcoms-approach-to-impact-assessment/

2.47 The draft legal instruments to implement the decisions set out in this document are set out in Annex 12. The other annexes set out in further detail our analysis in support of the proposals we have set out in sections 3 to 6. We intend to publish the financial models which contain details of our analysis in the next few weeks.

Section 3

Assessment of charge control

Introduction

3.1 The Market Review concluded that, on the evidence available at that time, there was a relevant risk of adverse effects arising from price distortion and therefore the imposition of a price control was appropriate.[18] In this document, having undertaken a full cost analysis, we are consulting on the form of price control that would be appropriate and proportionate in accordance with the relevant legal tests. In order to assess the form of price control this review has:

- assessed Openreach's profitability for wholesale ISDN30 services; and
- taken into account the competitive conditions in the wholesale and retail ISDN30 markets.

Our proposals

3.2 We recognise that Openreach's key ISDN30 assets (line-cards and access electronics) are heavily depreciated. As a result, the reported return of capital employed (ROCE) may appear relatively high even if prices are not above a reasonable level, simply because the accounting value of the asset base is below its economic value, or its value in a steady state. This must be taken into account when interpreting Openreach's reported ROCE. We therefore propose to adjust the value of these assets to reflect an on-going network at steady state by uplifting their net replacement cost (NRC) so that it is equal to 47% of the gross replacement cost (GRC).

3.3 We propose that a return of capital employed (ROCE) based on Openreach's adjusted ISDN30 asset base is the most appropriate measure to assess its profitability. Based on these proposals, we estimate that the adjusted ROCE on ISDN30 rentals in 2009/10 would have been 24%.

3.4 We also propose that an RPI-X type charge control on core wholesale ISDN30 services is appropriate at this stage of the product's life. This is because:

- Openreach's adjusted ROCE of 24% in 2009/10 is well in excess of the relevant weighted average cost of capital (WACC) of 11%[19] for that year signalling that the price is likely to be above the competitive level; and
- switching to IP based alternatives, competition from OCPs using alternative infrastructure or other regulated wholesale inputs are unlikely to force Openreach to reduce the price of wholesale ISDN30 services to the competitive level in the forward look period to 2013/14.

[18] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/statement/statement.pdf

[19] We believe that the appropriate cost of capital for ISDN30 services is the "rest of BT rate". For a full discussion see Annex 7 of this document. Table A7.1 shows our previous and revised estimates of the cost of capital for BT Group and the disaggregated estimates for copper access services and the rest of BT.

3.5 An RPI-X glide-path is intended to approximate to the workings of a competitive market in which excess profits are gradually eroded and will therefore substitute for the missing competitive pressure which would otherwise have brought wholesale ISDN30 prices into line with costs.

We estimate that Openreach's adjusted ROCE for wholesale ISDN30 rental services in 2009/10 was 24%

Some ISDN30 assets are heavily depreciated and this results in a distorted estimate of the profitability for wholesale ISDN30 services

3.6 The first step in assessing the form of price control for wholesale ISDN30 services is to determine Openreach's past profitability for these services. BT's regulatory financial statements (RFS) report a ROCE in 2009/10 of 62.1% for core wholesale ISDN30 services (excluding the impact of BT's re-valuation of duct).[20]

3.7 The key assets used in the provision of wholesale ISDN30 services are heavily depreciated, in particular:

- ISDN30 line-cards (with an NRC/GRC[21] ratio of 8% in 2009/10); and
- Access Electronics (with a NRC/GRC ratio of 13% in 2009/10).

3.8 In general, the value of an asset's annual depreciation is a function of the asset's initial value and the expected lifetime over which this initial value is depreciated. Therefore, depreciation depends crucially on accounting rules about asset lifetimes that were determined at the time when the product was introduced. If an asset's accounting life is shorter than its economic life, then the asset may remain in use even when its value has been fully depreciated. When this occurs, the asset's accounting value (i.e. its GRC minus the accumulated depreciation) reflected in the mean capital employed (MCE), may underestimate its true economic value.

3.9 In addition, where a product is close to the end of its life, Openreach may not be replacing network assets. In this situation it may be more economic to continue to use old assets rather than replacing them for what may be a short time period. This means that capital expenditure is likely to be lower than we would expect for a product in a steady state. This again means that the MCE would be lower than may otherwise be expected. It may also be the case that operating costs may be higher due to the additional cost of maintaining ageing assets.

3.10 In these cases, assessing the profitability of a service using ROCE (which measures the return – earnings before interest and tax – divided by the MCE) may overstate the true profitability of the service in question. In light of the above, we need to determine how best to estimate the underlying returns for the core wholesale ISDN30 services when these are provided over a network whose assets have been heavily depreciated. We discuss the different approaches considered in turn below.

[20] The reported profitability including BT's revaluation of duct and copper is 69.7% including the re-valuation of duct gives rise to a holding gain which increases BT's overall profits in 2009/10.
[21] Net Replacement Cost to Gross Replacement Cost ratio.

We propose to assess Openreach's profitability for wholesale ISDN30 services using the adjusted ROCE approach

3.11 Openreach's submissions to the Market Review highlighted that ISDN30 services had been introduced in 1986 and since then the underlying assets (access electronics and line-cards) have been subject to significant depreciation or completely written down in the accounts. It argued that in these circumstances accounting measures such as ROCE would be inappropriate to assess the profitability of these services. Instead, it suggested that we should use the internal rate of return (IRR) to assess the profitability of ISDN30 services over the lifetime of these products.

3.12 Below we discuss the different approaches we could use to assess the profitability of wholesale ISDN30 services, which are:

- internal rate of return (IRR);
- truncated IRR,
- return on sales (ROS); and
- adjusted ROCE.

Sole reliance on IRR is not appropriate

3.13 In its response to the Market Review, Openreach and its consultants dot.econ[22] submitted that, due to the depreciated nature of some of its assets, wholesale ISDN30 services were an ideal candidate for the use of lifetime profitability measures such as the IRR or the net present value (NPV). In their view, both of these approaches were superior to ROCE as they were not affected by accounting conventions.

3.14 ✂

3.15 We agree with Openreach that when accounting rules do not correctly predict the economic life of an asset, the accounting value of the asset may underestimate its effective economic value. In these cases, using an accounting measure of profitability such as ROCE may distort the true profitability of the service that uses those assets. Openreach and dot.econ propose to address this through the use of IRR or NPV, which measure the profitability of a service over its lifetime.

3.16 IRR and NPV are the most common measures of profitability used by businesses when deciding where to make their investments. They are both calculated using information on the cash outflows (investments and operating expenditure) and inflows (revenues) generated by an activity over its lifespan. The IRR is the discount rate that would yield an NPV equal to zero, while the NPV calculates the expected return of an activity over its life for a given discount rate. When deciding whether to invest in an activity, the expected IRR can be compared to the cost of capital of that activity. If the expected IRR is higher than the cost of capital, investing in that activity is expected *ex-ante* to generate economic profits. On the other hand, if the *ex-post*

[22] Dot.econ Ltd prepared a report for Openreach which they submitted as part of Openreach's response to the Market Review. http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/responses/Openreach_DotEcon_Ltd.pdf

IRR is below the cost of capital, returns from that investment are not sufficient to compensate for the returns that would have been obtained by investing in an alternative activity.[23]

3.17 However, where there is insufficient data available for periods of an asset's lifetime, assumptions need to be made and the IRR calculation is highly dependent on the assumptions used (especially if these are made in the earlier periods of an activity). Further, because of the discounting inherent in the IRR formula, cash flows at the latter stages of a project (which are subject to higher discounting) will have relatively little impact on the IRR. Therefore a possible charge control in the later stages of an activity will have a relatively small impact on these cash flows and the resulting IRR. We consider that both of these issues are relevant to the ISDN30 market, in particular we do not believe that the possible imposition of a charge control at this stage of the product's life will have a (material) impact on any IRR calculation in relation to ISDN30 services.

3.18 Therefore, we consider that, if we used IRR to assess Openreach's profitability for ISDN30 services, this could allow it to significantly increase its charges for this product towards the end of its life, with a relatively small impact on its IRR. In this case, a customer taking up the service now might have to pay substantially above the cost of providing the service.

3.19 Openreach also argued that when a product, such as ISDN30, is nearing the end of its economic life it would have a shorter time frame during which to recover any additional investment made to meet new demand.

3.20 However, it appears unlikely that Openreach will in fact require any significant capital expenditure to support wholesale ISDN30 services during the charge control period and beyond. In the past, Openreach has served in excess of 2.2m ISDN30 channels on its network and the current volume of channels is less than 2m. With demand expected to decline in the future, it is reasonable to assume that Openreach will be able to serve new demand without significant capital outlay, using current and returned equipment. In addition, Openreach has indicated to us that the main capital assets used in the provision of ISDN30 services (line-cards and concentrators) are no longer in manufacture and that to serve new demand it is currently re-using its existing stock.[24]

3.21 Because our forecasts are based on the assumption of a hypothetical ongoing network starting from a steady state, our projections allow for a higher level of capital expenditure, consistent with maintaining such a network. These are based on a steady state level of capital expenditure which is adjusted downwards to allow for the expected decline in ISDN30 volumes, consistent with our forecasts. This is discussed in more detail in Annex 6.[25]

[23] See Oxera, *Assessing profitability in competition policy analysis*, OFT Economic Discussion Paper 6, July 2003, pages 32 - 42, available at: http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft657.pdf

[24] ✂

[25] For the avoidance of doubt we replace Openreach's capital expenditure forecasts with our own revised forecasts.

Truncated IRR is not appropriate for determining lifetime profitability of a service

3.22 The truncated IRR can be used to calculate the profitability of an activity over a limited period. The truncated IRR is calculated using data over a relatively short period of time (compared to the entire lifetime of an activity in the case of the standard IRR). Additionally, it only requires estimates of asset values at the start (opening) and end (terminal) dates of the period considered. The opening asset value is treated as an initial investment at the start of the period, whilst the terminal value is in effect assumed to be realised at the end of the period.

3.23 Truncated IRR is particularly suitable when accurate information on past cash flows and asset values exist. However, when such data is not readily available, this methodology has been considered to be less adequate.[26]

3.24 In order to calculate the truncated IRR for wholesale ISDN30 services, we would need to estimate both the opening and terminal values for the underlying assets. IRR calculations can vary widely depending on the assumptions used, particularly in the case of the truncated IRR where we need to make assumptions regarding the terminal value of assets which would be difficult to determine.[27]

ROS is only appropriate to determine returns of services with low levels of capital employed

3.25 The use of ROCE as a measure of profitability may not be appropriate in all circumstances, particularly in the case of activities, such as retail services, that inherently require relatively little physical or working capital. A frequently used alternative in such circumstances is Return on Sales (ROS), which measures profits as a proportion of sales revenue. ROCE is generally considered to have greater economic significance than ROS, which has the disadvantage that there is no theoretical benchmark with which to compare it.[28]

3.26 We do not think ROS would be an appropriate measure to assess the profitability of a wholesale service such as ISDN30. To the extent that capital employed in ISDN30 appears low, this is only because some of its key assets are heavily depreciated, whereas, in fact, the capital investment required to supply wholesale ISDN30 services is inherently high.

3.27 The use of the ROS would also imply a deviation from our past practice that, considering the limitations discussed above, would not be justified.[29]

The adjusted ROCE approach is most appropriate to determine the profitability of wholesale ISDN30 services

3.28 As we noted above, the assets used in the provision of ISDN30 are heavily depreciated, even though they remain in use and may do so for some time to come. The accounting value – the NRC – of these assets is then significantly less than their economic value. Some assets may even be fully depreciated and have an accounting

[26] See Oxera, *Assessing profitability in competition policy analysis*, OFT Economic Discussion Paper 6, July 2003, page 4, available at:
http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft657.pdf
[27] ✂
[28] In the case of ROCE, the relevant benchmark is the weighted average cost of capital.
[29] Based on BT's RFSs, the ROS for aggregate ISDN30 services is 58% excluding the gain from the BT's upward revaluation of its duct assets.

value of zero. A simple calculation of the ROCE, based on asset values in the accounts will therefore result in an overstatement of profitability. It is however possible to make a more meaningful estimate of profitability by adjusting the NRC of the assets so that they approximate their steady state values more closely. We can then recalculate the ROCE using these steady state asset values.

3.29 Calculating an adjusted ROCE in this way is a simple alternative to the IRR approach which addresses the issues caused by the use of heavily depreciated assets without the drawbacks of IRR. In particular, we do not need to make assumptions about cost and revenues in the far future or distant past to calculate an adjusted ROCE.

3.30 In more detail, the steady state adjustment is as follows. In the steady state, with volumes roughly constant over time, an asset will on average be half way through its economic life. If the accounting and economic lives are equal and we assume straight line depreciation, in the steady state the NRC/GRC ratio should be around 0.5. However, when the assumed asset life does not accurately reflect its economic life, the asset's accounting value differs from its true economic value. In particular, if the accounting asset life is shorter than the economic life, assets are likely to remain in use after they have been fully depreciated and their value in the accounts (i.e. NRC) is zero. On average, assets are also likely to be more than half-way through their accounting lives and this means that (with straight-line depreciation) the average NRC/GRC ratio will be less than 50%. So if asset accounting lives are excessively "prudent", one will observe NRC/GRC ratios of less than 50%, sometimes significantly so, and accounting asset values which are less than their true economic or steady state values. The accounting value of the assets would not then be a good basis for making cost projections for a hypothetical ongoing network, as it would understate the value of the investment required to maintain such a network. This problem can be addressed by uplifting the asset's accounting value so that its ratio of NRC to GRC reflects the accounting value of an asset in steady state.

3.31 We therefore bring accounting asset values into line with their steady state levels by means of a simple adjustment. If accounting and economic asset lives are equal, such a steady state adjustment would consist of uplifting the asset's NRC such that the NRC/GRC ratio is equal to 0.5 and adjusting the asset's depreciation based on a correct estimate of its economic life (this is further explained below).

3.32 In light of our discussion in the above paragraphs, we believe that using an adjusted ROCE to estimate the profitability of wholesale ISDN30 services is the most appropriate approach. We believe that such a steady state adjustment would address Openreach's concerns that wholesale ISDN30 assets are heavily depreciated due to the fact that they are nearing the end of their accounting lives, and are not an appropriate basis for projecting the costs of a steady state network. Theoretically, in steady state, we would also expect IRR and ROCE to produce broadly the same answer.[30]

3.33 In the paragraphs below we consider some of the practical issues related to the calculation of an adjusted ROCE for wholesale ISDN30 services.

[30] See Ofcom, *Pay TV phase three document – Proposed remedies*, 26 June 2009, paragraph 6.188, available at:
http://stakeholders.ofcom.org.uk/binaries/consultations/third_paytv/summary/paytv_condoc.pdf

We propose to calculate an adjusted ROCE for wholesale ISDN30 services by uplifting the NRC/GRC ratio of relevant assets to 47%

3.34 There are various options for calculating an adjusted ROCE to reflect a steady state level for wholesale ISDN30 services. The options we have considered are:

- Option 1: Do nothing on the grounds that Openreach have already recovered these costs in the past and therefore make no adjustment;
- Option 2: Go back to the date of the asset purchase and recalculate the depreciation and capital employed based on asset lives now known;
- Option 3: Restate the present asset values based on the assumption that a steady state prevailed on an ongoing basis (50% NRC/GRC ratio) and adjust depreciation;
- Option 4: Restate the present asset values based on another value (e.g. average NRC/GRC ratio) and adjust depreciation; and
- Option 5: Reinstate asset values or NRC/GRC ratios of a previous period where the assets were deemed to be in a steady state.

Option 1 - Do nothing

3.35 Under this option we would make no adjustment to the value of ISDN30 assets on the grounds that Openreach has already recovered the costs. Our calculations would be based on the capital employed and depreciation figures as reported in BT's RFSs. This means that our ROCE will be based on an artificially low MCE resulting from the fact that key ISDN30 assets are either heavily depreciated or completely written down in the accounts. This will in turn lead to an inflated ROCE which would not be reflective of a network in steady state.

3.36 If we then required Openreach to change its prices so that its ROCE on the depreciated ISDN30 asset base was equal to its WACC, one result would be big reductions in the price of wholesale ISDN30 services. Such big reductions in prices could, in the short-term, stimulate additional demand which could only be met by new investment. In the longer term, demand is expected to switch to newer IP based alternatives (such as SIP Trunking), meaning that such investment may be largely wasted. To put it another way, prices would be too low to allow recovery of the investment needed to meet the demand which could be created.

3.37 We therefore do not think that this option is appropriate for assessing the profitability of wholesale ISDN30 services.

Option 2 – Restate the asset values using today's information

3.38 This approach would require us to determine the date the ISDN30 assets were first purchased and then to assess the actual asset lives that have prevailed. We would then calculate the capital employed and depreciation based on the asset lives now known. We would expect this approach to result in a higher NRC/GRC ratio for ISDN30 assets than the one in BT's RFSs in 2009/10, but not as high as 50%. In addition, assets which are currently fully depreciated in BT's accounts would, under this option, attract a depreciation charge, albeit at a lower rate than the one originally included in BT's RFSs.

3.39 In theory, this could be an appropriate adjustment. However, there is insufficient information for us to identify accurately when the assets were first purchased. An assumption about asset lives could be made, but this approach would still be reliant upon accurate information about asset lives, and therefore would not be a practicable alternative to recalculate the ISDN30 asset base.

Option 3 - Restate the asset values to reflect steady state (NRC/GRC of 50%)

3.40 As discussed above, in a steady state with continued reinvestment, we would expect the NRC/GRC ratio of ISDN30 assets to be around 50%. We could therefore approximate a steady state by increasing the NRC of the relevant depreciated ISDN30 assets to 50% of their GRC. We would then calculate the capital employed and depreciation based on the new NRC values.

3.41 To approximate the steady state we would also have to adjust depreciation. BT's accounting depreciation is less than its steady state level as many of the assets are fully depreciated but still in use (and therefore included in BT's estimate of the relevant GRC). We therefore recalculate depreciation by dividing the GRC by an appropriate asset life assumption.

3.42 In order to implement this approach we would need to adjust the implied asset lives for ISDN30 line-cards and access electronics using one of the approaches listed below:

- Use Openreach's assumed accounting asset lives[31] (10 years for line-cards and 5 years for access electronics);
- Use an approximation to the actual lives of these assets; or
- Use the depreciation figure from BT's RFSs which is consistent with an NRC/GRC ratio of 50%.

3.43 Out of the three approaches proposed above, we consider that using Openreach's assumed accounting lives (for ISDN30 specific line-cards and access electronics) is most appropriate for wholesale ISDN30 services. This is because, although the accounting asset lives have been prudent compared to the actual lives of these assets in the past, it is reasonable to assume that the remaining useful economic lives will be shorter because of the expected migration to IP services. Going forward, we consider that the economic and the accounting lives of the underlying assets are likely to be similar. In addition, this approach is relatively simple to implement and is based on financial data which can be reconciled to BT's RFSs.

3.44 On the other hand, we do not have sufficient reliable data from Openreach to either assess the actual asset lives or the depreciation level in BT's RFSs at a time when the NRC/GRC ratio was 50%.

Option 4 - Restate the asset values based on the NRC/GRC ratio of ISDN30 assets which are in steady state

3.45 It could be argued that an NRC/GRC ratio of 50% is too high. One way of obtaining an indication of a typical steady state NRC/GRC ratio would be to use the NRC/GRC

[31] The assets within the ISDN30 asset base have been subject to different accounting asset life assumptions, however we consider that the approximate accounting asset lives above represent reasonable proxies.

ratio of the remaining ISDN30 assets (i.e. other than the heavily depreciated line-cards and access electronics) which could be regarded as being in steady state.

3.46 We have estimated this ratio using the Ofcom models. The NRC/GRC ratio of the remaining ISDN30 assets is 47%, which is not significantly different from 50% in any case. If we chose to implement this option, we would then need to follow a similar approach to Option 3 which we have discussed above. First, we would increase the NRC of the relevant depreciated ISDN30 assets to 47% of their GRC and then recalculate the relevant depreciation by dividing their GRC by Openreach's assumed accounting asset lives (10 years for line-cards and 5 years for access electronics).

Option 5 – Restate asset values by using a previous steady state

3.47 Under this approach we would need to identify a period in time where the relevant assets were in steady state and then use the GRC, NRC and depreciation figures from BT's RFSs for that year. This approach has been implemented in the past, for example in the Network Charge Controls (NCC) which amended the GRC and NRC to those in the previous charge control period (with additional adjustments for volumes and efficiency).[32]

3.48 This approach can only be implemented where a previous period can be identified as a steady state and the relevant financial information can be easily obtained. ISDN30 services have been in existence since 1986 and the steady state is likely to be before 2003/04 when the wholesale product was first introduced. We do not have the relevant financial data to determine when ISDN30 assets were in steady state. We therefore do not think this option would be a practicable alternative to adjust the depreciated ISDN30 asset base.

We propose to adjust the NRC/GRC ratio of the heavily depreciated ISDN30 assets to 47% (i.e. Option 4)

3.49 In our view Option 4 is most appropriate to calculate Openreach's adjusted ROCE. This approach is relatively simple to implement and is based on financial data we have obtained from the Ofcom models which can be reconciled to BT's RFS. Our approach is also consistent with the approach recently proposed for the WBA charge controls.[33]

3.50 In order to implement this option we propose to uplift the NRC of heavily depreciated ISDN30 line-cards and access electronics to 47% of the GRC reported in BT's RFSs. We also propose to calculate depreciation as the GRC divided by the accounting asset lives used in BT's RFSs. Our detailed calculations are shown in Annex 6.

Openreach's adjusted ROCE in 2009/10 would have been 24%

3.51 We have recalculated Openreach's adjusted ROCE by uplifting the NRC of the heavily depreciated ISDN30 assets (line-cards and access electronics) to 47% of their GRC and recalculating the relevant depreciation by dividing the GRC by Openreach's assumed accounting asset lives (5 years for line-cards and 10 years for access electronics).

[32] See Annex 2 at:
http://stakeholders.ofcom.org.uk/consultations/review_bt_ncc/statement/
[33] http://stakeholders.ofcom.org.uk/consultations/wba-charge-control

3.52 Following this approach, Openreach's adjusted ROCE in 2009/10 for wholesale ISDN30 services would have been **24%.** This is still significantly above Openreach's WACC of 11%[34] for that year.

3.53 The impact of our proposed approach is to increase Openreach's base year costs by up to **£71.2m** or **£33.17/channel**. For detail of our calculations see Annex 6.

Our proposals

3.54 Following from the above discussion we propose to:

- assess Openreach's profitability in 2009/10 for wholesale ISDN30 services using the adjusted ROCE approach;
- adjust Openreach's ROCE in 2009/10 by uplifting the NRC/GRC ratio of the heavily depreciated ISDN30 assets (line-cards and access electronics) to 47%; and
- re-calculate the depreciation value of the heavily depreciated assets using Openreach's assumed accounting asset lives (10 years for line-cards, 5 years for access electronics).

Question 1 Do you agree that we should assess the profitability of wholesale ISDN30 services using the adjusted ROCE approach? Do you also agree that we should make an adjustment to Openreach's depreciated ISDN30 assets (line-cards and access electronics) by setting the NRC/GRC ratio of these assets to 47% (i.e. Option 4)? If not, please explain your rationale and propose alternative approaches.

Openreach does not face sufficient competitive pressure to reduce the price of wholesale ISDN30 services to the competitive level

In the Market Review we decided that Openreach has entrenched SMP in the provision of wholesale ISDN30 services

3.55 In the Market Review we concluded that wholesale ISDN30 services are in a narrow market on their own and that the availability of alternative means of provision based on other regulated inputs (such as partial private circuits, PPCs) is unlikely to constrain the price of these services to the competitive level. We also concluded that, although IP based alternatives are likely to succeed ISDN30 services in the longer term, these newer alternative services are also not in the same market as ISDN30 and therefore unlikely to constrain ISDN30 prices during the forward look period.

3.56 In the Market Review we also noted that the (nominal) wholesale ISDN30 rental price has remained constant at £141/channel since the introduction of wholesale regulation in 2004.

3.57 This can to a certain extent be explained by Openreach's entrenched SMP. As described in our Market Review, 71% of the retail market is still supplied over

[34] We believe that the appropriate cost of capital for ISDN30 services is the "rest of BT rate". For a full discussion see Annex 7 of this document.

Openreach's wholesale network[35] (with 46% of the retail market being provided by BT Retail and 25% by other operators using Openreach's wholesale offering[36]), as shown in Figure 3.1 below. Under these circumstances, Openreach has the incentive to keep wholesale charges high to increase its wholesale profits. Due to Openreach's entrenched SMP at the wholesale level, Openreach has the ability (and the incentive) to maintain prices at an excessive level.

3.58 As discussed in our Market Review,[37] Openreach's entrenched SMP is also reflected in the fact that competing infrastructure providers only supply 29% of the retail ISDN30 market, using predominantly their own end-to-end infrastructure (see Figure 3.1 below). One of the reasons why OCPs have been unable to gain further market share may be that on average they are less efficient than Openreach due to scale and scope disadvantages and, therefore, it is only economical for them to provide ISDN30 services under certain conditions. For example, infrastructure providers may be less inclined to extend their network to supply a single small customer and would only tend to do so for large business customers. Additionally, the current level of infrastructure competition from OCPs may have been distorted by Openreach's high charges for wholesale ISDN30 services, which may have overstated the extent to which OCPs are a truly competitive constraint on Openreach. In other words, if wholesale ISDN30 charges had been at the competitive level it is possible that infrastructure competition would not have developed to the current extent.

3.59 PPCs are also generally used by OCPs as an alternative upstream wholesale input to supply circuits with high levels of channel utilisation (i.e. close to 30 channels). The underlying economic reason for this is that PPCs are charged on a bearer basis (a 2Mbit/s bearer can contain up to 30 channels), whereas ISDN30 services are charged on a channel basis, both at the wholesale and retail level. Therefore, OCPs find it economical to use PPCs only when bearers are close to full capacity, as this allows them to spread the PPC connection and rental costs over a higher number of (revenue generating) ISDN30 channels. In contrast, the low revenues obtained from a retail ISDN30 circuit with a small number of channels do not generally justify incurring the connection and rental costs of a full 2Mbit/s PPC circuit. For this reason we consider that PPCs can only exert a weak competitive constraint on the price of wholesale ISDN30 services. In fact, PPCs represent around 3% of the total retail ISDN30 market, as shown in Figure 3.1 below.

3.60 Additionally, as in the case of supply using end-to-end infrastructure, we also believe that the current high wholesale ISDN30 prices may have resulted in an over-utilisation of PPCs to supply ISDN30 services.[38]

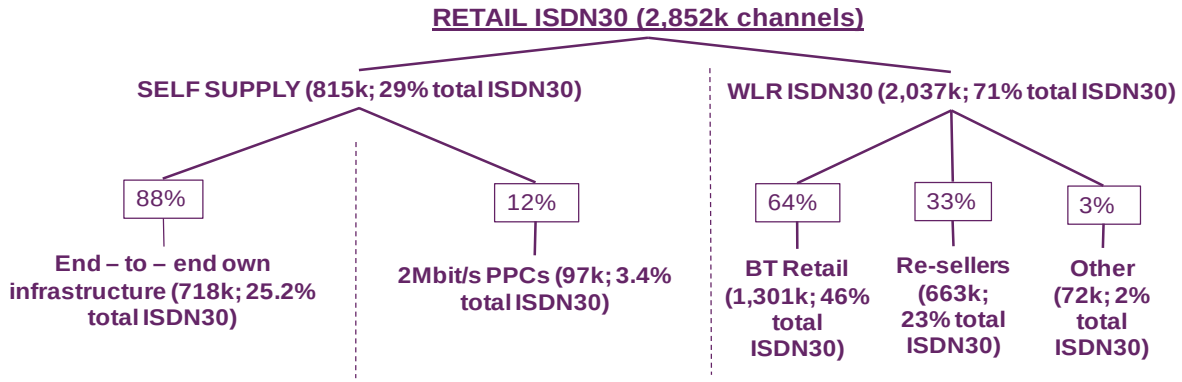
3.61 In summary, we believe that PPCs and infrastructure competition may have exerted some competitive constraint on the price of wholesale ISDN30 services, but they are unlikely to be sufficient to reduce Openreach's prices to the competitive level.

3.62 A few highlights from Figure 3.1 below can be used to illustrate the limited extent of competition:

[35] See Table 7.1 page 54, at: http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf.
[36] Idem, Table 5.1, page 34.
[37] Idem, Section 7, page 52.
[38] As discussed further in section 5, we believe that our proposed charge control of wholesale ISDN30 services will remove this distortion and, in future, OCPs' choice of wholesale inputs will be based on the option resulting in the cheapest way to supply ISDN30 services.

- The share of the retail ISDN30 market supplied by operators using PPCs is very small (around 3%).
- Once other forms of infrastructure based competition are added in, the share of the market supplied by BT's rivals using their own networks is still less than 30%.
- This means that almost three-quarters of the retail market is supplied by operators using Openreach's wholesale ISDN30 product. By far the biggest of these is BT Retail.
- This picture of Openreach dominance at the wholesale level is consistent with the findings of our Market Review.

Figure 3.1 Retail ISDN30 market and key players (as at June 2010)



ISDN30 is a mature product, but we still expect a significant volume of ISDN30 channels in the next years

3.63 Our analysis has indicated that there will also be a potentially large base of retail ISDN30 channels remaining by 2013/14. In June 2010 there were around 2.9m retail ISDN30 channels. Our analysis suggests a decline of around 19% in retail ISDN30 channels by 2013/14, with around 2.3m retail channels remaining (see Annex 8). The equivalent number using Openreach's predicted rate of decline of 40-50%, would be around 1.7m-1.4m retail channels. In addition, Openreach has also indicated that it expects to retain the product until ✂ when it expects around ✂ retail channels on its network alone. In light of the above, we believe that in spite of being a declining market, ISDN30 will remain an important product during our forward look period and beyond.

We propose that a price control on core wholesale ISDN30 services is an appropriate remedy

3.64 In the above paragraphs, we have described our key concerns in relation to Openreach's provision of wholesale ISDN30 services, which are:

- Openreach's high profitability in 2009/10 where its adjusted ROCE would have been 24%, well in excess of its WACC of 11% for that year;
- the charge for wholesale ISDN30 services which has remained constant in nominal terms since the introduction of the wholesale product in 2004; and,

- the limited constraints on the price of wholesale ISDN30 services provided by current alternative forms of supply (based on OCPs' end-to-end infrastructure and PPCs) and future IP based alternatives.

3.65 We therefore consider that a price control on core wholesale ISDN30 services is appropriate. We next need to consider what form the control should take. We now discuss our assessment of the following forms of control:

- A cost orientation requirement;
- Safe-guard caps;
- Retail minus; and
- RPI-X charge control.

3.66 We note that these options are not mutually exclusive – a cost orientation requirement is often considered in addition to a charge control – however, in this instance we are considering the applicability of cost orientation without any charge control as an alternative form of price control. We later consider the use of cost orientation in addition to the proposed charge controls (see section 5).

We do not believe that, by itself, a cost orientation requirement will be sufficient to reduce wholesale charges to an appropriate level

3.67 A cost orientation obligation generally requires, as a first order test, charges to be within specified floors and ceilings, which may allow for a wide range of prices. Our *Guidelines on the Operation of the Network Charge Controls*[39] specified distributed long-run incremental cost (DLRIC) and distributed stand alone cost (DSAC) as the respective floor and ceiling.[40] The range of prices which can be implied by the DLRIC to DSAC range can be very wide and the DSAC ceiling is likely to be well above the fully allocated costs (FAC) in most cases. This means that a cost orientation requirement (by itself) may mainly be appropriate in markets which are expected to become competitive, and in which competition is therefore expected to be the binding constraint on prices in the longer term.[41] It can also be appropriate as an adjunct to an RPI-X charge control. It then allows BT an appropriate degree of freedom to vary individual charges within the overall basket constraint, which itself is likely to be set to bring average charges for the basket into line with FAC.

3.68 When a cost orientation requirement is imposed without a charge control, there is a risk that, if competition fails to develop as anticipated, prices could rise towards DSAC and high rates of return (when measured on an FAC basis) could result. Our analysis shows that the weighted average (internal and external) rental price, which accounts for the majority of wholesale ISDN30 revenues, was around 89% of the weighted average DSAC between 2007/08 and 2009/10. In the light of this, we think that a cost orientation obligation is unlikely to address our key concern of high rental wholesale prices.

[39] Oftel, *Guidelines on the Operation of the Network Charge Controls,* 2001, available at http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/pcr1201.htm

[40] These are referred to as the "first-order tests" for cost orientation. See also the clarification issued on 7 December 2010 at: http://stakeholders.ofcom.org.uk/consultations/wla/?a=0

[41] Cost orientation can also be used as a complement to a charge control in which case it allows freedom to vary individual charges within a charge control basket, but within the limits set by floors and ceilings (on, of course, a first order test basis).

3.69 In light of the degree of market power held by Openreach in this market, we believe it would be inappropriate to set a cost orientation obligation that could allow charges overall to remain near, or rise, to DSAC. In these circumstances, if reliance were to be placed on the cost orientation condition alone, we believe it would be necessary to interpret this in a market-specific way.

3.70 We acknowledge that a cost orientation requirement on the wholesale ISDN2 exchange line services has been in place since 2003.[42] However, we consider that there are significant differences between the ISDN2 and ISDN30 markets that could justify a more prescriptive approach (such as a charge control) in the case of ISDN30. ISDN2 generated a total turnover of £151m with associated volumes of 1.2m in 2009/10, compared to revenues of £320m and volumes of 2.2m for ISDN30.[43] Additionally, as discussed in our *Review of the fixed narrowband wholesale services,*[44] we expect the ISDN2 market to decline at a slightly higher rate than the ISDN30 market.

3.71 We believe that the differences highlighted above justify adopting a different approach to regulating wholesale ISDN30 and ISDN2 services. We believe that the fact that the ISDN30 market is significantly larger (both in terms of revenues and volumes) and is expected to decline at a slower rate imply that a more prescriptive form of control than a cost orientation requirement could be a proportionate measure to adopt in the ISDN30 market.

We do not believe that a safeguard cap on rental prices will be appropriate as charges are well in excess of FAC costs

3.72 When prices are already close to FAC, and there is no requirement for large price reductions in order to align prices with costs, some form of safeguard cap (e.g. RPI-0 or RPI-RPI) might be appropriate as a light touch alternative to an RPI-X type control. This would protect customers and impose low burdens on us and Openreach and so may be a proportionate response in some circumstances. A potential drawback is that, because costs may change markedly over time, particularly where markets are growing or declining rapidly, an RPI-RPI or RPI-0 control may either prove too loose to prevent the exploitation of SMP, or too tight to allow a reasonable rate of return to be earned. Such a control is more likely to be appropriate where the market is expected to be stable, or as another form of light touch regulation which is not expected to be the primary constraint on prices.

3.73 As discussed above, our analysis has indicated that the wholesale ISDN30 rental price, which accounts for the majority of ISDN30 revenues, is well in excess of FAC, therefore, we believe that a safe-guard cap such as RPI-RPI or RPI-0 would not be appropriate as it would be unlikely to reduce this price to the competitive level.

[42] Oftel, *Review of the fixed narrowband wholesale exchange line, call origination, conveyance and transit market- Identification and analysis of markets, determination of market power and the setting of SMP conditions*, November 2003, available at:
http://stakeholders.ofcom.org.uk/binaries/consultations/750148/fixednarrowbandstatement.pdf
[43] See BT's 2010 Regulatory Financial Statements, available at:
http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2010/CurrentCostFinancialStatements2010.pdf
[44] See paragraph 5.24, page 28, at:
http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf.

Retail-minus would not provide a control on the absolute level of prices

3.74 Where markets are sufficiently close to becoming effectively competitive, a cost orientation requirement may be unnecessary and a lighter touch form of regulation may be appropriate. Regulation of wholesale charges may then be limited to "retail-minus" pricing of wholesale services (i.e. where the maximum wholesale charge is equal to the retail price less the costs incurred by the retail activity of the operator's in-house service provider). This can be imposed by a condition prohibiting undue discrimination or a more specific condition specifying the retail-minus formula (as in the 2004 Wholesale Broadband Access (WBA) market review[45]).

3.75 This is a lighter touch form of regulation than a cost orientation requirement. The circumstances in which a retail-minus approach is likely to be appropriate were set out in 1999 in the context of the LLU charge setting:[46]

- First, retail-minus is appropriate where markets are competitive or moving sharply towards a competitive structure. In these circumstances, regulation of prices might be a disproportionate response to the degree of market power being exercised, and could even undermine the move towards competition.
- Second, where major risky investments are undertaken in order to provide the relevant services, price control would constitute the substitution of a regulator's judgement for an investor's judgement about the circumstances and prices under which an investment was likely to be viable. This would risk distortion of investment, and indeed could deter investment in new ventures.

3.76 The aim of retail-minus controls is to avoid leverage of market power into other markets (particularly from the wholesale to the retail level). However, the absolute level of prices would not be controlled under such an approach and hence it would do little to control the ability of operators with market power to raise prices above the competitive level. The focus of regulation would be on the prevention of a margin squeeze by the operator with market power.

3.77 We consider that a retail-minus approach would not be an appropriate form of price control for wholesale ISDN30 services. Given the degree of SMP and the fact that the market is mature, it is appropriate to control the absolute level of wholesale charges rather than just the margin between these and retail prices, and to bring these wholesale charges into line with cost (on an FAC basis).

We consider that an RPI-X charge control is appropriate for key wholesale ISDN30 services

3.78 As we have summarised in paragraph 3.64, we are particularly concerned about Openreach's high level of profitability in the provision of wholesale ISDN30 services and the fact that the price for these services has remained constant in nominal terms since 2004. These factors point to the fact that the prices of core wholesale ISDN30 services are not constrained by competition and are likely to be above the competitive level. We could, in theory, address this by imposing a requirement on BT to set its prices equal to FAC, including the cost of capital. This form of control is

[45] Ofcom, *Review of the wholesale local access market,* December 2004, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/rwlam/statement/rwlam161204.pdf
[46] Oftel, *Access to Bandwidth: Delivering Competition for the Information Age*, November 1999, available at: http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/llu0799.htm #Annex C.

known as rate of return control. However, in general we prefer price controls of the RPI-X type as we explain below.

3.79 RPI-X charge controls are typically set so that average revenues for a basket of services are brought into line with expected costs, usually defined on a fully allocated cost (FAC) basis and including the cost of capital, by the end of the charge control period. An RPI-X glide-path of this kind is intended to approximate to the workings of a competitive market in which excess profits are gradually eroded as rivals improve their own efficiency. That is, it is intended to substitute for the missing competitive pressure which would otherwise have brought prices into line with costs. Therefore, where there is entrenched market power and (efficient) entry is unlikely to occur, an RPI-X charge control is likely to be an appropriate way to prevent excessive charging and support downstream competition.

3.80 In particular, RPI-X charge controls are designed to give the incumbent (i.e. Openreach) incentives to increase its efficiency. This is achieved by allowing Openreach to keep any super-normal profits that it earns within a defined period by reducing its costs over and above the savings envisaged by the charge control. The benefits of any cost savings would potentially accrue to the regulated company in the short run and this would give incentives to make those efficiency savings. In the longer run, these cost savings could be passed to consumers when price controls are subsequently reset. The incentives to make cost reductions give RPI-X an advantage over rate of return control. The strength of these additional incentives to reduce costs depends on the duration of the control, as we discuss below.

Our proposals

3.81 In the light of the above discussion we propose to impose an RPI-X type charge control on core wholesale ISDN30 services with the aim of bringing the prices down to the competitive level by the end of the proposed charge control period.

Question 2 Do you agree that an RPI-X type charge control would be the appropriate form of price control for core wholesale ISDN30 services? If not, please explain why.

Section 4

Charge control design principles

Introduction

4.1 In this section we describe the key economic principles that have guided our approach in designing the charge control framework for wholesale ISDN30 services and our key proposals in relation to these.

4.2 In section 5 we describe in detail how we propose to apply these principles when designing the charge control framework for wholesale ISDN30 services.

Our proposals

4.3 We propose to take into account the following when designing the charge control framework for wholesale ISDN30 services:

- We will consider whether there are differences in the competitive conditions among services when deciding on the appropriate charge control baskets;
- We propose to use current cost accounting with fully allocated costs (CCA FAC) as the basis for setting the charge controls;
- We propose a three year charge control period;
- We propose to be consistent with the anchor pricing approach when forecasting the costs of wholesale ISDN30 services;
- We would only consider making one-off adjustments to the starting charges if there would otherwise be a real risk of distortion;
- We propose to use RPI as the inflation index; and
- We propose to use prior year revenue weights when assessing Openreach's compliance with its charge control obligations.

4.4 Our specific proposals in relation to the level of the charge controls and any price adjustments are discussed in detail in section 5.

Five steps to designing the charge control framework

4.5 There are five key steps we follow when designing a charge control framework. These are:

- Step 1: Identify appropriate charge control baskets;
- Step 2: Identify base year costs for services in scope of the charge control;
- Step 3: Forecast the costs of the relevant services for the duration of the charge control;

- Step 4: Consider the case for one-off adjustments to charges at the start of the charge control; and
- Step 5: Calculate the value of X for the proposed basket(s) of services.

4.6 In the paragraphs below we discuss the key charge control design principles which support each of the five steps listed above.

We have considered the principles behind basket design (Step 1)

4.7 A charge control can either be applied to an individual service or a "basket" of services. A charge control basket is defined as the group of products and services subject to the same overall charge control conditions. Combining services in a single basket means that the RPI+/-X% constraint would apply to an appropriate weighted average of the changes in the prices of all of the services in the basket. This section describes the economic principles to which we have had regard when designing the specific charge control baskets for wholesale ISDN30 services which we discuss in detail in section 5.

We prefer combining services in broad baskets

4.8 In instances where there are many wholesale services, applying a charge cap on individual services could result in a very complex set of charge control arrangements and that might unduly constrain Openreach's scope to price efficiently. With this in mind, we generally choose to combine services into wider baskets unless there are good reasons not to do so. This has been our default position in previous charge controls, including, for example, the Network Charge Control (NCCs)[47] and the Leased Lines Charge Control (LLCC).[48]

4.9 At the basket level, setting X to bring revenues into line with FAC during the charge control period allows a reasonable contribution to common cost recovery and reasonable return on capital. But at the individual service level, it is generally efficient to reflect differences in demand (especially the responsiveness of demand to price), as well as costs, in relative prices. Openreach is best placed to assess how to set efficient relative prices in order to recover costs which are common across a number of services in the most efficient and appropriate manner. If we applied separate controls, we would have to decide on the efficient allocation of common costs between these services. This would require detailed modelling of costs and information on the demand for individual services in order to arrive at an efficient allocation of those costs between services. This is not likely to be a practical or desirable proposition. This means that there are likely to be benefits to allowing Openreach to vary relative prices within 'broad' baskets containing a number of services and subject to a single overall constraint on average charges.

4.10 Identifying a large number of service specific controls would give Openreach reduced scope to respond to changing demand or changing costs. For example, if there are changes in relative costs over time, especially in ways not forecast when the charge control was set, then having broad baskets would allow Openreach to reflect these changes in its prices.

[47] *Review of BT network charge controls,* paragraphs 4.87 to 4.91, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/summary/reviewbtncc.pdf.
[48] *Leased Lines Charge Control*, paragraphs 3.79 to 3.82, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/summary/leasedlines.pdf

4.11 Therefore, the use of broad baskets would give Openreach greater flexibility to respond to changing market conditions, and this may lead to more efficient pricing. Wherever appropriate, we have sought not to constrain unduly Openreach's pricing behaviour by having baskets which are too narrowly defined. Our approach is also consistent with our wider regulatory objective of applying charge controls in the least interventionist way we can.

Differences in competitive conditions might point to separately controlled services

4.12 We generally apply a charge control to a basket of services which are subject to similar competitive conditions. If services with different competitive conditions are included in the same basket, Openreach would have an incentive to concentrate price cuts on the most competitive services and offset these with price increases on the least competitive services.[49] This can be avoided by placing the more competitive services in a separate basket.

4.13 In some downstream markets, BT competes with OCPs which also rely on Openreach for a wholesale input, but BT's downstream divisions use a different wholesale input to that used by BT's competitors. For example, BT supplies retail broadband services using WLR+SMPF, whereas many of its competitors use MPF. In these circumstances, if all the wholesale inputs were included in a single charge control basket, Openreach might have an incentive to concentrate price cuts on the services that BT Retail uses more intensively at the expense of services that it does not. This could harm competition.

4.14 The scope for anti-competitive pricing within a basket can be reduced by using sub-baskets or safeguard caps. For example, an appropriate sub-cap could be applied to the less competitive services. By limiting the maximum increase in the prices of the less competitive services, the incentive to cut price of more competitive services, in a way which could restrict the development of competition, is reduced .[50] On the other hand, sub-caps can make monitoring compliance with the charge control conditions more cumbersome than separate controls on individual services.

We propose to use CCA FAC costs (Step 2)

4.15 Charge controls are usually set to allow the firm to recover both the additional costs incurred in the production of the controlled service (the incremental costs[51]) and

[49] This behaviour is sometimes described as "costless predation".
[50] Suppose services were in the same basket and the basket required BT to reduce prices by RPI-10% each year. Without a cap, BT might decrease prices for the competitive service by 30% and increase prices for the uncompetitive service by 10% and still meet its charge control obligations (as the average reduction would be -10% assuming each price change was weighted equally and RPI=0). With an appropriate safe-guard cap (such as RPI-0) on the less competitive service, BT would be unable to do this. It would still be able to respond to competition, for example by decreasing prices on the competitive service by 30% but it could not offset this with an increase in the price, in real terms, for the less competitive services, which would greatly reduce the incentive on it to make anti-competitive reductions in prices. These can be applied to individual service elements to avoid excessive rebalancing of charges. The appropriate value of the safeguard cap is likely to depend on the value of the basket X and the relative initial profitability of the difference services.
[51] The incremental costs of a service are then those costs which are directly caused by the provision of that service in addition to the other services which the firm also produces. Another way of expressing this is that the incremental costs of a service are the difference between the total costs in a situation where the service is provided and the costs in another situation where the service is not provided.

make a contribution to the recovery of costs which are shared by that service and the other services supplied by the firm (the common costs[52]). In general, companies need to recover common costs to ensure that their business is sustainable in the long term. For this reason, common costs are typically allocated or shared among the different services that generate them, and recovered in the prices for those services.

4.16 There are a number of different costs standards that we have used when setting charges for one-way access services like wholesale ISDN30[53] (covering both incremental and common costs). The most common ones are:

- Current cost accounting fully allocated cost (CCA FAC). Under this approach all the firm's costs are distributed among the services it provides. Under the CCA accounting convention assets are valued and depreciated according to their current replacement cost.[54]

- Long run incremental costs plus an equal proportionate mark-up (LRIC+EPMU). The LRIC is the cost of producing a specified additional increment of output in the long run, i.e. when all costs (including capital investment) are considered variable. The relevant increment may be the entire output of a particular service or group of services. Thus the incremental cost of a service is the difference between the total costs in a situation where the service is provided and the costs in another situation where the service is not provided. The LRIC+EPMU approach allows for recovery of a reasonable share of common costs. Using an EPMU rule, we can allocate any common costs across the different services in proportion to the LRICs of individual services.[55]

4.17 We propose to use CCA FAC as the basis of setting the wholesale ISDN30 charge controls:

- The use of CCA FAC is consistent with the approach we have adopted for other recent charge controls (for example the LLCC[56], NCC[57] and the current WLR/LLU charge controls). It is our view that a consistent approach amongst various charge controls on BT is desirable as many of the common costs under consideration are 'common' across a wide portfolio of services in different markets. Consistency will enable systematic over- or under-recovery of costs to be avoided.

- CCA FAC and LRIC+EPMU have some similarities in that the definition of costs for both is still forward looking, unlike historic cost accounting (HCA) approaches.

[52] Common costs are those which arise from the provision of a group of services but which are not incremental to the provision of any individual service. Common costs may be identified in the following way. If the incremental costs of each service are removed from the total cost of providing all services, what are left are the common costs (i.e.: those costs which are shared).
[53] This distinction is with two-way access services. The classic two-way access service is call termination. Operators purchase call termination from each other, and hence access is two-way. In the case of one-way access services like ISDN30, Openreach does not need to purchase an equivalent service from OCPs.
[54] An alternative to CCA would be the historic cost accounting (HCA) convention where assets are valued and depreciated according to their historic purchase cost.
[55] For example, if the LRIC of service X was £100/unit and the LRIC of service Y was £50/unit, then (assuming the same volumes for each service) we would have a 2:1 ratio. If Openreach had common costs of £6m, an equi-proportional mark-up would allocate £4m to service X and £2m to service Y.
[56] http://stakeholders.ofcom.org.uk/consultations/llcc/statement/
[57] http://stakeholders.ofcom.org.uk/consultations/review_bt_ncc/statement/

Charges based on forward looking costs provide appropriate incentives for entry and investment.

- Monitoring Openreach's actual financial performance on a LRIC basis is not straightforward, as its wholesale service profitability as reported in BT's RFSs is generally on a CCA FAC basis. A charge control based on CCA FAC data can be reconciled more easily to BT's RFSs, which are audited and are in the public domain. We are also of the view that CCA FAC and LRIC+EPMU should provide reasonably similar results, particularly at more aggregate levels, since the overall total of costs to be recovered is the same.

4.18 However, simply setting all prices equal to CCA FAC is unlikely to result in the most efficient possible outcome. Recovery of common costs for one-way access services, by means of mark-ups over incremental cost is usually seen as necessary but it can result in allocative inefficiency.[58] Approaches have been developed which minimise this inefficiency, given the need to recover common costs, by setting prices on the basis of willingness to pay. However, this approach to pricing (called Ramsey pricing) requires detailed information on the elasticity of demand – a measure of how users react to changes in prices – which can make it difficult apply in practice.[59] For this reason we have rejected using Ramsey pricing.

4.19 However, even without using Ramsey pricing, we can achieve some of the efficiency objectives through our charge control design. In particular, the use of broadly defined charge control baskets would allow Openreach (who might be in a better position than us) to set relative prices that recover common costs in the most efficient manner.

4.20 In addition, we are mindful that our use of CCA FAC to set the current LLU and WLR charge controls was considered by the Competition Commission (CC) under appeal. In its determination, the CC found that we were not in error in our use of CCA FAC given that we also checked that the price differentials between MPF and SMPF+WLR were at least equal to LRIC differentials. It also found that we had given sufficient weight to allocative and dynamic efficiency[60] factors in adopting a CCA FAC approach to cost allocation.[61]

Our proposals

4.21 Following from the above discussions, we propose to use CCA FAC. CCA FAC has the benefit of greater transparency to enable us to map more easily BT's RFSs to relevant base year costs in our model. Our proposed approach is also consistent with

[58] This results from the fact that allocative efficiency is maximised when prices are aligned with the additional cost of producing an extra unit of output, that is, their marginal cost.
[59] Under Ramsey pricing, elasticities of demand are used to allocate common costs. Services with higher elasticities of demand (i.e. for which demand is more sensitive to price) attract lower mark-ups than services with lower demand elasticities. Relative to spreading common cost recovery more evenly, this form of pricing rule can enhance consumer welfare as it can help increase demand from customers with a relatively lower willingness to pay (i.e. higher demand elasticity). Instead, if charges were set so that common costs were recovered more evenly then these customers may be priced out of the market. Therefore, as the costs of providing services would more closely match customers willingness to pay, there are possible benefits to Ramsey pricing on allocative efficiency grounds.
[60] Dynamic efficiency concerns the ability of firms to innovate and make efficient investments, including activities designed to reduce costs over time.
[61] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Case 1149/3/3/09, available at http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

the approach we have adopted in the WBA and WLR/LLU charge controls which we are currently consulting on.

Question 3 Do you agree that CCA FAC is the appropriate cost basis for setting the proposed charge controls? If not, please explain why.

We propose to forecast costs over a three year period (Step 3)

We need to consider the length of our charge control period

4.22 When designing a charge control, one of the key issues we need to consider is the length of the proposed control period. In general, in assessing the question of duration, we need to consider the balance between incentives for productive and dynamic efficiency for the regulated firm, and the benefits of allocative efficiency.

4.23 Dynamic efficiency concerns the ability of firms to innovate and make efficient investments, including activities designed to reduce costs over time. Price caps generally provide strong incentives for dynamic efficiency because they allow regulated firms to earn profits in excess of the cost of capital if they are able to manage costs below the level assumed when setting the value of X. These incentives can drive innovation and investment. Other things being equal, incentives for dynamic efficiency will be stronger in a longer than a shorter price cap because a longer period gives the firm more opportunity to enhance its profitability through innovation and cost reduction.

4.24 In designing a charge control, incentives for dynamic efficiency must be considered alongside the benefits of allocative efficiency. Allocative efficiency is achieved when prices are aligned with underlying resource costs. As explained above, prices can diverge from costs over the life of a price cap if the costs of price-capped services deviate from the level assumed when setting the value of X. The use of an RPI-X control therefore creates a trade-off between dynamic and allocative efficiency. The longer the duration of the cap, the stronger the incentives for dynamic efficiency and the greater the possible loss of allocative efficiency. To balance this, we ensure that allocative efficiency objectives are also met by periodically setting new controls to bring prices back into line with costs.

4.25 In the past we have set charge controls to run for four years (e.g. LLCC[62]). A four year duration has proved effective in providing a good balance between dynamic and allocative efficiency for other charge controls that we have set. However, we have had regard to the new European regulatory framework, scheduled to be implemented in the UK by May 2011. The European Framework sets the requirements for harmonisation of communications across European member states through a series of Directives establishing rules to be enshrined in the national framework of each member state. The new framework prescribes in most cases that market reviews should be undertaken by national regulatory authorities (NRAs) every three years. This requirement will apply to the UK from 26 May 2011, and our proposal for a three year charge control is consistent with this timeframe.[63]

[62] http://stakeholders.ofcom.org.uk/consultations/llcc/statement/

[63] European Commission, *Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009*, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0037:0069:EN:PDF.

4.26 The Market Review considered a four year period starting on 20 August 2010 and ending on 20 August 2014. Our proposed three year charge control, ending on 31 March 2014, will be within the forward look period set by the Market Review.

4.27 Adopting a control with a duration of three, rather than four, years will change the balance between dynamic and allocative efficiency incentives slightly. This balance will shift in favour of allocative efficiency as the shorter period between reviews will mean that prices are less likely to get significantly out of line with costs. This may have the additional benefit of reducing pressure for interim reviews. The incentive on Openreach to make efficiency gains may be reduced slightly but, on the other hand, such gains can be passed to customers more quickly. And crucially, when compared to the alternative of annual charge determinations, a three year RPI-X control will still contain substantially stronger incentives for dynamic efficiency. In the circumstances, we think that a three year control is the best available option. A three year duration should also provide sufficient regulatory certainty for wholesale ISDN30 services.

4.28 Finally, a three year charge control will be consistent with other charge controls we are currently setting (i.e. the WLR/LLU charge controls).

Our proposals

4.29 We propose a three year charge control period for wholesale ISDN30 services. This is consistent with the forward look period set in the Market Review, the new EU framework and other charge controls we are currently considering setting.

Question 4 Do you agree that a three year duration for the charge controls on wholesale ISDN30 services is appropriate? If not, please explain why.

We propose an anchor pricing approach to setting the control (Step 3)

4.30 The anchor pricing approach is a way of setting charge controls when costs are affected by technological change. Technological change is relevant to this charge control because of the move to Next Generation Access (NGA) networks based on fibre and the emergence of IP-based alternatives to ISDN30 (e.g. SIP Trunking).

4.31 We have previously referred to the anchor pricing approach as the “technology neutral” approach. A key feature of the anchor pricing approach is that charges do not immediately reflect the costs of a new technology but may, for a time, be based on the costs of an older existing technology. The anchor pricing approach can be contrasted with alternatives in which prices reflect the costs of the latest technology at any point in time. Indeed the latter is our standard approach, and in this section we explain why, and when, we use the anchor pricing approach instead.

4.32 We discuss the following in turn:

- How our approach to pricing depends on the type of technological change;
- Why we use the anchor pricing approach during a period of major technological change;
- The technological changes which may affect ISDN30 services; and

- How we propose to implement the anchor pricing approach in the case of wholesale ISDN30 services.

Our approach to pricing depends on the type of technological change

4.33 We distinguish between gradual technological change, which is part of business-as-usual, and "paradigm shift" technological change. Our standard approach to setting charges is to base costs on what is believed to be the most efficient available technology that performs the same function as the old technology (which might be the one actually in use). This is sometimes described as the "modern equivalent asset" (MEA[64]) approach to pricing.

4.34 The MEA approach to pricing is consistent with the use, in our cost model, of costs measured on a CCA basis. Under the CCA convention, assets are valued at their current replacement cost, but the replacement asset might not be identical to the asset in use – it may well have superior functionality or lower operating costs. In such cases, the CCA value of the existing asset will be abated to reflect the cost of a functionally identical modern asset. MEA values should be reflected in the costs which BT reports in its CCA financial statements. Use of these data will then, in general, be consistent with the MEA approach to pricing.

4.35 There are circumstances where we would not set charges on the basis of new technology costs. During a period of major, or "paradigm shift", technological change, we generally adopt an approach to charge control setting which we refer to as "anchor pricing".[65] Under this approach the charge control modelling (for relevant cost components) would be based on the cost of existing technology rather than that of any new technology which might be adopted during the control period. A detailed description of the principles of anchor product regulation was set out in our September 2007 consultation on "*Future broadband: policy approach to next generation access*".[66] We discussed the use of anchor product regulation in the context of investment in next generation access in the wholesale local access (WLA) market, and key features of our policy are relevant here.

4.36 We have had to address the implications of major technical change – in this case from copper access to NGA – in our current review of the WLR/LLU charge controls. Our proposals for the next WLR/LLU charge controls reflect the principles of anchor pricing. [67] We propose to use the anchor pricing approach because of its incentive

[64] For a definition of MEA, see for example paragraph 4.86 of Ofcoms' second consultation "*Valuing copper access*" (March 2005) at:
http://stakeholders.ofcom.org.uk/binaries/consultations/copper/summary/copper2.pdf.
Ofcom asked Analysys Consulting "to undertake a comparison between the valuation of the existing [copper access] network and a hypothetical Modern Equivalent Asset (MEA)". The definition of the MEA used was: "*The MEA chosen will be the most cost efficient method, using modern technology, of providing the same services, to the same level of quality and to the same customer base as is provided by the existing copper access network*". The Analysys report is available at
http://stakeholders.ofcom.org.uk/binaries/consultations/copper/annexes/loop.pdf.

[65] We also note that it may take some time for a new technology to be recognised as the MEA for accounting purposes.

[66] See Annex 7 in *Future broadband – Policy approach to next generation access,* Consultation, 26 September 2007, available at:
http://stakeholders.ofcom.org.uk/binaries/consultations/nga/summary/future_broadband_nga.pdf

[67] As described in Ofcom's WLR/LLU charge control consultation document, the anchor pricing principle has been incorporated in our modelling of the costs of WLR, SMPF and MPF services as a "cross-check". We have confirmed that the model actually used, which allows for some reallocation of costs to NGA services, yields estimates of WLR, SMPF and MPF costs which are no higher than if

properties and the fact that it also helps address uncertainty over migration volumes and costs.

Why we use the anchor pricing approach during a period of major technological change

4.37 As we noted above, we have previously referred to the anchor pricing approach as the "technology neutral" approach. However, the term "anchor pricing" better captures one advantage of our approach, which is that consumers of existing services are not made worse off by the adoption of new technology. The price (and quality) of existing services are anchored by the legacy technology, even if the services are actually provided over new technology. This approach is intended to give the regulated firm incentives to invest in new technology only when providing services over the new technology would lower its overall costs, or would enable it to provide higher quality services for which consumers are willing to pay.

4.38 The general efficiency and practicality arguments for our approach to setting charge controls for one-way access services have been well rehearsed elsewhere and so we do not repeat them here.[68]

Static and moving anchor approaches can be used to limit Openreach's pricing flexibility

4.39 In our 2007 consultation on "*Future Broadband*",[69] two variants of the anchor pricing principle were identified:

- Under the "static anchor" approach, the definition of the anchor product is fixed at the start of the control for the entire charge control period. BT would then be required to ensure that customers can purchase an equivalent product to the anchor product at no more than its price at the start of the control period, even after new technology is introduced. This approach ensures that the customer is not made worse off than he or she was at the start of the control period, as a result of new technology.

- Under the "floating (or moving) anchor" approach, the definition of the anchor product changes over time, for example to reflect expected changes in usage and improvements in quality which would have been possible with existing technology. This ensures that customers are no worse off than they would have been in the absence of new technology.

4.40 The two variants differ in the degree of protection they offer customers and in the strength of the incentives they provide to introduce new technology. The floating anchor approach will normally give more protection to customers, at the expense of some reductions in incentives.

4.41 Which of the two variants is more appropriate in any particular case depends on the circumstances. In some cases, it is likely to be desirable to let prices signal that

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they had been calculated on an anchor pricing basis using the costs of a hypothetical ongoing copper access network.
http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

[68] See in particular the Competition Commission's (CC) decision in the appeal entitled "*the Carphone Warehouse Group plc v Office of Communications*", August 2010, case 1149/3/3/09 (the "WLR decision").

[69] Op cit. footnote 64.

customers would benefit from a change to new technology, so that migration to a more efficient alternative can take place. This means that prices for the old technology service may need to be higher than they would have been if new technology had not been developed. In other words, violation of the moving anchor principle may then be acceptable although as long as charges remain consistent with the static anchor principle, no customer need be worse off than at the start of the control period.

4.42 Violation of the static anchor principle, that is, allowing customers for the existing product to be made worse off than they were at the start of the control, is less likely to be acceptable. However, even this is not completely ruled out in some circumstances. It may be that, as the number of customers for an old service becomes progressively lower, average incremental costs per customer start to rise sharply. It may then be appropriate for prices to be allowed to rise and perhaps, ultimately, for an old service to be withdrawn. We would also need to consider how customers should then best be protected. It is however important to distinguish between reflecting changes in forward-looking costs in prices in order to encourage efficient migration and the exploitation of captive customers.

4.43 As we discuss further below, we think it is likely to be desirable for ISDN30 prices to signal the relative costs of ISDN30 and newer alternatives, in order to encourage efficient migration. Therefore, if we adopt an anchor pricing approach to the new price control, the static anchor principle is likely to be the more relevant.

We do not consider a MEA pricing approach is appropriate for wholesale ISDN30 services

4.44 Openreach's provision of ISDN30 could be affected by two main technological developments over the period of the charge control. The first is the development of next generation access (NGA) networks, initially alongside, but later potentially replacing current generation copper access. The second is the future gradual migration of ISDN30 services to IP based alternatives.

4.45 We discuss the likely impact of these alternative technologies on ISDN30 below.

Openreach does not propose migrating its ISDN30 services to its NGA network

4.46 Openreach does not propose migrating its ISDN30 service to its NGA network. However, some of the costs of providing ISDN30 are shared with the (current generation) copper access network and these are affected by the development of NGA. We have adopted a consistent approach to forecasting these costs across the WLR, LLU and ISDN30 charge controls. We noted above that the anchor pricing principle has been incorporated in our modelling of the costs of WLR, SMPF and MPF services.

We do not consider IP based alternatives to be the MEA for ISDN30 services

4.47 The second key development which is likely to be relevant to ISDN30 over the next charge control period is the gradual migration of ISDN30 customers to IP based alternatives (e.g. SIP Trunking[70]). Although customers have not so far switched in significant numbers for reasons set out in the market review, we expect switching from ISDN30 to SIP Trunking to increase during the period of the charge control. We

[70] See Annex 5 for a technical description.

discuss this further in section 5 when we explain how we have arrived at our ISDN30 volume projections.

4.48 In this section we consider whether IP based alternatives (e.g. SIP Trunking) should now be considered the MEA for ISDN30. If we deemed that it was, one approach could be to move immediately to setting charges on the basis of SIP Trunking costs.

4.49 An alternative approach is the anchor pricing approach described above. If we adopt this approach, we also need to consider whether to project ISDN30 costs on the assumption that combined ISDN30 and SIP Trunking volumes would continue to be provided using ISDN30, or to reflect migration to SIP Trunking in our modelling.

4.50 We do not think it would be appropriate to set the charge control for ISDN30 on the basis of SIP Trunking costs as it is not clear that SIP Trunking is in fact the MEA for ISDN30. By definition the MEA needs to be *"... the most cost efficient way, using modern technology, of providing the same services, and to the same level of quality and to the same customer base as provided by the existing ...network*".[71] The market research that we conducted as part of the Market Review found, instead, that many customers do not consider that SIP Trunking and ISDN30 are, at present, equivalent.[72]

We propose to reflect the projected decline in ISDN30 volumes due to migration to IP based alternatives

4.51 When setting a charge control on the basis of current technology costs, it is necessary to consider whether to forecast costs on the assumption that all services are provided over a single hypothetical ongoing network, or instead to adopt an explicit forecast of migration. The latter will tend to lead to increases in unit costs and hence prices of the current technology services as volumes decline. A concern for allocative and productive efficiency would imply that, if the forward looking costs of the current technology are higher per customer than they were previously, then the prices of those services should go up, in order for customers to face prices which reflect the costs of the resources they use. It is however possible to distinguish between increases in marginal costs and increases in average costs arising from fixed, and particularly common, costs being spread over fewer customers. There is a good case for prices to reflect the changes in marginal costs but it is not necessary for prices to increase to reflect increases in average fixed common costs, for reasons of either allocative or productive efficiency.

4.52 In the light of this, we propose to reflect the projected decline in ISDN30 volumes due to migration to SIP Trunking in the volumes forecasts we use in our financial modelling. This is for the following reasons:

- We have information from a number of sources including Openreach, OCPs and customer surveys, which we can use to inform our projections of migration from ISDN30 to SIP Trunking.

- Migration must be initiated by the customer. This means that it is likely to be appropriate for ISDN30 charges to reflect increases in forward-looking costs as

[71] See reference at footnote 61 http://stakeholders.ofcom.org.uk/consultations/copper/value2/value2/

[72] See the market research we conducted as part of our Market Review, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf

volumes fall, in order to give signals for customers to choose the lower cost service, and reflect the resource costs of continuing use.

- There are material differences between ISDN30 and SIP Trunking services, which are in separate markets. This means it could be difficult in any case to calculate a "combined volume" forecast.

- In the Market Review we concluded that SIP Trunking was not part of the ISDN30 market and so neither the SMP finding nor the SMP conditions imposed in that review apply to SIP Trunking. Hence the price of SIP Trunking is not subject to RPI-X regulation and any control will therefore apply only to wholesale ISDN30 prices. With a control only on ISDN30 charges, the value of X may then need to allow for anticipated increases in the efficient level of forward looking wholesale ISDN30 costs if charges are to be consistent with efficient migration to newer services.

4.53 Reflecting expected migration to SIP Trunking in our volume and cost projections means that ISDN30 charges will be somewhat higher than in the absence of any assumed migration. As a result they will more closely reflect the costs of continuing demand for ISDN30 services and allow users to make an efficient choice between ISDN30 and SIP Trunking services. However, those who continue to use ISDN30 will still benefit from the proposed control as wholesale ISDN30 charges will fall significantly in real terms over the life of the proposed control. Our proposed control is therefore consistent with the static anchor principle described above. Hence we think that our approach combines protection for consumers who remain with the anchor product with prices which give appropriate signals to switch to lower cost alternatives.

4.54 In our model, common costs are reallocated to other Openreach services as ISDN30 volumes decline. This avoids any tendency for average ISDN30 costs to increase as a result of spreading a fixed amount of common costs over fewer customers. In addition, for the purpose of our cost modelling, we have ensured that costs relating to the roll-out of next generation access (NGA) are not included in the cost stack for copper products or ISDN30. Cost categories that relate exclusively to NGA, in particular NGA equipment costs, have been excluded from the cost model.

4.55 We have carried out cross checks to ensure that ISDN30 costs do not rise as a result of NGA. We find that the unit costs resulting from our modelling are lower than those that would result from a model excluding NGA products, but in which NGA volumes were included in the volume forecasts for existing technology services. This is because our model allows for an increasing share of common costs to be recovered from NGA products as NGA volumes grow, reducing the amount of common costs to be recovered from existing technology services. This outweighs the effect on unit costs of the assumption of lower volumes. Thus our modelling is consistent with our anchor pricing approach.

Our proposals

4.56 Based on the above we propose to:

- reflect expected migration to IP based alternatives (e.g. SIP Trunking) in our volume and cost projection for wholesale ISDN30 services; and

- ensure that prices fall from current levels and so are consistent with the "static" anchor pricing principle.

Question 5 Do you agree with our proposal to apply the anchor pricing approach to wholesale ISDN30 services and reflect migration to IP based alternatives? If not, please explain why.

We would only consider one-off adjustments to starting charges under certain circumstances (Step 4)

4.57 As part of our charge control assessment, we need to consider whether to make any one-off adjustments to prices. We explain below why our general preference is to adopt a glide-path approach, whereby the charge control would bring about a gradual convergence of prices and unit costs over the period of the control. We explain that some adjustments could be justified at the start of the control to prices which are markedly out of line with costs.

Our general preference is for glide-paths

4.58 Often, a new charge control replaces a similar expiring control on the same set of services. In these circumstances, we have a strong preference for glide-paths rather than one-off adjustments to charges. This is largely for incentive reasons, as we explain below.

4.59 One of the features of price cap regulation is that profits may diverge from the level expected at the time when the control was set. Any such divergence may be taken into account when X is reset in the next price control review. In principle, one way in which this could be done is by a one-off adjustment to prices, which would bring the firm's expected rate of return to an acceptable level in the first year of the new cap. The main alternative is a glide-path approach, which would set the control so that the expected rate of return reaches an acceptable level by the end of the price control period.

4.60 The benefit of the glide-path approach is that it approximates more closely than one-off reductions to the workings of a competitive market in which excess profits are gradually eroded as rivals improve their own efficiency. It also avoids discontinuities in prices over time and leads to a more stable and predictable background against which investment and other decisions may be taken, by both suppliers and customers in the telecoms market. This is particularly important for telecoms as there are now many players besides Openreach.

4.61 This approach also has greater incentives for efficiency as it allows the firm to retain the benefits of cost reductions made under a previous charge control for longer. The key difference between price control and rate of return control, in terms of their incentive properties, arises from the longer regulatory lag in the former. This means that cost reductions feed into price reductions only after a period during which the firm receives the benefit of increased efficiency. One-off adjustments to prices would reduce the effective regulatory lag, and hence the incentives to reduce costs. Clearly, as wholesale ISDN30 services have not hitherto been charged controlled, this argument is less relevant here, although it may become more so in future, if there were to be a subsequent control.[73]

[73] Whilst the above discussions relate to one-off cuts to prices, one-off increases would similarly raise concerns about incentives for efficiency. Allowing a rapid rise in charges (i.e. via one-off price adjustments) would signal to Openreach that cost increases would quickly be followed by price rises. Therefore, if cost increases resulted in swift price increases this could reduce the incentive to control

4.62 Whilst the charge control incentive arguments are of less relevance to wholesale ISDN30 services, the potential impacts of one-off charge changes on regulatory certainty and stability may be more so. OCPs have made technology choices around the supply of ISDN30 and made the relevant investments to use their own networks, 2Mbit/s PPCs or Openreach's wholesale ISDN30. Unanticipated one-off changes to wholesale ISDN30 charges could make some of these investments appear to be "the wrong choice" and would not necessarily best reflect outcomes likely in competitive markets (whereby surplus profits are gradually eroded).

We might consider one-off reductions under some circumstances

4.63 While the above suggests a general preference for the glide-path approach in the context of RPI-X controls, this does not mean we should rule out one-off reductions where there are good reasons to introduce them. In the context of the wholesale ISDN30 charge control, it is useful to understand the circumstances under which we might consider one-off reductions. This might include, for example, scenarios where:

- there are strong allocative efficiency arguments for bringing prices into line with cost sooner (such as where Openreach's prices of particular services are out of line with first-order tests of cost-orientation); and/or
- the previous charges were unregulated or are not subject to charge control and where Openreach's charges are high relative to costs.

4.64 It is not possible to identify all circumstances in which one-off adjustments might be appropriate, as each case will be considered on its own facts and on its individual material circumstances. In practice, one-off adjustments to BT's charges have been made in only a small number of cases. Apart from the Leased Lines Charge Control (LLCC) statement, which we discuss further below, these have generally been situations where there was a change to the basis of estimating costs (notably at the start of the 1997 network charge control) or to correct for small discrepancies in base year cost data which had come to light after a control had been set. On the other hand, Ofcom has required one-off adjustments to mobile termination rates in some instances, partly in recognition of the risk that high mobile termination rates could lead to a distortion to retail mobile prices.

4.65 Therefore, if prices of individual services are materially out of line with costs we may need to address this through one-off reductions. However, in assessing possible one-off reductions, we need to balance this against alternative (and potentially more proportionate) regulatory approaches. We need to consider the materiality of the issue (particularly given the risk of damage to incentives associated with one-off adjustments). It may also be possible for Openreach to make acceptable voluntary adjustments in prices without us having to mandate this through detailed one-off reductions.

We believe that DLRIC and DSAC are reasonable benchmarks for assessing the need for one-off adjustments

4.66 As discussed above, the case for a one-off adjustment at the start of a charge control is strongest where a charge is out of line with costs to an extent which could cause

costs. Indeed, one-off adjustments upwards could create an expectation that other one-off adjustments – up or down – will be made in future, and this could also have adverse effects on incentives.

material distortion. We believe that DLRIC[74] and DSAC,[75] which are used as a first-order test for the "cost orientation" of charges,[76] are reasonable benchmarks to inform our judgement of the appropriate balance between one-off adjustments at the start of the control and glide-paths, because of the raised risk of distortion where prices are outside the range between DLRIC and DSAC. We used this approach in the LLCC and it has been upheld by the CC in the LLCC appeal.[77] Even though ISDN30 is not subject to cost orientation, we believe that these benchmarks remain a useful way of identifying charges for which one-off changes might be appropriate. The economic significance of these benchmarks is not dependant on the existence of a cost orientation obligation.

4.67 We believe therefore that it is appropriate to compare Openreach's wholesale ISDN30 charges with the relevant DSACs in order to identify any possible need for one-off reductions. If charges are above DSAC, there is likely to be a good case for one-off reductions. If charges are below DSAC, but above FAC, the case for one-off reductions is likely to be much less strong, in the absence of other factors. We have therefore asked Openreach to provide the necessary data (as ISDN30 is not currently subject to cost orientation obligations, DSAC data have not routinely been reported by BT in its regulatory financial statements). We discuss the outcome of our analysis in more detail in section 5.

Other charge control design issues

We propose to retain RPI as the relevant inflation index

4.68 We propose to retain the retail price index (RPI) measure of inflation index in the price control formula (i.e. RPI-X). However, as in past charge control reviews, we have considered alternatives to RPI. These include the consumer price index (CPI), which excludes costs related to owner-occupation of housing and some other items and is calculated in a different way to the RPI,[78] and also RPIX which calculates the RPI excluding mortgage interest payments.[79] There are also telecommunications specific price indices, which would more accurately track telecommunications related prices.

4.69 It is important that price caps have the effect of indexing price levels against a fixed measure, which is outside the control of the firm subject to the price cap. RPI and other variants of RPI (which exclude mortgage and indirect taxes) all have this characteristic.

[74] Distributed Long Run Incremental Cost (DLRIC).
[75] Distributed Stand Alone Ceiling (DSAC).
[76] The test is "first order" because, although an important consideration in itself, other factors are also taken into account before reaching a view on cost-orientation.
[77] Competition Commission, *Cable & Wireless UK v Office of Communications*, Determination, Case 1112/3/3/09, June 2010, available at: http://www.competition-commission.org.uk/appeals/communications_act/final_determination_excised_version_for_publication.pdf.
See, for example, paragraph 3.224 where the CC notes that "*C&W agreed that when the prices of services were outside the DLRIC-DSAC range, it was right to bring them back in".*
[78] The CPI is a "geometric mean" whereas the RPI is an "arithmetic mean".
[79] For a more detailed discussion, see our April 2010 consultation on wholesale mobile voice termination (MCT), and references therein at http://stakeholders.ofcom.org.uk/binaries/consultations/wmctr/summary/wmvct_consultation.pdf.

4.70 We consider that an advantage of RPI is its familiarity to stakeholders, which means that its use as a price control index enhances the transparency of the system. Adjustments for mortgage interest and/or indirect taxes would detract from this. Telecommunications specific indices have the disadvantage that Openreach's prices would be a major input to them and so there would be circularity in setting price controls for Openreach on this basis.

4.71 For the above reasons we believe that RPI continues to be the best index for price control in telecommunications.

Question 6 Do you agree that the proposed charge control on wholesale ISDN30 should be indexed to RPI?

We have not considered the treatment of discounts in detail

4.72 Openreach does not currently provide any form of discount off its standard prices for wholesale ISDN30 services and we do not currently expect it to do so. We do not therefore propose to consider the issue of discounts in detail in this consultation. In the event that Openreach were to propose discounts on wholesale ISDN30 services in the future, Openreach would need to ensure that there was no breach of the obligation not to discriminate unduly.

4.73 In other charge controls, for services where Openreach offers such discounts, we have stated that discounts are likely to be considered unduly discriminatory if they appear to favour BT's downstream businesses. We have also decided that price reductions made in the form of discounts should not contribute towards Openreach meeting its charge control obligations.

We propose to use prior year revenue weights

4.74 The proposed charge controls on Openreach will limit the weighted average increase in Openreach's charges to a maximum of RPI-X. Under a basket approach, it is necessary to calculate the basket weights that are used in the calculation of the values of X and to assess Openreach's compliance with the controls. Regulators who have applied this form of control have generally used one of two main methods of calculating these weights – "prior year revenue weights" or "current year revenue weights".

4.75 Under the prior year weighting approach, basket weights are set equal to the proportions of basket revenues accruing to the relevant services in the year prior to the one in which the price change occurs. Under the current year weighting approach, the weights are set equal to the proportion of current year basket revenues accounted for by each service as a proportion of total current year revenues. A current year weighted control may take the form of a control on average revenue.

4.76 We have generally preferred prior year weighting because current year weighted controls have two significant disadvantages. The first is that current year weights cannot be calculated with certainty until after the end of the price control year in which compliance is being assessed, because current year revenues will only be known with a significant time lag. This means that, to decide how far to reduce prices, the firm has to make forecasts of weights, with the consequent need for retrospective adjustment for forecast errors. Some energy network services in the UK are subject to average revenue controls, which incorporate such adjustment

factors. For example, where actual revenues recovered in a particular formula year exceed allowable revenues (implied by the charge control), then the charge control includes a factor for any such over-recovery (or under-recovery).

4.77 In addition, a second potential disadvantage may arise where a control based on current year weights takes the form of a control on average revenue. In this situation, average revenue can be affected by product mix within the basket. For example, average revenue will fall if the quantity sold of a lower price product within the basket increases relative to the quantity sold of a higher priced product, even if the prices of both products are unchanged. This is sometimes referred to as the "apples and pears problem".[80] In some markets (for example gas or electricity markets) in which average revenue controls have been used, output can be expressed in a convenient common unit, which avoids this problem, but this is much less likely to be true in telecoms markets.

4.78 By contrast, a prior year weighted control relies only on revenue information which is (or can be) already known when setting prices to comply with the control. In addition, it also has some theoretical advantages which mean that, under certain conditions, it can induce the regulated firm to set prices to recover common costs in an efficient way.

4.79 However, a feature of prior year weighting is that it does not allow for relative price or volume changes during the year in question (though these will of course be included in the weighting for the following year). This means that prior year revenue weights can have disadvantages when the volumes from different products within a basket are expected to change markedly relative to each other over the period of the charge control. When this occurs, in order to maximise its revenues, the regulated company has an incentive to concentrate the price decreases on the product whose volumes are expected to decrease and concentrate price increases in the products whose volumes are expected to increase.[81] By exploiting changes in basket weights in this way, the firm can in effect "loosen" the charge control, increasing its profits without necessarily making efficiency gains. The risk that changes in weights over time will be exploited can be addressed without abandoning prior year weights. One obvious way is a sub-cap on the charge for the service whose weight is expected to increase. In this way, it is possible to avoid or at least minimise the risks inherent in using prior year weights without the drawbacks of current year weights.

[80] So called because, if apple and pears are sold at different prices, compliance with a control on the average revenue from fruit will be affected by changes in the relative quantities of apples and pears sold.

[81] For example, imagine a basket of two products, X and Y. In year 2009 product X was sold at price £10 and quantity 60 while product Y was sold at price £10 and quantity 40, making total revenues of £1000. In this case, the prior year revenue weight for the year 2010 will be 60% for product X and 40% for product Y, while the average price will be £10. Suppose that as a result of regulation the basket of these two services is subject to a 10% price decrease for the year 2010 (i.e. the weighted average price in 2010 should not be higher than £9). However, suppose in year 2010 the company knows that there will be a change in the relative weight of each product in the basket and that it will only sell 40 units of product X and 60 of product Y. In this situation, the company has an incentive to concentrate the price cuts on the service whose volumes are decreasing while concentrating price increases on the service whose volumes are increasing. For example, by setting prices equal to, say, £6 for product X and £13 for product Y it would obtain revenues of £1020 while still meeting the charge control conditions, given that the weighted average price of the basket will be £6 x 60% + £13 x 40% = £8.8.

4.80 On balance we propose to use prior year weights to calculate the average price of a proposed charge control basket. We discuss details of our proposed charge control baskets in section 5.

Question 7 Do you agree with the use of prior year revenue weights when setting charge control baskets? If not, please explain why.

Section 5

Proposed charge control framework

Introduction

5.1 In this section we discuss the details of our proposed charge control framework for wholesale ISDN30 services, building on the economic principles of section 4. In particular we discuss the following:

- Our proposed charge control baskets for the relevant services;
- Our approach to assessing Openreach's base year costs and any additional adjustments we propose to make;
- Our approach to forecasting adjusted base year costs forward to 2013/14. In particular we discuss the key assumptions we have used and their likely impact on future costs;
- Whether we propose any adjustments to the starting charges of some services;
- The proposed values of X for the relevant basket(s) of services;
- The potential implications of our proposed charge control; and
- How our proposed charge control conditions meet the relevant tests set out in section 88 and 47 of the Act.

Our proposals

5.2 We propose to set the following charge control baskets for wholesale ISDN30 services.

Table 5.1 Our proposed charge control baskets for wholesale ISDN30 services

Baskets	Services included	Revenues 2009/10 (£m)[82]	Proposed control	Proposed safe-guard caps
Wholesale ISDN30 Rental & Connections	Rental per channel p.a. Connections - Fixed - Per channel Enhanced care - Service Level 3 - Service Level 4	9 310 [redacted][83]	RPI-8% to RPI-12%	RPI+5% (on the average connection charge) RPI-0% (on each enhanced care service)
Wholesale ISDN30 transfers	Charge per 30 channel access bearer	1	RPI-0%	N/A
Wholesale ISN30 Direct Dial-In (DDI)	Wholesale ISN30 DDI - Planning - Connection per DDI - Rental per DDI	N/A	RPI-0% (on each DDI charge)	N/A

5.3 In addition to the RPI-X controls summarised in the above table, we also propose a number of **safe-guard caps** to ensure that Openreach does not use the pricing flexibility afforded to it in an anti-competitive manner:

- A safe-guard cap of RPI+5% on the average connection charge. This will limit the potential increase in the average connection charge to RPI+5% in nominal terms, while allowing Openreach some flexibility in rebalancing the individual connection charges (see paragraph 5.158 onwards).
- A safe-guard cap of RPI-0% on each enhanced care service.
- A safe-guard cap of RPI-0% on each DDI service.

5.4 In relation to the **costs** of wholesale ISDN30 services:

- We propose to make a number of adjustments to Openreach's base year (2009/10) costs. The impact of our proposed cost adjustments is to increase base year rental costs by **£71m** or **£33**/channel.
- We have forecast costs in 2013/14 to be **£210m** across the two core charge control baskets (excluding DDI services). The key drivers of our forecasts are the assumed levels of future ISDN30 volumes and forward looking efficiency gains.

5.5 We do not propose to make any one-off adjustments to the **starting charges** of wholesale ISDN30 services.

[82] As per BT's RFSs in 2009/10, page 40.
[83] This figure is estimated. See Annex 6 for a more detailed explanation of our calculation.

5.6 We have also investigated the **potential impact** of our proposed charge controls:

- Our analysis suggests that the resulting falls in wholesale ISDN30 charges are likely to induce only a small proportion (around 8% to 10%) of ISDN30 channels currently provided over Partial Private Circuits (PPCs) to switch to Openreach's wholesale ISDN30 services.

- We have also confirmed that the difference in the prices of wholesale ISDN30 and PPCs will not be reduced below the difference in their incremental costs. This means that operators will continue to have an incentive to use the more upstream input (i.e. PPCs) if this is overall the cost-minimising option.

We propose a combined basket including connections and rentals and a separate control for transfers

We have considered three options for the design of the charge control baskets for core services

5.7 In this section we discuss possible basket design options for core wholesale ISDN30 services which include connections, rentals and transfers. As we have discussed in section 4, in determining the appropriate number of charge control baskets we have had regard to two potentially opposing considerations:

- **Efficient pricing:** Allowing Openreach to set relative prices is more likely to result in an efficient price structure than if we tried to do so ourselves. Efficient pricing will be promoted by having larger and fewer baskets. Creating more baskets than is appropriate given the competitive conditions in the markets being regulated would potentially restrict Openreach's flexibility in setting prices for its products and services in an efficient manner.

- **Competition concerns**: Where services in the same basket face different competitive conditions or BT Retail does not use the same mix of wholesale inputs as its rivals, Openreach could seek to set prices in a way that undermines competition. If there is a risk that pricing flexibility will be used anti-competitively, we are more likely to favour more and smaller baskets. Alternatively, we may seek to address concerns of this sort through the use of sub-caps.

5.8 Following from the above, in arriving at our preferred option, we have considered the following basket design options:

- Option 1: Separate baskets for each of the core wholesale ISDN30 services.

- Option 2: A combined basket for wholesale ISDN30 connections, rentals and transfers.

- Option 3: A combined basket for wholesale ISDN30 connections and rentals, with a sub-cap on connections, and a separate control for transfers.

5.9 Along with the design of the charge control baskets for core wholesale ISDN30 services, we also consider whether a cost orientation obligation and/or the use of safe-guard caps would be appropriate. We discuss each of these in turn below.

Option 1: Separate baskets for each core service

5.10 Including connections, rentals and transfers in separate baskets would give the least scope for anti-competitive pricing. We believe this option would simplify compliance with the charge control and would provide greater transparency and certainty to OCPs on the future prices of Openreach's wholesale ISDN30 services.

5.11 However, we generally seek not to constrain Openreach's pricing behaviour unduly by having baskets which are too narrowly defined. Furthermore, for the reasons discussed in paragraph 5.7, we believe there are benefits to allowing Openreach some flexibility in the re-balancing of connections and rentals within a combined basket.

5.12 Following from the above our preference would be not to set separate baskets for each core wholesale ISDN30 service.

Option 2: A combined basket for wholesale ISDN30 connections, rentals and transfers

5.13 This option would give the greatest pricing flexibility to Openreach. As discussed in section 4, we generally have a preference for broad baskets as they allow for the efficient recovery of common costs. In the case of wholesale ISDN30, this option would allow Openreach to reflect differences in the demand or costs of the three core wholesale ISDN30 services in their relative prices, which would result in more efficient pricing.

5.14 However, this approach could also increase the risk of excessive and/or discriminatory pricing by Openreach. As discussed in section 4, when Openreach uses different wholesale inputs to its competitors, it may have an incentive to discriminate by concentrating price cuts on the services that BT Retail uses more intensively at the expense of services that it does not (i.e. it could raise rivals' costs).

5.15 In fact we have indentified the following three issues which make Option 2 less desirable:

- Firstly, when compared to other OCPs, BT's downstream business uses rentals proportionally more than connections and transfers (see Table 5.2 below). In a combined basket, with no constraints on its pricing flexibility, Openreach could have an incentive to increase charges for transfers and connections and reduce charges for rentals.

- Secondly, in 2009/10 the revenues of transfers and connections represented around 3% of the combined revenues for core wholesale ISDN30 services. This means any increases in the price of transfers and connections would have a very small impact on the average price of the combined basket. This could further increase Openreach's ability to price these services excessively because even large increases in connection or transfer charges would require Openreach to make only a very small reduction in the rental charge for compliance with the overall control.

- Thirdly, Openreach could have an incentive to increase transfer charges to deter switching from BT's downstream business. This is because, as wholesale ISDN30 volumes are expected to decline in future (see paragraph 5.113) OCPs

may compete more aggressively for the remaining ISDN30 customers.[84] Therefore, and as discussed further in paragraphs 5.184 to 5.200, we believe it is important that transfer charges are kept low to avoid an increase in the barriers to switching that could hamper downstream competition.

5.16 Based on the above considerations our preference would be not to set a single basket including each core wholesale ISDN30 service.

Table 5.2 Share of total wholesale ISDN30 service volumes by Openreach's internal and external customers

		2007	2008	2009	2010
Rentals	*Internal*	86%	80%	75%	68%
	External	14%	20%	25%	32%
Connections	*Internal*	80%	72%	62%	56%
	External	20%	28%	38%	44%
Transfers	*Internal*	24%	46%	44%	31%
	External	76%	54%	56%	69%

Source: BT RFSs 2008/09 and 2009/10

Option 3: A combined basket for wholesale ISDN30 connections and rentals (with a sub-cap on connections) and a separate basket for transfers

5.17 The possible disadvantages of Option 2 discussed above can be mitigated by implementing a combined basket for rentals and connections and a separate control for transfers.

5.18 A combined rentals and connections basket will provide a number of advantages. Firstly, a combined basket would allow Openreach flexibility in the way it recovers the underlying costs of rentals and connections. The way in which Openreach allocates costs to services is driven by accounting conventions which, if reflected exactly in prices, may not always result in charges which are economically efficient.

5.19 As we explain below, for economic efficiency, prices should reflect variable (or marginal) costs. If fixed costs need to be recovered in prices, which is the case for one-way access services, the best way to do so is by means of service specific mark-ups which capture the responsiveness of demand to changes in price. Openreach's FAC estimates for these services include an allocation of fixed and variable costs, but the allocation does not reflect the way demand changes when prices change. Setting all prices equal to the FAC of the service in question is then unlikely to result in the most economically efficient way of recovering fixed costs. In the case of wholesale ISDN30 services, it may therefore be more efficient for some costs which are allocated to connections to be recovered, over time, through rentals. This can be achieved by including rentals and connections in the same basket.

[84] As an example, during the current economic downturn and in the context of a decrease in the total ISDN30 retail market, we have observed an increase in the volumes of transfers. There is a possibility that due to the decline in the retail ISDN30 market OCPs will compete more aggressively for the remaining ISDN30 customers, which could result in transfer volumes remaining at relatively high levels.

5.20 Secondly, the rental price is close to DSAC, while the current average connection price is below our estimate of FAC. We therefore think it is likely that price reductions required by the control will be concentrated on rentals, and that connection charges may rise in future, although by how much is not clear. However, if we imposed a separate control on connections alone, under an RPI-X approach, there would be a strong incentive on Openreach to raise these charges to the fullest extent allowed under the cap. We do not think such increases in the prices of connections would necessarily be beneficial for consumers. On the other hand, a combined basket gives Openreach the flexibility to choose a slower rate of rebalancing if market conditions suggest that this is appropriate.

5.21 We also do not propose to apply a cost orientation obligation on wholesale ISDN30 rental prices. This is because ISDN30 revenues represent the majority of the revenues in the combined rentals and connections basket (97% of combined rental and connection revenues in 2009/10) and the proposed value of X, together with the requirement for charges to be fair and reasonable and not unduly discriminatory, will be a more effective constraint on the level of the rental price.

Safe-guard cap on connections

5.22 Some additional limit on Openreach's flexibility to raise individual connection and rental prices within the overall basket may be desirable. In particular, large increases in connection charges would disadvantage external customers who purchase more wholesale ISDN30 connections than rentals (see Table 5.2). In 2009/10 connections represented around 3% of the total revenues from connections and rentals. This means that in a combined basket, significant increases in the price of connections could be compensated by relatively small decreases in the price of rentals. This type of pricing behaviour can be avoided by imposing a sub-cap on the average connection price. For reasons discussed later (see paragraph 5.32) we propose to limit increases in the average connection charge to RPI+5% per annum.

5.23 We acknowledge that the proposed sub-cap represents a (marginal) increase in the complexity of regulation. However, in our view this would be mitigated by the fact that the combined basket includes a very small number of services (five) when compared to other charge control baskets we have set in the past.[85]

5.24 As our preference would be to impose a safe-guard cap on the average connection price, we do not think a cost orientation obligation is also required. The safe-guard cap will ensure that Openreach does not raise the average connection price above the maximum level prescribed by it. We recognise that such a safe-guard cap will not constrain the maximum (or minimum) level of the individual connection prices. However, as discussed in paragraphs 5.32 to 5.40, we do not believe Openreach would have an incentive to re-balance the two connection charges in an anti-competitive manner. In addition, the requirement for charges to be fair and reasonable and not unduly discriminatory will apply.

Separate basket for transfers

5.25 Transfer charges have an important role in facilitating switching between providers at the retail level. In general, companies do not charge their customers when they transfer in from another OCP and we would be concerned if an increase in the

[85] For example the TI basket in the LLCC includes in excess of 100 services. See the LLCC Statement at:
http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/statement/llccstatement.pdf

transfer charge would lead them to do so. We therefore consider that transfer charges should be included in a separate basket.

5.26 Openreach levies two separate transfer charges:[86]

- A connection charge per access bearer. Openreach currently levies a transfer charge of £75 for a 30 channel access bearer. This charge applies when an incoming end user or OCP takes over service at a site where it already exists (no new external wiring is provided) and where there is no break in service. This transfer must take place on the same calendar day. Where there is a delay between one customer ending service and a new customer requiring service, i.e. not on the same day, the new customer is required to pay the full connection charge (which includes £550 per installation and £30 per channel).

- A pre-validation charge. Openreach also levies a pre-validation charge of £3.50 per installation. Pre-validation is used to check whether the service a gaining OCP wishes to offer is compatible with the service currently being provided over the relevant bearer. This service is only used in a minority of cases[87] and consequently we are proposing to exclude it from the basket of transfers. We instead propose to treat pre-validation as an ancillary service, subject to the fair and reasonable charging provision. Our proposals for ancillary services are discussed in more detail in paragraph 5.59.

5.27 We propose transfer charges are included in a basket of their own. This will ensure that the most appropriate form of price regulation is applied to this service avoiding unintended consequences in the downstream market where high switching costs may dampen competition and reduce consumer welfare. We discuss these points in more detail in paragraphs 5.184 to 5.200.

5.28 As for wholesale ISDN30 rentals, we also do not propose to apply a cost orientation obligation on wholesale ISDN30 transfers. This is because transfers are included in a basket on their own which will be more effective at constraining the level of the transfer price.

Our proposals

5.29 In light of the above considerations, we propose to implement Option 3.

- **Combined basket for wholesale ISDN30 rentals and connections**. We believe there are significant benefits in allowing Openreach some pricing flexibility for connection and rental charges by including both services in a combined basket. We consider that the risk of Openreach using its pricing freedom for anti-competitive purposes will be limited by imposing a sub-cap of RPI+5% on the average connection charge, together with the requirements for charges to be fair and reasonable and not unduly discriminatory.

- **Separate basket for transfers**. We consider transfer charges are important in facilitating switching and promoting further competition. We therefore propose to make them subject to a separate control. We do not think it would be desirable

[86] For these charges see Openreach Carrier Price List at:
http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=CRdZCG1nNAFk46d2aTKmailhWjbv3ISjzoi4SeIn498lMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D

[87] ✂

for Openreach to have the flexibility to increase transfer charges, offset by reductions in other charges, which it would enjoy if transfer charges were included in the main basket.

- **No cost orientation obligation**. We are not proposing to impose a cost orientation obligation on core wholesale ISDN30 services. This is because we consider that the low number of services in the charge control baskets and the presence of safe-guard caps where appropriate, together with the requirements for charges to be fair and reasonable and not unduly discriminatory, will be more effective at constraining the level of prices.

5.30 We are mindful that our basket design proposals differ slightly from the current proposals for WLR/LLU charge controls.[88] The basket structure proposed for those controls, which includes separate baskets for each core service, reflects considerations which are less relevant to wholesale ISDN30 services. In particular, Wholesale Line Rental (WLR)/Shared Metallic Path Facility (SMPF) and Metallic Path Facility (MPF) can both be used to provide the same downstream retail services, that is, voice telephony plus broadband internet access. However, BT uses WLR+SMPF whilst its competitors increasingly use MPF. Hence, in the case of WLR/LLU one of our main concerns when designing the charge control baskets is that by giving Openreach wider flexibility to set connection and rental charges, as would be the case in a combined connection and rental basket, it might use this freedom to set charges which would favour BT Retail over OCPs using MPF. As we do not have an equivalent concern in the case of ISDN30, we believe that the benefits of combining connections and rentals, as discussed above, outweigh any potential costs.

5.31 Table 5.3 below lists the services included in our proposed core baskets for wholesale ISDN30 services.

Table 5.3 Proposed baskets for core wholesale ISDN30 services

Baskets	Charges included
Wholesale ISDN30 rentals & connections	Rental per channel per year (currently £141/per channel) One-off connection charge (currently £550/per site) Per channel connection charge (currently £30/channel)
Wholesale ISDN30 transfers	Charge per 30 channel access bearer (currently £75)

Question 8 Do you agree with our proposal to implement a combined basket for wholesale ISDN30 connection and rental services and a separate basket for transfers? Do you also agree with our proposal not to impose a cost orientation obligation on core wholesale ISDN30 services? If not, please explain why.

We are proposing to apply the safe-guard cap on the average connection charge

5.32 Openreach levies two separate connection charges, with an average connection price of £40.71 per channel:

[88] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

- A *per-site* connection charge. Openreach levies a one-off connection charge of £550 on a per new site basis. This charge is only applied once (i.e. it is not charged for additional new bearer connections at the same site) and is independent of the number of ISDN30 channels connected. On average this connection charge is levied on 33% of the total number of ISDN30 bearers and, taking into account that Openreach's estimated an average of 17 channels per bearer, it contributes around £10.71 to the average per channel connection charge.[89]

- A *per-channel* connection charge. Openreach also levies a connection charge of £30 per channel.

5.33 Openreach has indicated to us that this pricing structure is in place for historical reasons, as these prices were charged by BT Retail to its customers before the introduction of wholesale regulation in 2004. The one-off per site charge allows Openreach to recover some of the sunk costs involved in the connection service upfront, given that it does not apply early termination charges (ETC) or minimum term contracts (MTC) at the wholesale level.

5.34 New connections are the main driver of Openreach's capital investment in ISDN30. This means Openreach may have an incentive to increase the one-off charge to recover any capital investment arising from future new demand for wholesale ISDN30 services. A sub-cap on the average connection charge would allow for this, while preventing the average charge from increasing excessively.

5.35 Moreover, we believe that some degree of re-balancing between the two connection charges may be desirable. This is because, as discussed further in paragraphs 5.163 to 5.168, most of the connection costs seem to be driven by the number of new sites connected, rather than the number of ISDN30 channels, whereas the opposite is true for revenues (i.e. most revenues are obtained from the per channel rather than the per site charge). For this reason we believe that, as long as the rebalancing of charges does not have any anti-competitive effects, it would be preferable to allow Openreach some flexibility in the way it recovers its connection costs through these charges.

5.36 To assess the risk of any anti-competitive effects arising from the rebalancing of the per-site and per-channel connection charges, we would need to investigate the number of channels on a per-site basis between internal and external customers. We have not been able to obtain this data as it is not available and it could only be produced at disproportionate cost and effort. We have instead analysed the percentage distribution of ISDN30 circuits provided by Openreach by their level of channel utilisation and on an internal (BT Retail) and external (re-sellers) basis (see Figure 5.1 below). It is our view that this is a reasonable proxy on the basis that channel utilisation will be higher at sites with more channels and a reduction in the per-channel charge will favour those connecting larger numbers of ISDN30 channels per site.

[89] In other words, £550x33% divided by 17 channels (i.e. the estimated average number of ISDN30 channels in a bearer) is roughly equal to a £10 contribution to the average per channel connection charge. We note that the current average per channel connection charge is £40.71, which is roughly based on the sum of the £30 per channel charge and the £10 contribution of the one-off connection charge to the average per channel charge.

Figure 5.1 Percentage distribution of ISDN30 circuits by their level of channel utilisation and on an internal and external basis

5.37 Overall it is not clear that BT Retail has a markedly higher share of ISDN30 circuits with a higher level of channel utilisation than re-sellers. In light of this, we believe that the incentive for Openreach to increase the one-off connection charge for anti-competitive purposes is likely to be small. This is also supported by the fact that since the introduction of the requirement to provide wholesale ISDN30 services Openreach has not rebalanced these two charges. Additionally, Openreach's flexibility in rebalancing the two connection charges will be limited by the obligation not to unduly discriminate[90] and the obligation to set charges that are fair and reasonable.[91]

We propose to set a safe-guard cap of RPI+5% on the average connection charges

5.38 Above we have discussed that some degree of re-balancing between the per-site and per-connection connection charges may be desirable. We have also noted that the incentive for Openreach to increase the per-site connection charge for anti-competitive purposes is likely to be small. However, as discussed in paragraphs 5.22 to 5.24, our view is that the average connection charge should be subject to a safe-guard cap. This means that in a combined basket, Openreach's ability to increase the average connection charge materially will be limited.

5.39 We propose to set the level of the safe-guard cap for the average connection price at RPI+5%. The level of the sub-cap is set such that at the end of the proposed charge control period (by 2013/14) the average connection price could rise up towards our estimated average FAC.

5.40 The proposal is for a sub-cap on the increase in the average connection charge, not for another basket control on a weighted average of the changes in the individual connection charges. We think that this is appropriate in this case without complex "true-up" mechanisms because we expect the average to be reasonably stable and predictable and because the cap is only a safeguard within the main basket. As such we would not necessarily expect Openreach to increase prices right up to the maximum permitted by the sub-cap. For the purposes of assessing compliance with the main basket constraint, we will calculate the weighted average of the change in the two connection charges separately, using weights based on shares of prior year revenues in the usual way.

Our proposals

5.41 For the reasons set out above we propose to impose the sub-cap of RPI+5% to the average connection charge per channel.

[90] See Condition AAA(IS)2 in Annex 5 of the Market Review
http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf
[91] See Condition AAA(IS)1(a) in Annex 5 of the Market Review
http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf

Question 9 Do you agree with our proposal to impose a safe-guard cap of RPI+5% on the average connection charge? If not, please explain why.

We propose to include enhanced care services in the combined rentals and connections basket

5.42 Enhanced care services offer end users higher levels of care (in response to reported faults) than is available to customers of the core wholesale ISDN30 rental service. Additionally, customers are able to choose a range of one-off expedited repair services.

5.43 Openreach has recently harmonised its enhanced care services across some of its portfolio of products.[92] WLR and LLU enhanced care services were the focus of this harmonisation initiative which, at that stage, excluded wholesale ISDN30 services.

5.44 There are currently three care levels for wholesale ISDN30, as shown in Table 5.4 below. Openreach also offers one-off expedited repair services for wholesale ISDN30 which enables customers to expedite repairs by moving from Service Level 3 to Level 4 at a one-off cost of £500 per bearer.[93]

[92] For information on the repair service levels offered to Openreach WLR, LLU, ISDN2 and ISDN30 customers see:
http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

[93] See Openreach Carrier Price List at:
http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

Table 5.4 Service maintenance levels for wholesale ISDN30

	Operational hours	Target Repair Time	Price (per channel)[94]	% of total customers (Nov-2010)
Service Level 2	08:00 – 17:00 (except Sunday and bank holidays)	< 1 – 2 working days depending on time of fault report[95]	Included in line rental	75%
Service Level 3	08:00 – 21:00 Monday to Sunday	Next ½ working day (reported am fixed pm; reported pm fixed next am)	£25.20	✂
Service Level 4	24 hours/Monday to Sunday	6 hours repair time	£27.20	✂

Source: Openreach, Maintenance Options Overview, available at http://www.openreach.co.uk/orpg/home/products/serviceproducts/serviceharmonisation/serviceharmonisation.do

5.45 The price of Service Level 2 is included within the core rental charge and is used by 75% of current customers. Service Levels 3 and 4 (enhanced care services) are used by the remaining 25% of wholesale ISDN30 customers.

5.46 We would be concerned if Openreach was to increase the price of enhanced care services in order to recoup some of the lost revenues from the core rental product. Openreach's incentive to do so will be minimised to the extent that internal (BT Retail) and external customers purchase a similar proportion of enhanced care services. We have not been able to ascertain this.[96] We have therefore considered the following options for the regulation of enhanced care services:

- Option 1: Do nothing;
- Option 2: Apply a cost orientation requirement;
- Option 3: Impose a requirement on Openreach to keep the current relationship in the price of WLR and ISDN30 enhanced care services;
- Option 4: Impose a safe-guard cap; and
- Option 5: Apply a charge control on enhanced care services.

5.47 As we have discussed in section 3, some of the above options are not mutually exclusive. For example Option 2 could also be used as a complement to Option 5.

[94] See Openreach pricing list for repair services: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

[95] Under the service description, Openreach states that faults are repaired by the end of the next working day (i.e. 23:59 pm of the next working day), which may result in one to two working days depending on the time at which the fault is reported.

[96] Openreach currently report revenues and costs of ISDN30 enhanced care products as part of the overall WLR enhanced care services. Therefore we have been unable to obtain a disaggregation of the costs and revenues of ISDN30 enhanced care services. Similarly, Openreach have not been able to provide a split of ISDN30 enhanced care service volumes by internal and external customers.

5.48 Under Option 1 we would not set any specific price regulation on enhanced care services. Instead we would rely on a constraint from the regulated price of the core service as well as *ex-post* remedies and existing SMP remedies (i.e. obligation to set charges that are fair and reasonable). This approach was applied in the case of WLR enhanced care services and it is effective if the regulated price of the core rental will constrain the price of higher standards of care. However, in the case of wholesale ISDN30 services we do not have any evidence that the standard care level (Service Level 2) and the enhanced care services (Service Level 3) are good substitutes. On the face of it, the extent of demand for enhanced care at the current significant price premium over the price of standard care is consistent with the view that substitutability may be limited, at least for some customers. Therefore we consider that Option 1 is unlikely to be effective.

5.49 We are also of the view that Option 2 of applying a cost orientation requirement would not be appropriate. The usual first order test for cost orientation is whether a charge is between DLRIC and DSAC. In most cases the range between DLRIC and DSAC is wide and DSAC is well above FAC. This is because BT's cost structure is such that a large proportion of costs are regarded as common between services rather than incremental to any particular service and the difference between DLRIC and DSAC is made up of common costs. We are also concerned about whether we could set the differential between the charges for different care levels appropriately which we might be required to do if we relied on the cost orientation condition. In practice, given that the costs of providing enhanced care services are the costs of reprioritising existing resources, and we do not know how demand for different care levels would respond to changes in the differential, it would be difficult for us to accurately assess the appropriate differential. A cost orientation requirement will also not provide the necessary incentives on Openreach to align the price of these services with the underlying costs of provision and it is unlikely to be effective in that regard.

5.50 Under Option 3 we would require Openreach to maintain a fixed relationship between the relative prices of WLR and ISDN30 enhanced care services. For example, we could specify that the charge for ISDN30 enhanced care should not exceed a certain multiple of the charge for the equivalent level of WLR care. As stated in the WLR/LLU charge control consultation, we believe that the charges for WLR enhanced care services are constrained by the regulated price of the core service. If an explicit requirement were created to ensure that enhanced care services for ISDN30 services do not become misaligned from WLR services, the WLR core rental price would then become an "anchor" constraining the level of charges for enhanced care services across WLR and ISDN30. We have considered whether such a requirement would provide an adequate level of protection.

5.51 However, we do not believe this would be appropriate for ISDN30 enhanced care services. This is because, although Openreach has harmonised enhanced care charges across WLR and LLU, it has not done so for wholesale ISDN30 services. There are a number of differences between WLR and wholesale ISDN30 services. Wholesale ISDN30 enhanced care services continue to be charged on a per-channel basis (rather than on a per-line basis as is the case for WLR and LLU) and, when converted to a per-line basis, the charges are much higher than the price of enhanced care services for WLR and LLU.[97] Openreach has argued that this

[97] For example Openreach's current charges for Service Maintenance Level 3 are £25.20/per-channel for wholesale ISDN30 services and £37.20/per-line for LLU MPF services. On a per-line basis ISDN30 users are paying considerably more (£428 assuming an average of 17 channels per an ISDN30 bearer) for this level of care than users of this level of care for LLU MPF services.

difference is due to the fact that ISDN30 services require more manual intervention and are therefore more expensive to service, but has not shown that the charge differences reflect differences in cost. Following on from this, although Option 3 would be desirable as it will ensure consistent regulation of enhanced care service across Openreach's portfolio, we do not believe it would be effective in constraining the price of enhanced care services for ISDN30 and in aligning these with the underlying costs of provision.

5.52 An alternative approach would be to set a safe-guard cap which limited further price increases (e.g. RPI+0%) as per Option 4. While this approach would provide protection to consumers it would in practice become the binding constraint on prices rather than a safeguard. In addition, a safe-guard cap will not provide the necessary incentives on Openreach to align the price of these services with the underlying costs of provision and therefore would not be an appropriate option for us to implement.

We propose a charge control on wholesale ISDN30 enhanced care services

5.53 Following from the above we propose that a charge control on enhanced care services is most appropriate i.e. Option 5. This could be set by including enhanced care services within the combined wholesale ISDN30 rentals and connections basket. The advantage of this approach is that it will provide the right incentives on Openreach to set the relative prices of these services in an efficient manner, whilst protecting customers against unexpected increases in prices (as the average prices will be constrained by the value of X of the combined basket). In addition, wholesale ISDN30 customers are only eligible for expedited repairs if they are already on Service Level 3.[98] Making the price of wholesale ISDN30 enhanced care services subject to the control will therefore also protect customers requiring expedited repairs.

5.54 We do not currently know the distribution of Openreach's internal and external customers across the various enhanced care services. We would therefore be concerned that, by including these services in the combined rentals and connections basket, Openreach may have an incentive to price anti-competitively by increasing charges for enhanced care levels which are not heavily utilised by BT retail customers.

5.55 We therefore propose a sub-cap of RPI-0% on the price of each enhanced care service (i.e. Service Levels 3 and 4). As a safe-guard cap would be a stronger constraint on the price of enhanced care services, we do not believe a cost orientation obligation is also required.

5.56 We have also considered whether the proposed safe-guard cap could make it harder for Openreach to make adjustments to the configuration of the services and structure of prices to improve efficiency. However, because prices have hitherto been unregulated, we think it is reasonable to assume that Openreach has set relative charges for different care packages at the level it considers likely to maximise its profits in the light of users' willingness to pay for enhanced care. We think it unlikely that there is any strong argument to suggest that the current price differentials should widen.

[98] Openreach only offers expedited repairs from Service Level 3 to Service Level 4 for wholesale ISDN30 services. Expedited repairs are not available from Service Level 2 to Service Level 3.

Our proposals

5.57 Following from the above we propose to:

- **include enhanced care levels** (Service Levels 3 and 4) in the combined wholesale ISDN30 rentals and connections basket; and
- impose a **safe-guard cap of RPI-0%** on the price of each enhanced care service.

5.58 We recognise that our approach for wholesale ISDN30 enhanced care services diverges from the approach adopted in the WLR/LLU charge controls. In our view the differing approaches are justified and we have explained our reasoning in paragraph 5.48.

Question 10 Do you agree with our proposal to include enhanced care services in the combined wholesale ISDN30 rental and connection basket? Do you agree that each of the enhanced care services should also be subject to a safe-guard cap of RPI-0%? If not, please explain why.

We propose to set a safe-guard cap on DDI

5.59 Openreach provides a number of ancillary services which are add-ons to the core wholesale ISDN30 services in that they provide functionality beyond the access connection (see Annex 11). Some of these ancillary services (e.g. outgoing call barring) can be replicated or substituted by similar services either by OCPs or the end-user with features commonly provided on PBXs. However, other ancillary services, including notably Direct Dial-In (DDI) and Calling Line Identification Presentation (CLIP), cannot be replicated by OCPs or end-users.

5.60 By far the most important ancillary service in revenue terms is DDI, with internal revenues in 2009/10 of ✂. Openreach estimates DDI rental charges apply to approximately 90% of installations. The second most important, CLIP, has much lower revenues of ✂ and is supplied with around 40-50% of installations. The rest of the calling and network features apply to around 10% of installations.

5.61 Following our proposal to regulate core wholesale ISDN30 services and, in particular, rental charges (which account for the vast majority of ISDN30 revenues), our key concern going forward would be that Openreach could increase the price of ISDN30 ancillary services excessively in a bid to recoup some of its lost profits on the core services. This could be prevented by imposing some form of price control on ancillary services.

We propose a safe-guard cap of RPI-0% on each DDI charge

5.62 Openreach currently levies three different charges for DDI:[99]

- A planning charge per DDI installation – currently £75 per installation;
- A connection charge per DDI number – currently set at £0.75 per DDI number; and

[99] http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=dLs8GxYbnYP2uRcs8CSohLVXg9qIg6ZASNDEpcqizEglMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D

- A rental charge per number at a DDI installation – currently £0.24 per DDI number per annum.

5.63 DDI accounted for around ✂ of Openreach's revenues for ancillary services in 2009/10. In fact, DDI is purchased almost on a one-to-one basis with wholesale ISDN30 rental services, given that it applies to around 90% of installations. If DDI were always purchased with ISDN30, customers would base their purchasing decisions on the price of DDI and ISDN30 together. The price of either on its own would be of less importance. This means that a control on just one price would also be of limited effectiveness as a reduction in the price of one service could be offset by an increase in the uncontrolled price without affecting demand. DDI is not always purchased with ISDN30, but it is purchased frequently enough to suggest that some control on the DDI charge is necessary to support the main control on ISDN30 charges.

5.64 We note that DDI cannot be replicated using PBXs and, therefore, competition is unlikely to be sufficient to constrain its prices. We have therefore considered the following options for the regulation of DDI services:

- Option 1: Apply a cost orientation requirement;
- Option 2: Apply a charge control; and
- Option 3: Impose a safe-guard cap.

5.65 As we have discussed in section 3, some of the above options are not mutually exclusive. For example Option 1 is usually used as a complement alongside Option 2.

5.66 We consider that Option 1 would not be appropriate and proportionate. The usual first order test for cost orientation is whether a charge is between DLRIC and DSAC.[100] In most cases, the range between DLRIC and DSAC is wide and DSAC is well above FAC. This is because BT's cost structure is such that a large proportion of costs are regarded as common between services rather than incremental to any particular service. If costs which are common to DDI and other services are significant, a first order ceiling on DDI charges based on DSAC could allow Openreach significant latitude to raise DDI prices. In addition, as we discuss in the below paragraph, we do not have reliable cost estimates for these services.

5.67 We also consider that Option 2 of setting an RPI-X charge control on DDI services would not be appropriate and proportionate. Firstly, our main concern is Openreach's incentive to recoup lost revenues in core ISDN30 rental services through increases in the prices of DDI services, rather than bringing DDI charges in line with FAC costs. Secondly, Openreach has not been able to disaggregate the cost of these services from other Network and Calling Features which means we would not be able to set an appropriate value of X.

[100] As highlighted in our clarification on cost orientation in the Wholesale Local Access market, published on our website on 7 December 2010, "*pricing between DSAC and DLRIC is a first order test for cost orientation, and is therefore not determinative. As a consequence, there is no automatic requirement for BT to bring prices inside the DLRIC-DSAC range. Whether or not BT would be required to do so in any particular case would also depend on the results of a second order evaluation of other relevant factors*.", available at : http://stakeholders.ofcom.org.uk/consultations/wla/?a=0.

5.68 Under these circumstances, we consider that Option 3 is most appropriate and proportionate. A safe-guard cap of RPI-0% would prevent Openreach increasing the price of this service materially to recoup lost revenues in core wholesale ISDN30 services.

5.69 Whilst we are not able to establish the underlying cost of provision of this service, we consider that it would be reasonable to assume that the starting charges for DDI are sufficient to recover costs given the lack of price regulation in this market to date. Taking into account the recent history of price reductions we consider that it would be disproportionate to impose other forms of price control.[101]

5.70 We also propose that the safe-guard cap of RPI-0% applies on each DDI service separately (i.e. on DDI connection, DDI rental and DDI planning charge). This is because the DDI rental charge accounts for around ✂ of Openreach's DDI revenues and a safe-guard cap on each charge will ensure that Openreach does not mitigate decreases in the rental charge with material increases in the prices of DDI connection and planning.

We propose the rest of ancillary services should not be subject to a specific charge control

5.71 As discussed above, the majority of Openreach's ancillary services' revenues are derived from DDI. None of the other ancillary services produce revenues which are greater than £500k per annum and, in aggregate, they have only generated revenues of ✂ in 2009/10. It is our view that it would be disproportionate to impose any form of charge control on ancillary services where individual items earn revenues of less than £500k per annum. As highlighted above, it is also impracticable for Openreach to provide robust estimates of the costs of providing these services. Additionally, a cost orientation obligation would also not be appropriate, for the same reasons we have discussed for DDI services. Furthermore, the fact that many of these ancillary services can be replicated by OCPs or end users (using functionality provided by their PBX) acts as a constraint on Openreach's ability to increase prices and, therefore, reduces the need for any form of price control.

5.72 Consequently, we propose that wholesale ISDN30 ancillary services (other than DDI) should not be subject to a specific price control remedy. They will however be subject to the existing fair and reasonable obligation imposed in the Market Review.

Our proposals

5.73 Following from the above we propose that:

- **A safe-guard cap on DDI services**. DDI connection, DDI rental and DDI planning charges are each subject to a safe-guard cap of RPI-0%; and
- **No price control on other ancillary services**. The remainder of the ancillary services continue to be subject to the existing fair and reasonable obligation.

[101] See http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=LKwLbNnZjX7RTVQavc3T9lPGhHskbpGUiFmWrkoVcKolMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D

Question 11 Do you agree that the DDI rental and connection services should be subject to a safe-guard cap of RPI-0%, whilst other ancillary services should not be subject to a specific form of price control? If not, please explain why.

We have developed a cost stack for ISDN30 services in the base year

5.74 As part of the WLR/LLU charge controls, we have developed a two stage modelling process to identify the base year costs for Openreach services (including ISDN30 rental, connections and transfers).[102]

5.75 For the purposes of the 2011 WLR/LLU charge controls we have built our own models based on the models used in the statement entitled "*A New Pricing Framework for Openreach"*[103] (the OFFR statement):

- First, operating costs and capital expenditure are forecast at an Openreach level in the "Cost Forecast" model. These costs have been calculated using an activity based costing model, using data based on historically observed activity levels and costs together with estimates of future demand.

- Second, operating costs and capital expenditure are allocated to individual services in the "Cost Allocation" model to derive unit cost estimates.

5.76 The starting point for these models is Openreach's internal forecasting models. For the purposes of the 2011 WLR/LLU charge controls we have built our own models based on similar information. Specifically, we have:

- modified the Cost Forecast model and extended it to include 2013/14. This model has been audited by Ernst & Young (E&Y); and

- engaged E&Y to modify and extend the Cost Allocation model on our behalf.

5.77 These models are populated with data obtained from Openreach under Ofcom's formal powers and also include our own assumptions. The models therefore provide an initial Ofcom forecast of Openreach's costs for the period 2009/10 to 2013/14.

5.78 We have obtained unit cost stacks for wholesale ISDN30 services from the Cost Allocation model. We consider that these models are an appropriate starting point for our analysis of wholesale ISDN30 costs. However, in order to ensure that the base year cost stacks are appropriate for forecasting ISDN30 costs to 2013/14, we have also made a number of 'off-model' adjustments to the cost stacks. We summarise these in this section and in more detail in Annex 6.

We propose to forecast BT's costs

5.79 In its response to our Market Review, C&W proposed that any charge control should be set by reference to the costs of "an efficient operator" rather than BT's costs.[104] It argued that Openreach's "*cost base is set at a level below that of a*

[102] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/
[103] http://stakeholders.ofcom.org.uk/consultations/openreachframework/statement/
[104] Cable & Wireless, *Review of retail and wholesale ISDN30 markets,* 15 June 2010, available at http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/responses/Cable_Wireless_Worldwide.pdf

hypothetical efficient operator in a competitive market" and that therefore ISDN30 charges should not be brought down to the level of Openreach's costs. The hypothetical operator would be one which, like C&W, purchases 2Mbit/s PPCs from BT Wholesale or uses its own network infrastructure in order to supply retail ISDN30 services.

5.80 C&W also argued that the relevant costs should include the costs of migration from services delivered over BT's legacy network to services provided over BT's Next Generation Network (NGN), as well as taking account of the short remaining life of legacy technology and (possibly), adjusting for BT's scale and scope advantages.

5.81 We are not attracted to the idea of basing a control on Openreach's wholesale ISDN30 charges on the higher costs of another operator, real or hypothetical. To do so could make consumers worse off, as a result of higher charges, and allow inefficient operators into the market. Indeed we expect Openreach to be able to reduce its real unit costs over the period of the control and we take this into account in our proposal for the value of X (by setting an appropriate value for forward looking efficiency gains).

5.82 We also do not believe we should artificially maintain high wholesale ISDN30 charges in order to encourage switching to IP based alternatives (such as SIP Trunking), which are not yet fully accepted by all users. For the reasons set out in section 4, we believe that, if our control is consistent with an anchor pricing approach, it is more likely to provide users with appropriate incentives to make an efficient choice. Users may then decide to switch once they judge the new technology to be a cheaper (or otherwise superior) alternative. As we noted earlier, an anchor pricing approach, in which the charge control is set on the basis of Openreach's costs (based on existing technology), has also been used to set the control on Openreach's LLU and WLR charges. Moreover, the Competition Commission (CC), in its consideration of Carphone Warehouse's appeal of these charges, rejected Carphone Warehouse's contention that the control should have been set on the basis of the costs of NGN technology.[105] Therefore we believe that our approach is the appropriate one to adopt in this case.

5.83 Our approach will in fact address most, if not all, of C&W's concerns. Firstly, we have carried out a cross-check on the differential between the combined wholesale ISDN30 rental and connection charges which will result from our proposed control, and the rental and connection charges for a 2Mbit/s PPC. We have confirmed that the control will not result in the difference in the charges being reduced below the difference in the incremental costs of the two services. This means that operators will continue to have an incentive to use the more upstream input, the PPC, if this is overall the cost-minimising option. We believe our approach will therefore maintain incentives to invest in efficient competing infrastructure and allow an efficient operator using PPCs to compete in the retail ISDN30 market. We have discussed this in more detail in paragraph 5.205.

5.84 Secondly, we have recognised that some of Openreach's ISDN30 assets are now largely depreciated and have adjusted its costs to approximate a steady state level. This is a more appropriate basis on which to forecast the costs of a hypothetical ongoing network and should also help address C&W's concern that Openreach's

[105] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications,* Case 1149/3/3/09 (the OFFR appeal), paragraph 3.75, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

accounting costs may be below the level of an efficient competitor's costs. We have discussed this in more detail in section 3.

5.85 Finally, we have assessed the extent to which the proposed charge control will tend to lead to greater take-up of wholesale ISDN30 services in preference to PPCs and have factored this into the volume forecasts used to set the control, ensuring overall internal consistency. We have discussed this in more detail in paragraph 5.216.

Question 12 Do you agree with our proposal that the costs of wholesale ISDN30 services should be based on BT's costs? If not, please explain why.

We have made further adjustments to Openreach's costs in the base year (2009/10)

5.86 In section 3, we discussed the adjustment we have made to Openreach's depreciated assets in the base year to reflect a steady state network for the purposes of assessing its profitability.

5.87 In addition to the steady state adjustment, we have made a number of regulatory cost adjustments to Openreach's base year costs to ensure that they are relevant for the purpose of developing a forward looking cost forecast for core wholesale ISDN30 services.

5.88 We have ensured that the costs of roll-out of next generation access (NGA) are not included within the cost stacks of ISDN30 products for the purposes of modelling. Cost categories that relate exclusively to NGA have been excluded from the cost model. Common costs have been allocated across services including NGA. We have ensured that ISDN30 costs do not rise as a result of NGA, consistent with our anchor product pricing approach.

5.89 Table 5.5 identifies the key cost adjustments, our estimate of the value of these adjustments in the base year for ISDN30 rentals and provides a brief description of each of them. The adjustments below do not have a material impact on the ISDN30 connection or transfer cost stacks. For a detailed discussion of our cost adjustments see Annex 6.

Table 5.5 Ofcom's proposed base year cost adjustments and the impact on wholesale ISDN30 rentals

Cost adjustment	Total impact (£m)	Impact (£/channel)	Description
Starting values	**142.4**	**66.38**	Ofcom's replication of Openreach's costs.
Steady state adjustment	71.2	33.17	We have uplifted the NRC of line-cards and access electronics to 47% of the GRC and calculated depreciation on the GRC based on Openreach's accounting lives for these assets.
Revaluation of duct	(0.2)	(0.10)	We have used RPI to index post 1997 expenditure, excluding the full value of Openreach's increased duct valuation.
RAV	(0.4)	(0.20)	We have used Openreach's RAV model to provide the necessary adjustment to pre-1997 assets.
Values after adjustment	**213**	**99.25**	Values after above adjustments.

We propose a steady state adjustment

5.90 Some of the wholesale ISDN30 assets (line-cards and access electronics) are heavily depreciated. We have therefore uplifted the NRC of line-cards and access electronics to 47% of the GRC and calculated depreciation on the GRC based on Openreach's accounting asset lives.

5.91 We have discussed this adjustment in detail in section 3 and Annex 6. These arguments are not repeated again in this section.

We propose to exclude BT's revaluation of duct

5.92 BT has increased the 2009/10 valuation of duct to £6.5bn which represents a £1.8bn increase compared to the 2008/9 equivalent valuation. As part of this, BT has estimated that the replacement value of post-1997 assets is £2.9bn.

5.93 As part of the WLR/LLU charge controls, we have reviewed BT's methodology and have considered alternative methodologies. For a full discussion we refer readers to Annex 4 of the WLR/LLU charge control consultation which we rely on for the purposes of this consultation.[106]

5.94 For the purposes of modelling, we have used a different valuation of duct of £2.1bn rather than BT's estimate of £2.9bn.

5.95 Duct does not form a significant part of the ISDN30 cost stack. The impact of using our base case valuation, rather than BT's valuation, is a decrease of approximately **£0.10 per channel** for ISDN30 rentals in 2009/10. This does not impact the ISDN30

[106] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

connection or transfer cost stacks as duct is not part of the asset base of these services.

We propose to take into account the Regulatory Asset Value (RAV) for pre-97 access copper and duct

5.96 The RAV adjustment is an adjustment made in order to restate the value of copper and duct assets acquired prior to August 1997 from a CCA value to an indexed HCA value. This approach was adopted to prevent over- recovery of costs related to assets purchased prior to 1997.

5.97 Openreach has built a model (the RAV model) based on a methodology consistent with that set out in the 2005 Cost of Copper statement. We have reviewed the assumptions in the Openreach RAV model and tested the key inputs and calculations and have found no material errors. On this basis, our view is that the model provides a reasonable basis for determining the RAV adjustments.

5.98 We propose to base the RAV adjustment on the results generated by Openreach's model and have therefore made no further adjustment to this. This is in line with the approach taken in the WLR/LLU charge controls, and we consider there to be no good reason to take a different approach for ISDN30.

5.99 The RAV does not form a significant part of the cost stack for wholesale ISDN30 services. The impact of including the RAV adjustment in the base year costs is to reduce the ISDN30 rental unit cost by approximately **£0.20 per channel.** The RAV adjustment has no impact on the ISDN30 connection or transfer cost stacks as copper and duct do not form part of the asset base of these services.

Question 13 Do you agree with our proposed adjustments to Openreach's cost base in 2009/10 for core wholesale ISDN30 services? If not, please explain why.

We have forecast costs forward to 2013/14

5.100 In order to forecast the costs for wholesale ISDN30 rental, connection and transfer services, we need to consider a number of assumptions. Table 5.6 below identifies the key assumptions we have used, provides a short description for these and proposes the level of such assumptions as we have used in the Ofcom base case scenario.

Table 5.6 Ofcom modelling assumptions for wholesale ISDN30 rental costs

Key assumption	Ofcom base case	Description
Wholesale ISDN30 volume forecasts	19% reduction by 2013/14 (rentals)	Volume forecasts for wholesale ISDN30 connections, rentals and transfers.
Steady state adjustment	NRC/GRC = 47%	We have uplifted the NRC of line-cards and access electronics to 47% of the GRC and calculated depreciation on the GRC based on Openreach's accounting asset lives.
Asset volume elasticities (AVEs)	0.5 (access electronics) 1 (line-cards)	% change in the gross replacement costs of assets for a 1% change in volumes. We have applied this assumption to forecast the adjusted asset costs for access electronics and line-cards.
Capital expenditure (capex)	Varies each year	For modelling purposes we have assumed capex (for access electronics and line-cards) is equal to depreciation in the first year of the proposed charge control. We have then forecast these forward by taking into account changes in the volume of core wholesale ISDN30 services. All other capex is forecast in line with the Cost Forecast model.
Efficiency gains	4.5%	Openreach's expected efficiency savings in each year of the proposed charge control period.
Weighted average cost of capital (WACC)	9.3%	The WACC is used to calculate the return on capital employed (ROCE) which is added into the cost stack of individual services. We propose ISDN30 services should attract "the rest of BT" rate.
Inflation rate	2.5% (operating costs) 3% (pay costs)	The Cost Forecast model forecasts costs in nominal terms. We therefore have to assume an appropriate rate of inflation for Openreach's input costs.
Asset price inflation	RPI (varies each year)	The RAV model and Cost Allocation model assume that assets increase in line with RPI.

We propose to forecast volumes of wholesale ISDN30 services in two stages

5.101 In order to account for the impact of our charge control proposals, we are proposing to forecast volumes for core ISDN30 services in two stages:

- Stage 1: First, we forecast volumes of core services at current prices (Stage 1 volume forecasts). These volume forecasts are then used to estimate the initial values of X for core wholesale ISDN30 services.

- Stage 2: We then adjust our original volume forecasts to take into account the impact on demand of price changes implied by the X derived in Stage 1 (Stage 2 volume forecasts).

5.102 We describe our volume forecasts in more detail in Annex 8.

We have estimated that volumes of wholesale ISDN30 rental services will decrease by around 19% by 2013/14

5.103 In order to estimate Stage 1 volume forecasts for wholesale ISDN30 rental services we have taken into account a number of sources of information available to us which we have summarised in Table 5.7 below. More details of the forecasts and the market research are included in Annex 8.

Table 5.7 Various forecasts for wholesale ISDN30 rental volumes

	Range of assumptions
Stakeholder forecasts	- 0% to -50%
Market research	- 14% to -44%
External consultants forecast	-20% to -30%
Forecast based on 2009-2010 trend in retail ISDN30 volumes	-24%

5.104 Out of the various sources of information, we propose to give more weight to stakeholder forecasts[107] and our own survey evidence in the Market Review.[108] This is because both of these sources are forward looking: stakeholder forecasts reflect their view of future switching in the ISDN30 market, while our market research looked at customers' willingness to switch and responsiveness to price changes in the future. This information revealed the following:

- Stakeholder forecasts are varied. These range widely from the expectation of a decline in the range of 0% to 10% throughout the charge control period to a 40% to 50% decline in wholesale ISDN30 volumes by the end of it.[109] The observed variability in forecasts shows that there is significant uncertainty surrounding the likely developments in the ISDN30 market and take up of IP based alternatives.

- Our own survey conducted in 2009 found that 14% of users were considering switching away from ISDN30, while 44% of current retail ISDN30 consumers could stop using it by 2013/14. As it is quite difficult for respondents to speculate

[107] We have received forecasts from three OCPs, including Openreach. More detail on these is included in Annex 8.
[108] We conducted a market research study as part of our Market Review. This report can be found at http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf
[109] More details of the individual forecasts are given in Annex 8.

about their choice of technology five years into the future,[110] we propose to give more weight to the lower number.

5.105 Based on the above, we have forecast a Stage 1 decline in the volumes of wholesale ISDN30 rentals of 27.5% (i.e. 590k channels) by 2013/14. This estimate falls roughly in the middle of stakeholder forecasts and is also broadly in line with the recent trends in the retail ISDN30 market. If we project the recent decline of around 6.6% in the year to June 2010 this would be equivalent to a 24% decline for the period between 2009/10 and 2013/14.[111]

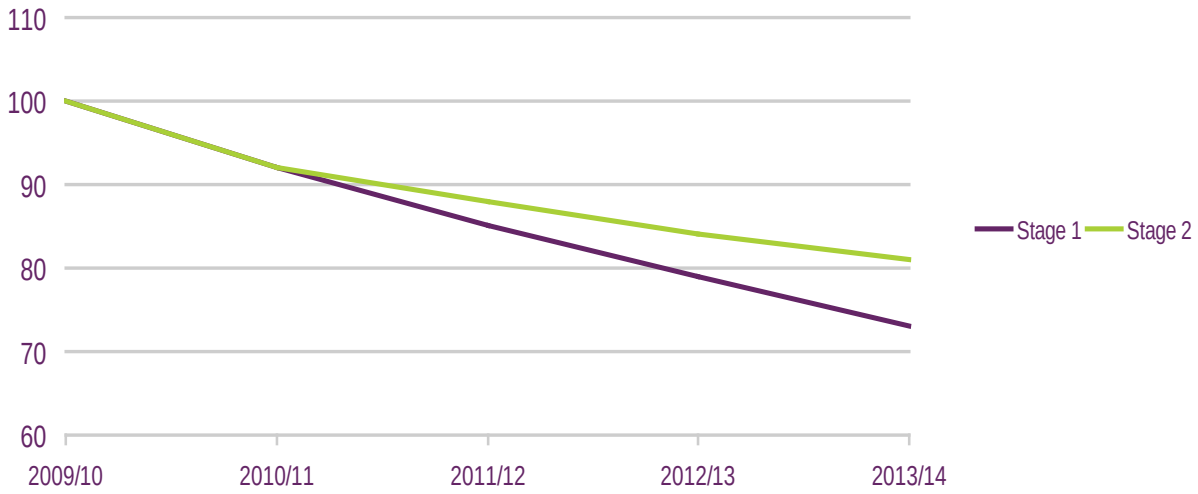
5.106 Using our volume forecasts from Stage 1, we have first estimated the change in the price of wholesale ISDN30 rentals (i.e. the value of X) and we have then calculated the impact of the resulting price decline on the demand for wholesale ISDN30 rental services. Based on our analysis, our proposed initial decrease in the rental price would increase our Stage 1 volume forecasts by around 11.5% (i.e. 179k channels). This is for the following reasons:[112]

- Switching of ISDN30 provision from 2Mbit/s PPCs to Openreach's wholesale ISDN30 services. This would increase Stage 1 volumes by around 0.7%;
- Increased retail demand for ISDN30. This would increase Stage 1 volumes by around 5.0%; and
- Reduced switching to IP-based alternatives. We consider that a reduction in the wholesale ISDN30 price is likely to decrease the extent of switching to IP based alternatives. This would increase Stage 1 volumes by around 5.7%.

5.107 **Following from the above we have forecast an overall Stage 2 decline in wholesale ISDN30 rental volumes of 19%** (i.e. 411k channels) by 2013/14 (see Figure 5.2 below).[113]

[110] The 44% figure is derived from the proportion of respondents to a December 2009 survey who answered that they only planned to use ISDN30 for the next five years. For further details see Annex 8.
[111] Calculated as (1-0.066)^4-1.
[112] For details of the calculations of the volume effects of our proposed charge control, see Annex 8.
[113] Although we have proposed a three year charge control period (between 2010/11 and 2013/14), our latest historic data is for 2009/10 which means we also forecast volumes for 2010/11.

Figure 5.2 Ofcom proposed volume forecast trend for wholesale ISDN30 rental services (indexed to 100 in 2009/10)



We have estimated that volumes of wholesale ISDN30 connection services will decrease by around 10% by 2013/14

5.108 We have forecast wholesale ISDN30 connection volumes in a manner consistent with our forecast of rental volumes both in Stage 1 and Stage 2.

5.109 We have derived Stage 1 connection volumes based on our Stage 1 rental volumes. To do this we have assumed that the difference in the rental volumes of two consecutive years should be equal to the amount of gross connections (i.e. the number of new subscribers to ISDN30) less churn (i.e. the loss of customers subscribing to ISDN30).

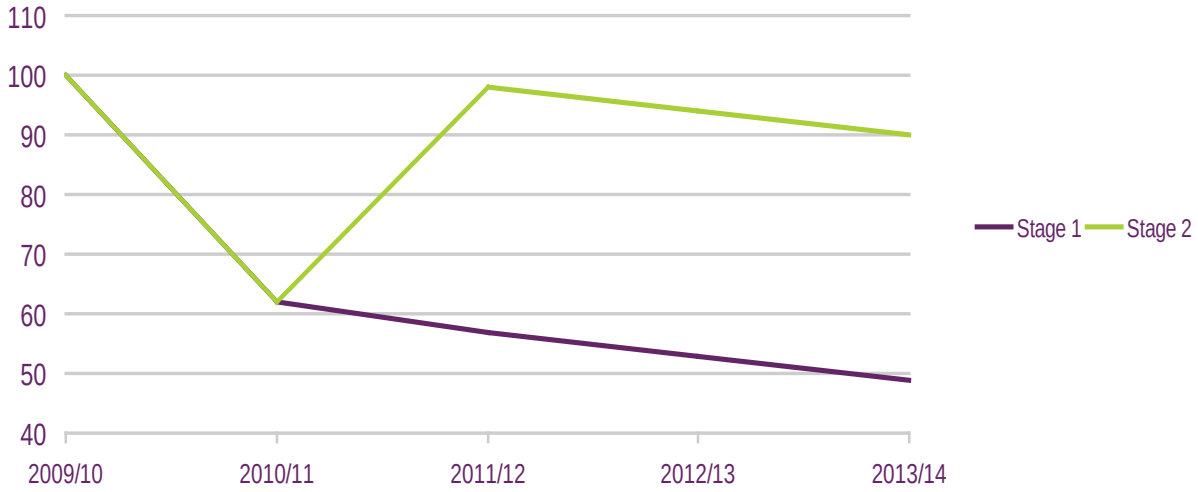
5.110 In order to calculate Stage 1 connection volumes, we have first calculated the average churn rate for the period running from 2004/05 to 2009/10 (equal to 14.2% of rental volumes) and applied it to our Stage 1 rental volume forecasts to obtain the churn volumes for each year between 2010/11 and 2013/14. We have then calculated the annual gross connection volumes for the period 2010/11 to 2013/14 by adding the churn volumes to the difference in the rental volumes calculated in Stage 1.

5.111 Following this approach we have estimated a Stage 1 decline in connection volumes of 51% by 2013/14. We have then calculated our Stage 2 connection volume forecasts using the same approach described above (Figure 5.3).[114]

5.112 **Overall, we have estimated a Stage 2 decline in wholesale ISDN30 gross connection volumes of around 10% by 2013/14**.

[114] We note that a similar increase in 2010/11 is not observed in the case of rental volumes. This is because rental volumes are cumulative and the impact of switching from 2 Mbit/s PPCs and increased retail demand is only recognised at the end of the control in 2013/14. Connection volumes on the other hand are discrete events which happen every year, whereby the impact of switching from 2 Mbit/s PPCs and increased retail demand is recognised in every year of the control as relevant.

Figure 5.3 Ofcom proposed volume forecast trend for wholesale ISDN30 connection services (indexed to 100 in 2009/10)[115]



We have estimated that volumes of wholesale ISDN30 transfer services will decrease by around 7.5% by 2013/14

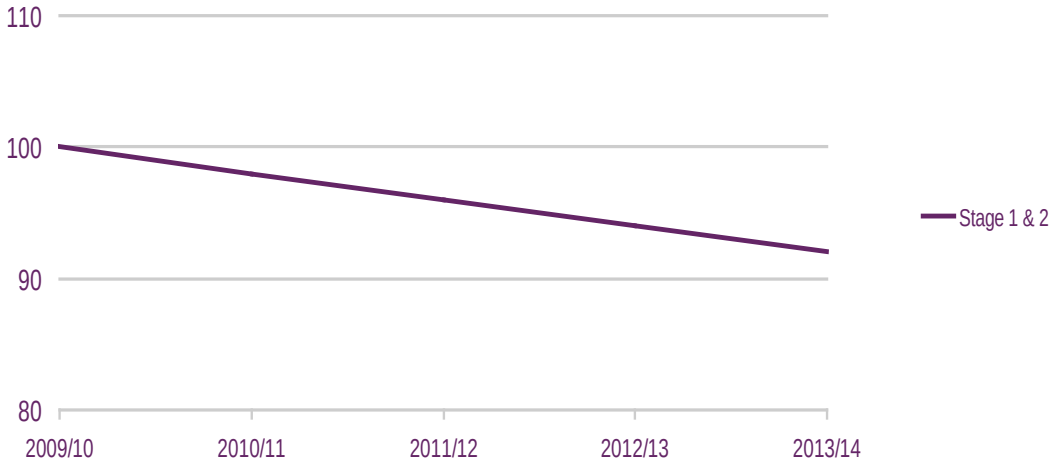
5.113 The likely impact that our predicted decline in the volume of ISDN30 rentals would have on switching is unclear. On the one hand, the volume of transfers is likely to be positively correlated with the total size of the wholesale ISDN30 market.

5.114 On the other hand, it could be argued that even if the wholesale ISDN30 market is expected to decline, transfers would remain fairly stable on the basis that BT Retail and re-sellers are likely to compete more aggressively for the remaining ISDN30 customers. In fact, as discussed in Annex 8, this is the outcome observed in the recent past, where the decline in total volumes due to the economic recession has led to an increase, rather than a decrease, in the level of transfers.

5.115 Therefore, bearing in mind that our Stage 2 volume forecasts predict a decline of 19% in rental volumes by 2013/14, **we propose to assume a smaller decline in transfer volumes in the range of 5% to 10%** during the period of the charge control. This recognises that there is likely to be an increase in the intensity of competition. For modelling purposes we propose to use the middle of the range, i.e. **a total decrease in transfer volumes of 7.5%**.

[115] Although we have proposed a three year charge control period (between 2010/11 and 2013/14), our latest historic data is for 2009/10 which means we also forecast volumes for 2010/11.

Figure 5.4 Ofcom proposed volume forecast trend for wholesale ISDN30 transfer services (indexed to 100 in 2009/10)[116]



Question 14 Do you agree with our volume forecasts for wholesale ISDN30 rental, connection and transfer services? If not, please explain why.

We propose to forecast our proposed steady state adjustment to 2013/14

5.116 As we have discussed in section 3 and Annex 6, we propose to adjust the heavily depreciated wholesale ISDN30 assets (line-cards and access electronics) in the base year to reflect a network at steady state (steady state adjustment). We propose to implement this adjustment in the base year by:

- uplifting the NRC/GRC ratio to 47%;
- calculating the ROCE on the uplifted NRC; and
- calculating the resulting depreciation based on Openreach's asset lives and GRC.

5.117 Once we have calculated the adjusted depreciation for 2009/10, we have assumed that in a steady state capital expenditure and disposals will equal depreciation. As the Cost Forecast model is in nominal terms, we have then forecast these items to 2013/14 by applying the asset inflation rate used in the RAV model (RPI[117]):

- Capital expenditure is forecast using an estimate of RPI p.a. and efficiency of 4.5% (see below) and adjusted to reflect declining volumes (see below).
- Disposal values are forecast to increase at the projected rate of RPI in 2010/11 and at the estimated rate thereafter. This is discussed in more detail below.
- Depreciation is calculated as the GRC for each year divided by the accounting asset lives.

[116] Although we have proposed a three year charge control period (between 2010/11 and 2013/14), our latest historic data is for 2009/10 which means we also forecast volumes for 2010/11.
[117] We forecast RPI in line with the WBA charge control consultation of 4.4% in 2010/11, 3.6% in 2011/12, 2.7% in 2012/13 and 3% in 2013/14. This is based on Treasury forecasts. See http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf

- The ROCE unit cost is calculated as the NRC for each year multiplied by the proposed WACC of 9.3% (discussed above).

5.118 We discuss the mechanics of our calculations in more detail in Annex 6.

We propose to forecast the GRC of access electronics and line-cards using an AVE of 0.5 and 1 respectively

5.119 We propose to forecast the adjusted GRC of line-cards and access electronics in proportion to appropriate asset volume elasticities (AVEs). An AVE measures the percentage change in GRC for a 1% change in volumes. This approach has been widely used in other charge controls we imposed on BT (for example the NCC and LLCC).

5.120 We consider that access products in general benefit from economies of scale and therefore a 1% change in volumes would have an effect on the cost of access products of less than 1%.

- **We propose to use an AVE of 0.5 for access electronics**. This is consistent with an AVE for access products which we have used in some previous charge controls.[118]

- **We propose to use an AVE of 1 for line-cards**. We consider that there are no economies of scale associated with line-cards, with one line-card being required per line. In addition, we have assumed that the reduction in rental volumes will be primarily due to switching to new technology, which is likely to be done on a site by site basis, rather than by reductions in the number of channels per line.

5.121 We describe our capital expenditure calculations in more detail in Annex 6.

Question 15 Do you agree with our proposed AVEs for line-cards and access electronics? If not, please explain why.

Capital expenditure is forecast in our Cost Forecast model and supplemented by the steady state adjustment

5.122 One of the key issues raised by Openreach during the Market Review was that a charge control could increase demand for wholesale ISDN30 services and could potentially require additional investment. Openreach argues that such investment is likely to be inefficient because declining demand for ISDN30 in the long term would mean that new assets would quickly become surplus to requirements. Our view is that the risk of inefficient investment is low.

5.123 For the purposes of forecasting Openreach's costs we have projected Openreach's future capital expenditure in the Cost Forecast model based on our projected volumes and in combination with data from Openreach including forecast labour time

[118] For example, in the 1996 Price Control Review Statement Oftel stated "*Oftel has considered each of the cost and asset volume relationships for growth in access lines and the volume of calls over the network. Oftel has used, in relation to access, asset volume and cost volume relationships in the region of 0.4-0.6 (that is a 1% increase in the volume of access lines would lead to an increase in assets and costs of between 0.4 and 0.6%)*" (paragraph 6.30).
http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/chap6.htm

spent on capital programmes and the level of capitalisation (proportion of labour costs that relate to capital expenditure and are therefore treated as capital expenditure) for each operational activity.

5.124 Therefore when we input our Stage 2 volumes, which aim to capture the slower volume decline as a result of our proposed charge control, increased capital expenditure will be forecast.

5.125 Our steady state adjustment does allow for additional capital expenditure (for line-cards and access electronics) which might be required in the future to maintain an on-going network. We have not adjusted this to take into account Openreach's possible re-use of certain assets. Specifically, these assets include line-cards which are not currently manufactured and which Openreach replace using existing and returned stock if required. Line-cards make up a small proportion (less than 10%) of the capital expenditure forecast as part of the steady state adjustment.

5.126 Our analysis indicates that the required capital expenditure is around £6m based on the Cost Forecast model with an additional £67m based on the steady state adjustment in 2013/14. We describe our capital expenditure calculations in more detail in Annex 6.

Question 16 Do you agree with our proposed approach to forecasting capital expenditure for core wholesale ISDN30 services? If not, please explain why.

We propose to use an annual efficiency target of 4.5%

5.127 One of the main benefits of the RPI-X form of charge control is that it creates incentives on the charge controlled firm to increase its efficiency, by allowing it to keep any super-normal profits that it earns by realising greater efficiency savings then those assumed in the cost forecasting model. We assume that Openreach will make the efficiency savings needed for costs to reach an efficient level at the end of the control period.

5.128 As part of the WLR/LLU charge controls,[119] we have estimated the target efficiency of Openreach as a whole to be within the range 3.5% to 5.5%. This represents a single rate to be applied to costs, including capital expenditure.

5.129 In arriving at the above efficiency range, we have considered the historical levels of efficiency achieved by Openreach, the benchmarking exercises conducted on behalf of Ofcom (and Openreach) and Openreach's own forecasts. We discuss these in more detail in Annex 6. For a comprehensive discussion of these benchmarks, we refer readers to Annex 6 of the WLR/LLU charge controls consultation which we rely on for the purposes of this consultation.

5.130 We consider the above range is also appropriate for wholesale ISDN30 services, as the potential efficiency gains have been considered at an Openreach level which includes the costs of these services. In addition, in a KMPG report[120] on Openreach efficiency, the core costs of ISDN30 services were considered to be similar in nature to Openreach IT costs which were directly benchmarked. These costs were then extrapolated and form part of the total efficiency savings identified in that report. The

[119] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/
[120] http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/annexes/Efficiency_Review_Report.PDF

KPMG report forms part of our analysis in arriving at the proposed range. This is discussed in more detail in Annex 6.

5.131 When making our proposals for some other charge controls, a disaggregated efficiency analysis like the KPMG study has not been available and we have placed more reliance on statistical benchmarking at a more aggregate level. In the cases of the WBA[121] and the Number Translation Services (NTS)[122] retail uplift charge controls, we have used statistical analysis by NERA to inform the range of efficiency assumptions, supplemented by historic trend data where available. In both cases, we are consulting on a range of 2% to 5% for efficiency, which overlaps with the range proposed in this consultation.

5.132 Based on the above we **propose to use an efficiency range of 3.5% and 5.5%** for wholesale ISDN30 services. We have modelled the Ofcom base case assuming an efficiency rate of 4.5%. We describe our efficiency assumption in more detail in Annex 6.

Question 17 Do you agree with our proposed efficiency assumption range of 3.5% to 5.5% for core wholesale ISDN30 services? If not, please explain why.

We propose to use the rest of BT WACC

5.133 As discussed in section 4, Ofcom's practice is to set the value of X so that our projection of Openreach's rate of return for the last year of the price control (2013/14) is equal to its WACC. This approximates to the workings of a competitive market in which excess profits are gradually eroded by competition.

5.134 In the WBA charge control consultation we have set out our latest estimates of Openreach's WACC. We have proposed a range for Openreach's WACC for copper access services of between 7.9%-9.4% (pre-tax nominal). Our estimated range for the WACC for the "rest of BT" (including core) is 8.5%-10% (pre-tax nominal). The two ranges (one for copper access and one for the rest of BT) reflect different levels of risk. The risk which is relevant for these purposes is called "systematic risk" and this broadly depends on the extent to which demand for a service varies over the economic cycle. The larger the correlation between demand for the service and the level of activity in the economy as a whole, the higher its systematic risk and the higher the cost of capital. Openreach's basic copper access services are particularly low-risk because demand is relatively stable over the cycle and therefore they attract a lower cost of capital than the rest of BT.

5.135 We are of the view that wholesale ISDN30 services should be classified within BT's core network for the purposes of an assessment of risk levels. Our more detailed analysis in Annex 7 shows that the economic downturn in 2009/10 has had a more significant impact on wholesale ISDN30 services than on copper lines. We believe this shows that wholesale ISDN30 services are more likely to be affected by systematic risks. This is because businesses are more likely to reduce their consumption of wholesale ISDN30 services in response to a downturn in the economy, whereas residential customers are less likely to dispense with their single fixed voice and broadband connection when faced with a similar situation.

[121] http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf
[122] http://stakeholders.ofcom.org.uk/binaries/consultations/nts-retail-uplift/summary/nts-retail-uplift.pdf

5.136 When assessing BT's WACC we have normally adopted a cautious approach, preferring to accept some risk of setting it too high over a risk of setting it too low. This is the appropriate approach because the costs of error are asymmetric and we would tend to be more concerned with the lack of investment which could result if the cost of capital is too low than with the risk of slightly higher prices.

5.137 In light of the above, we **propose wholesale ISDN30 services should be subject to the rest of BT rate**. The range for the rest of BT rate as proposed in the WBA consultation is 8.5% to 10.0% with a mid-point of 9.3%. We describe our WACC assumption in more detail in Annex 7.

Question 18 Do you agree with the range of WACC proposed for wholesale ISDN30 services? If not, please explain why.

We propose to use inflation of 2.5% to forecast operating costs

5.138 As the Cost Forecast model is in nominal terms we need to apply an appropriate rate of inflation to forecast Openreach costs forward to 2013/14.

5.139 Historically, we have used RPI as a reasonable proxy when forecasting cost inflation. However in the 2009 OFFR statement,[123] we explained that while RPI may be appropriate for forecasting cost inflation in the long term, it was less appropriate for short term cost forecasting. This is because it was considered that forecast reductions in RPI inflation would not be reflected in similar reductions in Openreach's input cost inflation (as the former resulted from reductions in mortgage rates and VAT which are not part of Openreach's costs).

5.140 Similarly, current forecast increases in RPI are unlikely to be reflected in Openreach's input cost inflation (as they include the effect of the increase in VAT in January 2011 and longer term forecasts reflect an expectation that mortgage interest rates will rise).

5.141 Based on the above, we have assumed that Openreach's input costs (including ISDN30 costs) will increase at a rate below that currently forecast for RPI. For the purposes of our base case, we **have assumed an annual rate of 2.5% for the next 3 years**.

5.142 We have also assumed that Openreach's pay costs increase at a rate above that of other operating costs, as has previously been the case. For the purposes of our base case **we have assumed an annual rate of 3% for pay costs over the next 3 years.**

We propose to forecast holding gains (losses) using an estimate of RPI

5.143 Holding gains (losses) are increases (decreases) in the replacement cost of CCA assets during a period. In order to forecast costs to 2013/14, we need to take account of this increase (decrease) in our modelling.

5.144 In line with the WLR/LLU charge controls, we propose to forecast holding gains (losses) on assets at the rate of RPI for 2010/11. We then forecast holding gains based on average RPI of 3% per annum from 2011/12 to 2013/14. We consider this should apply equally to the forecast of holding gains (losses) in relation to wholesale

[123] http://stakeholders.ofcom.org.uk/consultations/openreachframework/statement/

ISDN30 services. We have also applied this as the appropriate rate of inflation in our steady state adjustment.

5.145 We stated our projection of RPI for the next 3 years in the WBA charge controls; these are based on HM Treasury forecasts published in November 2010. We propose to use 4.4% for 2010/11. We then consider that 3% represents a reasonable estimate of inflation for the period 2011/12-2013/14.

Table 5.8 RPI forecasts

Year	2010/11	2011/12	2012/13	2013/14
RPI forecast in WBA charge control	4.4%	3.6%	2.7%	3.0%
RPI estimate for holding gains	4.4%	3.0%	3.0%	3.0%

Question 19 Do you agree with our proposed approach to inflate operating costs at 2.5% p.a., pay costs at 3.0% p.a. and holding gain/losses at an average RPI of 3.0% p.a.? If not, please explain why.

We have created an Ofcom base case to reflect the above adjustments

5.146 Using the above adjustments and assumptions, we have established an 'Ofcom Base Case' for wholesale ISDN30 services from 2009/10 to 2013/14. We are consulting on all of our assumptions and provide sensitivity analysis around these in Annex 6.

5.147 In Table 5.9 below we show the unit costs for wholesale ISDN30 rental[124] services under the Ofcom Base Case scenario. In addition, in Annex 6 we provide the total costs of the wholesale ISDN30 rentals and connections basket which also includes enhanced care services.

[124] Although we have proposed a single basket including wholesale ISDN30 rentals, connections and enhanced care services in Table 5.9 we have only shown the unit costs for the rental services. This is because ISDN30 rentals account for the majority of the revenues in this basket.

Table 5.9 Ofcom Base Case unit cost stacks for wholesale ISDN30 rental services

	ISDN30 - Rental (Standard)				
	2009/10	**2010/11**	**2011/12**	**2012/13**	**2013/14**
	£/channel	£/channel	£/channel	£/channel	£/channel
Unit costs from cost allocation model:					
Current Pay	3	3	3	4	4
Other Operating Costs	1	1	1	1	1
Transfer Charges[125]	6	5	5	6	5
Internal Cost of Sales[126]	41	38	38	44	48
Other Operating Income	0	0	0	0	0
Internal Capitalisation	0	0	0	0	0
Depreciation excl holding gains	8	9	8	8	8
Holding Gains	-1	-5	-3	-3	-3
Operating Cost inc Depreciation	**58**	**51**	**52**	**60**	**64**
Off-model cost adjustments:					
Steady state adjustment	33	38	41	39	39
Reduction in connection Sales + General admin	0	0	0	0	0
Reallocation of excess transfer costs[127]	2	3	3	3	3
ROCE @ 9.3%	7	7	7	8	8
Total Cost	**100**	**99**	**102**	**110**	**113**
MCE per model[128]	**172**	**158**	**151**	**150**	**140**
Volumes (k)	**2,146**	**1,980**	**1,895**	**1,813**	**1,735**

5.148 The above table shows that:[129]

[125] Transfer charges include a reallocation of BT group costs to Openreach.
[126] BT Operate levies charges against Openreach, referred to as 'Internal Cost of Sales' charges. These charges include line-card rental costs, and other costs such as access and backhaul. These are levied on the basis of costs incurred.
[127] If we implement an RPI-0% safe-guard cap on transfers, we would then propose to recover excess costs through the combined wholesale ISDN30 rentals and connections basket (see discussions from paragraph 5.184 onwards). As rentals make up the majority of the revenues in this basket, we would expect Openreach to recover these costs in the rental price.
[128] The MCE used to calculate ROCE unit cost above does not include the steady state adjustment uplift. This is because the steady state uplift in the ROCE is included within the steady state adjustment above.

- We would expect the price of rentals to decrease from the current level of £141/channel to around £**113/channel** by 2013/14.

- The steady state adjustment is the most material adjustment, amounting to around 35% of the unit cost stack in 2013/14.

- The unit costs on rentals is forecast to increase from £100/channel in 2009/10 to £113/channel in 2013/14 (i.e.by around 13%) due to the forecast decline in volumes.

We have considered the case for one-off adjustments to starting charges

5.149 As discussed in section 4, we have a strong preference for glide-paths rather than one-off adjustments to starting charges due to their incentive properties and the fact that they relate more closely to the dynamics of a competitive market. Therefore, we only tend to consider one-off reductions when there are strong allocative efficiency arguments and/or where charges have not been previously regulated and are materially out of line with costs increasing the risk of distortions in investment incentives.

5.150 In the analysis we present below, we have used estimates of DLRIC[130] and DSAC[131], as the reasonable benchmarks to inform our judgement of the appropriate balance between one-off adjustments at the start of the control and glide-paths. We note that Openreach does not currently have a cost orientation obligation for wholesale ISDN30 services and therefore it is not formally required to prepare this data for reporting purposes. Openreach has submitted this information on Ofcom's request to aid our analysis. As it is the first time that Openreach has prepared and submitted this data, coupled with the fact that it is not formally required to do so, we stress that we have only used it to guide our analysis.

5.151 We discuss the need for any one-off adjustments to the starting charges of the three core wholesale ISDN30 services in turn below.

We do not propose any one-off adjustments to the starting price of wholesale ISDN30 rentals

5.152 As discussed above, we generally make one-off adjustment to charges at the start of a new control only if the current level of charges would lead to significant distortions. We propose to use the first order tests for cost orientation to identify the strongest cases for one-off adjustments, as we did in the LLCC statement. The first order tests for cost orientation use DLRIC and DSAC as benchmarks to identify charges which may be too low or too high respectively.

5.153 Our analysis has indicated that the current charge of wholesale ISDN30 rentals (at £141/ channel *per annum*) has been within the DLRIC and DSAC benchmarks for the years 2007/08 to 2009/10, as shown below. This suggests that there is no strong case, based on the risk of distortions, for a one-off cut to ISDN30 rentals.

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[129] Please note the base year in this case uses our forecasting assumptions which includes a lower WACC of 9.3% and the impact of moving transfer costs in excess of revenues into the rental cost stack, it therefore differs slightly from the base year in Table 5.5.
[130] Distributed Long Run Incremental Costs (DLRIC).
[131] Distributed Stand Alone Ceiling (DSAC).

Table 5.10 Average price and weighted average FAC, DLRIC and DSAC for wholesale ISDN30 rentals (£)[132]

RENTAL	2007/08	2008/09	2009/10
Price	141.0	141.0	141.0
FAC	70.6	63.2	69.6
DLRIC	53.8	45.9	47.4
DSAC	173.1	145.8	156.2
Prices as % of DLRIC	262.0%	307.0%	297.6%
Prices as % of DSAC	81.5%	96.7%	90.3%

5.154 One of the reasons why we generally do not make deeper one-off cuts, for example to FAC, is that, where a charge has previously been subject to a charge control, to do so would damage incentives to make cost reductions. As wholesale ISDN30 charges have not been regulated before, this argument does not apply and we have therefore considered whether we should require one-off reductions to charges even though they are already below DSAC.

5.155 We have identified some factors which might make us more likely to require one-off cuts even where charges are already below DSAC. For example, we might be more likely to do so if the ROCE, on an FAC basis, had been significantly and persistently above the cost of capital. In the case of ISDN30, the level of the ROCE is clearly a concern, as we set out earlier when considering the need for a charge control. However, as we discussed in section 3, the headline ROCE is distorted by the highly depreciated asset base. Once we correct for this it is much lower and, though still above the cost of capital, this is in principle addressed by the charge control glide-path.

5.156 We have therefore considered whether other relevant factors strengthen or weaken the case for one-off cuts. We have considered additional indicators of the current and future profitability of ISDN30 services, the time-path of ISDN30 prices and the impact on users of ISDN30 charges, as set out below.

Additional factors relevant to profitability

- ISDN30 prices have been stable for some time, without recent increases.
- Volumes are expected to decline and this will tend to reduce the rate of return anyway even without price reductions.

The time-path of prices

- The value of X, in the absence of one-off reductions, is not unusually high.

[132] Openreach has provided FAC, DLRIC and DSAC figures on an internal and external customer basis, which we have combined into a weighted average using their respective volumes.

- A one-off cut to FAC would imply that a sharp fall in prices would be followed by an increase. This may be undesirable in a period of transition to new technology when stability in prices may aid planning.

The impact on users

- High ISDN30 prices may mean that incentives to use these alternatives are "too strong". But the evidence, for example from the Switching model, does not suggest that the size of the differential is likely to affect the choice of input on a very significant scale, and the direction of any distortion is in favour of upstream investment. In the longer term SIP Trunking is likely to be the more efficient option.

5.157 Our view is that each of these factors weakens the case for one-off cuts to ISDN30 charges. In the light of this, **we are therefore not proposing a one-off adjustment to the starting charge of wholesale ISDN30 rentals**.

Question 20 Do you agree that one-off adjustments to the starting charges of wholesale ISDN30 rental services are not required? If not, please explain why.

We do not propose a one-off adjustment to the starting charges of wholesale ISDN30 connections

5.158 There are two main connection charges which we are proposing to include in the combined wholesale ISDN30 rentals and connections basket:

- a one-off £550 charge that is charged on a per new site basis; and
- a £30 per channel charge.

5.159 In order to assess whether any one-off adjustments are required to the starting charges of connections we have investigated the average but also individual connection charges against our benchmarks. We have also considered connection and rental charges together, as a typical ISDN30 customer will have regard to both charges when deciding to buy the product. We discuss our analysis in more detail below.

The average connection charge is within prescribed benchmarks

5.160 As shown in Table 5.11 below, the weighted average DLRIC and DSAC of the two connection charges has been subject to substantial volatility during the period 2008/09 to 2009/10. Openreach has indicated that this variability was due to an incorrect allocation of the costs for certain activities to core wholesale ISDN30 services in 2007/08 and 2008/09.[133] This mis-allocation of costs was corrected in

[133] The reduction in the connection costs between 2007/08 to 2008/09 is explained by a reduction in the costs allocated to the activities 'Service centre costs-Provision' (i.e. service centres dedicated to the provision of ISDN30 circuits) and the non-Openreach 'Sales, General Management and Administration' (i.e. administration costs carried on Openreach products by non-Openreach units on an agency basis). In the case of the 'Service centre costs – Provision', Openreach conducted a survey in 2009/10 to understand the true level of costs for these provision activities and the survey showed costs similar to those in 2007/08 but significantly above the costs in 2008/09 (which partly explains why the connection costs in 2009/10 are more closely aligned with the 2007/08 costs than the 2008/09). In the case of the costs relating to 'Sales, General Management and Administration', the

2009/10, after Openreach conducted a survey to determine the true level of costs for these activities and the most appropriate way to allocate these costs to core wholesale ISDN30 services.[134] Similar considerations also explain the variability in the DSAC figures between the three years.[135] In light of the above, Openreach has indicated to us that they view the 2009/10 cost estimates as the most robust of the three years in Table 5.11.

5.161 In 2009/10 the average connection charge per channel was £40.71,[136] which was above the FAC of £37 and within the DLRIC and DSAC benchmarks.

Table 5.11 Average price and weighted average FAC, DLRIC and DSAC for wholesale ISDN30 connection (£)[137]

CONNECTION	2008	2009	2010
Price	40.7	40.7	40.7
FAC	33.3	8.8	37.3[138]
DLRIC	31.7	8.3	30.1
DSAC	88.9	23.4	351.1
Prices as % of DLRIC	128.5%	491.7%	135.4%
Prices as % of DSAC	45.8%	173.7%	11.6%

5.162 Given that the current average connection charge was within the DLRIC floor and DSAC ceilings for 2009/10, we do not propose any one-off adjustment to the average connection charge.

reduction in the costs in 2008/09 relative to 2007/08 was due to a reduction in the non-Openreach units dedicated to these activities. These two factors explain most of the difference between the costs allocated to connections in 2007/08 and 2008/09.

[134] The main explanation for the increase in the costs allocated to connections in 2009/10 (relative to 2008/09) is the increase in the costs allocated to the activity 'ISDN30 connection' (i.e. field engineering works relating to the connection of ISDN30 bearers). In the year 2009/10, Openreach conducted a survey and discovered that some of the engineering costs that had been allocated to Private Circuits in the previous years related to ISDN30 and should have been allocated to 'ISDN30 connection'. Additionally, in previous years some of the costs of 'ISDN30 connection' had been allocated to the transfer service, whereas in 2009/10 they were all allocated to the connection service. According to Openreach this was more appropriate because these activities only related to the connection service.

[135] In particular, the increase in the DSAC in 2009/10 relative to the previous years has been due to an increase in the DSAC to FAC ratio for the activity 'Sales, General Management and Administration' (discussed above), as well as the fact that this activity made a larger proportion of the total FAC costs for ISDN30 connections in 2009/10 than in the previous years considered.

[136] This is the sum of the *per channel* charge (£30) and the *per site* charge (£10.71). The *per site* charge of £550, is converted to a *per channel* basis by assuming that this charge applies to around 33% of ISDN30 bearers and that on average a bearer to a site contains an estimated average of 17 channels. Therefore £10 = £550 x 33% / 17.

[137] Openreach has provided FAC, DLRIC and DSAC figures on an internal and external customer basis, which we have combined into a weighted average using their respective volumes.

[138] Please note that the Ofcom Cost Forecast model estimates the FAC for the average connection charge as £47 in 2009/10 and £55 in 2013/14.

The individual connection charges are outside prescribed benchmarks

5.163 We have also considered whether the individual connection charges have been within our prescribed benchmarks in the historic period under consideration (i.e. 2007/08 to 2009/10).

5.164 We would expect that most of the costs recovered through the connection charge are driven by the number of sites, rather than the amount of channels required in a specific ISDN30 bearer. For example, most of the service management costs and the circuit provision costs[139] are driven by the number of bearers rather than the number of channels requested. In contrast, the majority of the connection revenues are obtained through the per-channel rather than the per-site charge.

5.165 We asked Openreach to provide disaggregated cost data on a per-channel and per-site basis. Openreach provided the required data and stated that it considered its estimates to be illustrative only, noting that some values may not be robust. This is because these estimates were derived using an approach which differed from that used to establish costs for reporting purposes and were not done to the level of detail required for that purpose. The details for 2009/2010 are set out in Table 5.12 below. We consider that the disaggregated data is consistent with our hypothesis that the majority of the connection costs are driven by the number of new sites rather than the number of ISDN30 channels. In particular, it suggests that in 2009/10 the per-site connection charge was below DLRIC, while the per-channel charge was above DSAC.

Table 5.12 Average price and FAC, DLRIC and DSAC for wholesale ISDN30 connection on a per new site and channel basis in 2009/10

CONNECTION	Per channel (£)	Per new site (£)
Price	30	550
FAC	✂	✂
DLRIC	✂	✂
DSAC	✂	✂
Prices as % of DLRIC	✂	✂
Prices as % of DSAC	✂	✂

5.166 As, on a disaggregated basis, prices appear to be out of line with costs, we have examined whether this would give rise to any anti-competitive effects. For example, the imbalance could affect a customer taking a large number of channels, as they would be paying a relatively large amount for each channel, and a relatively small amount for the per site cost.

5.167 If a charge (i.e. in this case the ISDN30 per-site connection charge) is below incremental cost, this could in principle discourage competing investment upstream. In practice, a single connection charge below DLRIC, when other charges are well

[139] These include all the activities between serving exchanges and the final test done on the ISDN30 bearer to ensure that it works adequately.

above FAC is unlikely to harm upstream competition and in general low prices will benefit users. However, a pricing structure which does not reflect the structure of costs may lead to inefficient investments by OCPs. For example a price below LRIC could result in ISDN30 being used at sites where the number of channels needed is too small for ISDN30 to be efficient. On the other hand if a charge (i.e. the ISDN30 per channel connection charge) is above DSAC, this could indicate that the price could harm (downstream) competition. This would suggest that a re-balancing of the per-site and per-channel charges to bring them more in line with their respective costs (i.e. an increase in the one-off connection charge and a decrease in the per channel charge) could be desirable.

5.168 However, investigating the individual connection charges in isolation may not be appropriate. We note that OCPs pay for the two connection charges together. We therefore consider whether the combined per-site and per-channel charges are above DSAC for any plausible combination of site and channel numbers. In addition connections are associated with rentals. We therefore also consider whether, over relevant time periods representing reasonable contract durations (not necessarily limited to one contract), a customer could pay over DSAC for the combined rental and connection charges.

Combined connection and rentals charges are within prescribed benchmarks

5.169 As discussed above we have also assessed, on the one hand, whether it is likely that some ISDN30 customers could be currently paying a combination of connection and rental prices above DSAC and, on the other hand, if the current price structure could discriminate in favour of BT Retail.

5.170 To assess whether ISDN30 customers are currently charged above DSAC we have determined the prices they would be required to pay when connecting a high number of channels at a new site.[140] First, we have calculated the number of channels that will result in a customer having to pay a total connection charge equal to the aggregate DSAC of these two services. We have then assessed the likelihood that a significant proportion of customers would purchase this volume of channels from Openreach. Then we take rentals into account. We have calculated the minimum contract length required for the combined charges for connections and rentals to be above the combined DSAC and considered whether any customers are likely to be in this position.

5.171 To estimate the number of channels at which the total prices paid will equate to the aggregate DSAC, we need to determine the margins between each of the three relevant charges and their respective DSACs. These margins are shown in Table 5.13 below.

[140] This is the situation in which the difference between the prices and the costs of the service provided are likely to be the largest. The reason for this is that the per-channel charge is the only one above the per-channel DSAC. Hence, the higher the number of channels, the more likely it will be that the customer is charged above DSAC. In relation to the one-off connection charge, this is only charged when connecting channels to a new site (not an existing site), whereas the costs of connecting a new or an existing site are very similar. Therefore, it is in the case of a new site (when the one-off connection price is charged) rather than in an existing site (when no such price is charged) that prices are more likely to be above DSAC.

5.172 We have also converted the margins for the two connection charges into an annual equivalent over a period of two years.[141] Although we consider this is likely to be below the average duration of a typical ISDN30 contract (of five years), aggregate prices are already likely to be below DSAC. We have not applied this annualisation to the rental charges and costs, as these are recurring.

Table 5.13 Price to DSAC margins for the rental charge and the two connection charges in 2009/10

	Connection		Rental
	Per channel (£)	**Per new site (£)**	**Per channel (£)**
Price (2009/10)	30	550	141
DSAC (2009/10)	✂	✂	✂
Margin (Price- DSAC)	✂	✂	✂
Margin after 2 year adjustment[142]	✂	✂	✂

5.173 As shown above, only the per-channel connection charge has a price above DSAC, whereas the remaining charges have prices which are below their respective DSACs. Because the per-channel connection charge is above DSAC, each additional channel connected to a customer's site means that the total amount that that customer is paying in excess of DSAC will increase by ✂, which we refer to as the "margin" between the price and DSAC (see Table 5.13). This margin becomes ✂ if it is spread over two years, as explained above. The per-site connection charge has a price which is below the DSAC for this service (in other words, the price-DSAC margin is negative).

5.174 We have looked at three scenarios which we discuss below.

5.175 In Scenario 1 we have estimated the number of channels at which the aggregate connection prices equal their DSAC, before any annualisation to connection charges is applied and before we account for the rental price. To calculate this we have divided the per-site margin of £✂ by £✂. This shows that a customer would need to connect approximately ✂ channels in a single year at a single site. In the market research we conducted as part of our Market Review,[143] which included a large sample of large businesses using ISDN30,[144] only around 5% of all businesses had more than 300 ISDN30 channels across their organisation,[145] which would be likely

[141] The annualisation is done over a two year period and using the "rest of BT" rate of 9.3% as a discount rate, consistent with the WACC that we are proposing to apply to core wholesale ISDN30 services.
[142] We convert the connection margins to an annual equivalent over a two year period (this is less than the average contract length used in our volumes and switching analysis in Annexes 8 and 9, respectively, but means that we obtain a more robust result) and using the "rest of BT" rate of 9.3% as the discount rate.
[143] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf
[144] In fact, of the 475 business customers surveyed in our market research, 24% had 20 to 49 employees, 44% had 50 to 249 employees and 32% had 250 or more employees.
[145] See Question ISDN30QB1.

to include more than a single site.[146] In the light of this, we believe that there may be some large ISDN30 customers that could potentially connect more than ✂ channels at a single site, although we believe that the number of such customers is likely to be very small.

5.176 In Scenario 2 we have considered the aggregate connection and rental prices, given that customers are likely to have regard to both prices. As shown in the table above, for each additional channel rented from Openreach, the total amount that that customer is paying above DSAC will decrease by £✂ (in other words, the price-DSAC margin is negative). If we compare the connection and rental margins in a single year and before any annualisation is applied to the connection charges, then the (positive) margin on the connection charge per channel exceeds the (negative) margin of the rental charge by £✂ (in absolute terms). In this case, every additional channel connected and rented for a year will increase the amount that the customer is paying above DSAC by £✂

5.177 To calculate the number of channels at which the aggregate rental and connection prices equal their total DSAC (before annualisation of connection charges) we have divided the per new site margin of £✂ by £✂. This shows that a customer would have to purchase ✂ channels. Only customers purchasing a larger amount of channels will be paying prices above DSAC. In light of the evidence from our market research discussed above we believe it to be highly unlikely that any customer would connect this many channels to a single site.

5.178 In Scenario 3, we have spread the connection charges over several years. The results show that even for contracts of only two years' duration, aggregate connection and rental prices would be below DSAC.[147] This is due to the fact that the negative margin on the per-channel rental charge (£✂) exceeds the positive margin on the per-channel connection charge (which when spread over two years is just £✂). Therefore, the aggregate connection and rental charges will always be below their DSAC for any volume of channels purchased.

5.179 In light of the above evidence, we conclude that connection charges are likely to be below their DSAC for the vast majority of customers. For the minority of customers for which the aggregate connection charges could potentially be above DSAC, we consider that the charges paid by these customers for their connection and rental service are also likely to be below their DSAC (even if they only purchased ISDN30 for a period of one year). Therefore, we believe that no one-off change to Openreach's pricing structure is required to bring prices below the DSAC benchmark.

5.180 In terms of the potential for discrimination in favour of BT Retail under the current price structure, we think such an anti-competitive effect would be more likely if BT Retail and OCPs purchased, on average, circuits with a different number of channels. However, as already discussed in paragraph 5.32 above, this is currently not the case ✂. Therefore, we do not believe that the current pricing structure would result in an anti-competitive effect.

[146] In fact, only 37% of all the businesses surveyed had a single site in the UK, see Question QA3.
[147] We note that annualisation over a larger period of years would further reduce the negative margin on the connection charge per channel and, consequently, the aggregate connection and rental prices would be below DSAC to a larger extent than in the case of two years.

Our proposals

5.181 Following from the above **we do not propose to make any one-off adjustment to the starting charges of connections**.

5.182 We are not well placed to identify an optimal balance between per-site and per-channel charges and therefore, in the absence of any clear anti-competitive effect from these charges, we do not believe it would be appropriate to require Openreach to make any one-off adjustments to these charges. However, we consider that it may be desirable to allow Openreach freedom to adjust the balance of charges to correct any possible distortive effect, within the overall control. We think Openreach is likely to be better placed than us to decide on the appropriate amount of any rebalancing necessary to achieve an efficient charging structure. Therefore we propose not to require one-off adjustments for this purpose, but to allow Openreach to change relative prices within the overall basket constraint as long as there are no anti-competitive effects resulting from its charging structure. This approach seems to us to be proportionate to the risk of distortion in this case.

5.183 We have also taken account of the likely desirability of some rebalancing when deciding on the need for a safe-guard cap on the one-off connection charge within the combined connection and rental basket, as discussed in paragraphs 5.22 to 5.24 above.

Question 21 Do you agree that one-off adjustments to the starting charges of wholesale ISDN30 connection services are not required? If not, please explain why.

We do not propose any one-off adjustments to the starting charges of wholesale ISDN30 transfers

5.184 The current transfer charge is £75 on a per-circuit basis, which equates to £4.36 on a per-channel basis.[148],[149] As we have discussed at the start of this section transfer charges are included in a basket on their own.

5.185 As shown in below, between 2007/08 and 2009/10 the current transfer charge was below FAC and DLRIC.

[148] Currently the estimated average number of channels per circuit on Openreach's network is around 17.

[149] This compares to the lower transfer charge per line for Openreach's WLR Analogue product of £3.09. The reason for this difference is that there is a greater amount of manual and systems work required in the case of wholesale ISDN30 than WLR Analogue. In the case of wholesale ISDN30, Openreach is required to review the features of the installed circuit and map these features onto the system under the name of the OCP taking over the customer. This includes, in particular, a review of all the network and calling features on the bearer, including DDI. A large amount of DDI numbers can be associated with a single circuit and the transfer may require substantial management work. Additionally, transfers require amendments to various databases and involve further systems, such as the Cosmos database.

Table 5.14 Average price and weighted average FAC, DLRIC and DSAC for wholesale ISDN30 transfers[150]

TRANSFER	2008	2009	2010
Price	4.4	4.4	4.4
FAC	25.5	13.5	18.5
DLRIC	24.3	12.4	17.1
DSAC	62.3	57.8	36.0
Prices as % of DLRIC	18.0%	35.0%	25.6%
Prices as % of DSAC	7.0%	7.5%	12.1%

5.186 We have considered whether we should bring transfer charges into line with FAC costs in the charge control period. Setting transfer charges on an FAC basis would mean that they would include a contribution to the recovery of BT's overheads in addition to the incremental costs of transfer. Most of BT's wholesale charges are set on an FAC basis, because if BT were unable to recover its overheads, provision of its wholesale services would not be sustainable. Setting a charge below FAC may then mean that a greater share of BT's overheads has to be recovered from other services. However, this may sometimes be justified where there are wider benefits ("externalities") associated with a particular service or where this will promote effective competition. Prices which are below FAC may also be efficient, that is, give customers the right signals about the resources they are using, as long as charges cover the extra costs caused by the provision of the service.[151]

5.187 We do not propose to bring charges into line with FAC on the basis that it would amount to a large price adjustment over the period of the proposed control and because it is not necessary for efficiency. Such a large price adjustment would carry a risk of disruption in the market and downstream in the retail market. Therefore, if we adopt an approach of aligning charges for wholesale ISDN30 transfers more closely to costs, we believe a more gradual transition is appropriate - for example, alignment of the charge to an estimate of LRIC over the life of the next controls would result in a shallower glide-path.

5.188 We have therefore considered the following two options for the treatment of the transfer charges:

- Option 1: apply a safe-guard cap of RPI-0% to transfer charges. This will ensure that increases in transfer charges are limited to RPI over the period of the next charge control period, however the price will still be substantially below DLRIC. Under this option we propose the shortfall in costs (up to the FAC) is recovered through the connections and rentals basket.

[150] Cost figures are provided on an Internal and External customer basis and weighted by their volumes.

[151] In this case we need to balance "static" efficiency, which usually requires charges to reflect costs, and "dynamic" efficiency – broadly the benefits of additional competition. Where externalities or dynamic competition benefits are particularly significant, even prices below the level required for static efficiency may sometimes be justified.

- Option 2: allow charges to rise over the life of the control to a level consistent with DLRIC. Our model does not forecast DLRIC values, however the values presented in Table 5.15 could be a reasonable point of reference. For example, Openreach could increase transfer charges to £17.1 which is an indicative value for the DLRIC in 2009/10.

5.189 Because of the nature of the transfer service, which facilitates customer switching between different ISDN30 providers, low transfer charges promote competition. In general, OCPs do not charge a customer for being transferred from another CP, which facilitates switching and competition at the retail level. Additionally, as in the case of WLR Analogue, OCPs tend to impose Early Termination Charges (ETCs) and Minimum Contract Periods (MCPs) for ISDN30 services.[152] We would be worried that if we increased the transfer charge to DLRIC (or FAC for that matter) there may be a risk that it may produce undesirable effects in the retail market, for example, OCPs could start charging for transferring customers from other CPs or could introduce higher ETCs or increase the length of the MCPs.

5.190 We have highlighted the importance of switching costs on competition in a recent consultation on consumer switching,[153] which included an assessment of the relevance of switching costs to small businesses (with up to ten employees). While we recognise that business customers are generally more likely to switch provider, in that consultation we found that one of the reasons for business consumers not switching was the perception that the process of switching was "*difficult, costly or time-consuming".*[154] We also conducted research on switching costs for larger businesses in our 2009 Business Consumer Experience Report.[155] In this report, we found that one of the reasons impeding businesses' ability to seek alternatives in the market was the length of their contracts, in particular, the second most important reason for not switching a fixed-line supplier was that businesses were "*tied into contract".*[156] In light of this, we have concluded that on balance, high switching costs are likely to dampen competition and will tend to increase prices and reduce consumer welfare.[157]

5.191 Our Market Review did not find any evidence of limited switching at the retail level that would have suggested that current transfer charges were acting as a barrier to switching and that transfer charges should be reduced. Still, we consider that a low transfer charge will help competition by making switching easier, particularly, as transfer volumes are unlikely to decrease to the same extent as rental or connection services during the charge control period.

5.192 We have also considered whether the current transfer charge could lead to inefficient levels of switching and whether it would enhance efficiency if charges were allowed to rise towards DLRIC.

5.193 For markets to work efficiently, consumers need to be able to base their decisions to change operator on the difference in the prices they expect to pay. Then, more

[152] As an example of ETCs and MCPs, see Cable & Wireless, *Pricing – Ancillary Charges*, effective from 5 February 2008; and BT Retail's price offering, available at: http://www.bt.com/pricing/current/Exch_Lines_boo/0011_d0e2917.htm#0011-d0e2917
[153] http://stakeholders.ofcom.org.uk/binaries/consultations/consumer-switching/summary/switching.pdf
[154] See page 59, http://stakeholders.ofcom.org.uk/binaries/consultations/consumer-switching/summary/switching.pdf.
[155] Ofcom, *The Business Consumer Experience*, December, 2009, available at: http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/bce.pdf.
[156] See page 82, http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/bce.pdf.
[157] Ibid paragraph 5.42.

efficient operators can attract customers by signalling their lower costs in the prices they charge. If transfer charges are high, this may interfere with this process by deterring customers from switching. However, the process of switching does cause some costs to be incurred, and if we were concerned that too much switching might otherwise occur, it would be appropriate to reflect these costs in transfer charges to encourage overall cost minimisation. That is, it is likely to be efficient for consumers to face the additional costs they cause to be incurred as a result of their decision to switch.

5.194 If we consider the case of an individual customer switching, the extra cost incurred is the marginal cost of transfer, that is, the additional cost of a single additional transfer. An individual transfer takes only a short time to carry out, during which time most of the operators' costs will be fixed. We describe the additional costs incurred, when most costs are fixed, as short-run marginal costs.

5.195 The DLRIC corresponds more closely to the extra costs of all transfers taken together, averaged over the total number of transfers. In other words, the relevant increment is taken to be all transfers, rather than an individual transfer as is the case with marginal costs. DLRIC is likely to be above marginal costs because it will include costs which are necessary to allow transfers to take place but which do not vary with the number of transfers. In addition, as a "long-run" cost concept, all costs will be regarded as variable and will be included in charges if these are set on a DLRIC basis.

5.196 Whether transfer charges should be allowed to rise towards DLRIC therefore depends on whether the appropriate increment is considered to be a single transfer or transfers as a whole, and on whether a short run or a long run definition of costs is appropriate.

5.197 If a transfer is seen as an inherently short-run activity – unlike the rental of an exchange line for example, which may last for many years, - then a transfer charge which recovers short run marginal costs may be sufficient to give potential switchers the correct incentives to make efficient decisions without leading to excessive levels of switching. In addition, this would be most consistent with the idea that keeping transfer charges as low as possible is appropriate in order to promote competition. On the other hand, a long-run view of costs may be appropriate, because transfers will take place for as long as there is a market with more than one supplier. So the demand for transfers as a whole is a long-term demand and the incremental investments needed to support the process of transfers will be needed in the long run. If transfer charges do not rise towards DLRIC, then some of the incremental costs of transfers will have to be recovered through other charges, and this may tend to create some offsetting loss of efficiency elsewhere. However, we would be unlikely to adopt Option 2 if the result would be the introduction of retail transfer charges or other changes which could result in a significant reduction in willingness to switch between operators. This is because the result could then be a reduction in competitive pressure and with it a loss of the dynamic efficiency benefits – innovation and cost reductions – which go with it. Keeping transfer charges below DLRIC is more likely to be justified if, by doing so, effective competition would be promoted.

5.198 Although we acknowledge that current charges are below DLRIC, we still believe that this is likely to be above the short-term marginal costs of providing this service. This is because most costs allocated to the transfer services are overhead costs that span across Openreach (i.e. computing costs such as IT support and IT development) and as such are unlikely to be part of the marginal costs of the transfer service.

Our proposals

5.199 In light of the above, and recognising that this is a finely balanced decision, **we are not proposing to implement any one-off adjustments to the starting charges of transfer services**.

5.200 Our proposal is also consistent with our proposals for the relevant transfer charges in the WLR/LLU charge controls.

Question 22 Do you agree with Ofcom's approach to the pricing of wholesale ISDN30 transfer charges during the next charge control? If not, please explain why.

We have assessed the level of the proposed charge control

5.201 Our proposals for the relevant values of X are shown below.

5.202 The range for the values of X (-8% to -12%) for the wholesale ISDN30 rentals and connections basket was informed by the sensitivity analysis we have conducted on key forecasting assumptions which is summarised at the end of Annex 6.

- The (absolute) lower end of the range is obtained when enhanced care revenues and costs are excluded from the basket.
- The higher end of the range is obtained when the AVE for access electronics and line-cards is set to 0.

5.203 The value of X for the wholesale ISDN30 rentals and connections basket using our proposed base case assumptions is -10.65% (or -10.75% when rounded to the nearest quarter percentage).

Table 5.15 Our proposed ranges for the values of X for core wholesale ISDN30 services

Baskets	Services included	Proposed control	Proposed safe-guard cap
Wholesale ISDN30 Rental & Connections	Rental per channel per year Connections - Fixed - Per channel Enhanced care services - Service level 3 - Service Level 4	RPI-8% to RPI-12%	RPI+5% (on the average connection charge) RPI-0% (on each enhanced care service)
Wholesale ISDN30 transfers	Charge per 30 channel access bearer	RPI-0%	N/A
Wholesale ISN30 Direct dial-in ('DDI')	Wholesale ISN30 DDI - Planning (connection) - Connection per DDI - Rental per DDI	RPI-0% (on each DDI charge)	N/A

We have assessed the implications of the proposed charge control

5.204 We have assessed the implications of our proposed charge control by:

- Investigating OCPs incentives to invest in efficient competing infrastructure; and
- Determining the likely proportion of ISDN30 channels provided over 2 Mbit/s PPCs which would switch to wholesale ISDN30.

The proposed charge control maintains OCPs' incentives to invest in efficient competing infrastructure

5.205 ISDN30 retail services can be provided using two other wholesale inputs: 2Mbit/s PPCs and MPF, although in practice no operator currently does so using MPF (see Annex 5 for a technical description of the provision of ISDN30 using PPCs and MPF). Where OCPs have a choice between different wholesale inputs, productive efficiency is maintained if OCPs choose to supply the end user using the cost minimising option.

5.206 For this reason we have checked that the differences in the prices of connections and rentals for 2Mbit/s PPCs and the proposed charges for wholesale ISDN30 services are at least as great as the differences in their LRICs.[158] This will ensure that OCPs will always have an incentive to choose the option which minimises overall

[158] According to Openreach the cost estimates submitted to us and used in the incremental cost analysis are pure LRICs, with the only exception of some cost components relating to e-PPCs, which are DLRICs.

costs. This approach has been upheld by the CC in its determination in the OFFR appeal.[159]

5.207 We propose to assess the differentials by investigating connections and rentals in aggregate because we believe that some flexibility to vary relative connection and rental prices is desirable (as discussed in paragraph 5.17). Setting the differentials of both services to separately equal the LRIC differentials would effectively tie the pricing structure of one product to that of the other. Additionally, this is unnecessary since the choice between the two wholesale inputs will not depend on either the price of connections or rentals alone.[160]

5.208 We have also conducted a high level check on the cost differences between MPF and wholesale ISDN30; although for the reasons highlighted in Annex 10 we believe we can be more confident that changes in wholesale ISDN30 prices would not have an impact on OCPs' choice between MPF and wholesale ISDN30.

5.209 We are proposing to calculate the incremental cost differential using the costs of PPCs and wholesale ISDN30 in the base year (i.e. 2009/10). Although we recognize that a comparison of the costs of both products at the end of the charge control (i.e. 2013/14) would be preferable, for the reasons discussed in Annex 10, we believe this is not practicable in the case of PPCs and wholesale ISDN30. However we have also carried out an analysis of the sensitivity of our results to changes in assumptions and the results of this give us some additional assurance that the charge differential resulting from our proposals will be at an appropriate level.

5.210 The LRIC differentials analysis shows that the aggregate (connections and rentals) LRIC for a wholesale ISDN30 circuit including 30 channels[161] is around £✂ whereas it is only around £✂ in the case of a 2Mbit/s PPC.

5.211 We have estimated that the (connection and rental) LRIC of wholesale ISDN30 was around £✂ greater than that of a 2Mbit/s PPC in 2009/10.[162] We have calculated that the current price of connecting and renting a 2Mbit/s PPC, after certain adjustments to the PPC price to make it comparable to an ISDN30 circuit (as discussed further in Annex 10), is around £✂. This means that the price for the aggregate wholesale ISDN30 connection and rental service that would exactly reflect the LRIC differentials between the two wholesale inputs would be around £✂ (i.e. the estimated price of a 2Mbit/s PPC connection and rental plus the estimated LRIC differential between this wholesale input and wholesale ISDN30).

5.212 In 2009/10 the aggregate FAC for a wholesale ISDN30 circuit connection and rental including 30 channels is £✂. This means that if we were to reduce the price of the aggregate wholesale ISDN30 connection and rental to reflect their 2009/10 FAC, the differences between these charges and the current PPC prices would be broadly in

[159] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications,* Determination, Case 1149/3/3/09, 31 August 2010, paragraph 3.163, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf.
[160] This is of course without prejudice to the possibility that an excessive charge for connections or rentals could be harmful in itself and hence not fair and reasonable.
[161] In order to compare the LRIC differentials between wholesale ISDN30 and a 2Mbit/s PPC we consider an ISDN30 circuit including 30 channels. This means that differences in cost do not result only from differences in the capacity taken and greatly simplifies the analysis. In Annex 10 we give a full explanation of the LRIC calculation and underlying assumptions.
[162] This difference is smaller than the one shown in paragraph 5.210 because we have only accounted for LRIC differences that would remain after assuming that both wholesale inputs are used to supply the same end user, as discussed further in Annex 10.

line with the estimated LRIC differentials. In fact, the differences between the wholesale ISDN30 FACs in 2009/10 and the current PPC prices would be above their difference in LRICs by ✂% [more than 20%].[163] Therefore we are confident that the differences between the aggregate charges of PPCs and the 2009/10 FACs for wholesale ISDN30 are at least as large as their LRIC differentials. In this case, given the state of competition, we do not believe we should intentionally set prices to promote use of PPCs or other upstream infrastructure, instead, we consider that the differential should not *be less* than the difference in LRICs so that incentives to invest in upstream infrastructure are maintained.

5.213 We have also conducted a high-level check on the likely differentials between the two services by 2013/14 (described further in Annex 10). We estimate that by 2013/14 the differences in the aggregate prices of connections and rentals of wholesale ISDN30 and PPCs are likely to exceed the difference in their incremental costs by ✂% [more than 30%].

5.214 Our proposed charge control will result in a differential between the relevant ISDN30 charges and the comparable charges for a 2Mbit/s PPC which is not less than the difference in the long-run incremental costs between them. As a result it is consistent with good incentives to make the correct choice between these two alternative ways of providing a retail ISDN30 services whilst maintaining incentives to invest in infrastructure.

5.215 We discuss our approach in more detail in Annex 10.

Question 23 Do you agree with our analysis of the LRIC differentials? If not, please explain why.

A small proportion of PPC based channels would switch to wholesale ISDN30

5.216 We have also assessed how the proposed charge control would impact OCPs' choice of form of supply. In general, infrastructure providers prefer using their own end to end infrastructure to provide ISDN30 services. However, where the circumstances do not justify the costs of connecting end users to their network, some OCPs provide ISDN30 services using 2Mbit/s PPCs. Only when provision using PPCs cannot be economically justified do OCPs provide ISDN30 using Openreach's wholesale offering. Therefore, our proposed decrease in wholesale ISDN30 charges could have an impact on OCPs' choice between the two wholesale inputs and could trigger switching from PPCs to Openreach's wholesale ISDN30 service.

5.217 We have developed a model to estimate the likely extent of switching from PPCs to wholesale ISDN30 as the price of the latter falls under our proposed charge controls.

[163] The wholesale ISDN30 price exactly reflecting the LRIC differentials would be £✂ (as shown above). This compares to a wholesale ISDN30 FAC in 2009/10 equal to £✂. Therefore, if we were to reduce wholesale ISDN30 charges to reflect their FACs, the prices would still be ✂% [more than 20%] higher than the LRIC reflecting charges. Although we do not report it here, we conducted an additional cross-check on the services' LRIC differentials by accounting for all the incremental cost differences between the two services shown by our Incremental Cost model. Under this approach we accounted for any cost difference between the two wholesale inputs, as long as it increased the magnitude of the differential, even when we believed such difference was the consequence of the cost allocation methodology adopted, rather than the result of differences in costs. In this case, we estimated that the difference between the ISDN30 FAC costs and the 2Mbit/s PPC prices in 2009/10 was larger than the difference in their incremental costs by around ✂% [more than 10%].

5.218 The Switching model estimates that the volume of channels switching from PPCs to wholesale ISDN30 will be in the range of 10,758 to 39,421 channels (equivalent to 9% to 31% of the total volume of channels that would have been provided using PPCs during the charge control period). The lower end of the range results from assuming the lower estimate of OCP's costs of supply using PPCs and the lower PPC prices.[164] In contrast, the higher end of the range results from assuming the higher OCP costs of supply using PPCs and the higher PPC prices. However, for the purposes of our base case scenario (i.e. the scenario used to derive the values of X in our Cost Forecast model) we have assumed the low OCP costs of supply using PPCs and an average of the high and low PPC price scenarios. This results in an estimate of 11,494 channels switching from PPCs to wholesale ISDN30.

5.219 We have adopted the above base case scenario because we believe it is likely to be the more plausible scenario (for the reasons discussed in Annex 9). Additionally, we believe it is consistent with our conservative approach to charge controls, as it will result in the number of channels switching towards the lower end of the range considered above. A lower number of channels switching results in a smaller number of channels on Openreach network and, hence, in lower values of X.

5.220 We note that, as discussed in Annex 9, our model has used relatively conservative assumptions throughout and that, in practice, we would expect that the actual level of switching would be towards the lower end of the range predicted by our model. We believe this is demonstrated by the fact that OCPs are currently providing ISDN30 services using PPCs where an assessment based on the costs of provision would suggest that it may not be strictly economic to do so. This may be explained by historical reasons but may also be due to the existence of economies of scope (with the provision of other services using common infrastructure) or due to OCPs' expectation of gaining future customers, factors which are difficult to account for when modelling the extent of switching between the two wholesale inputs.

5.221 We discuss our approach in more detail in Annex 9.

Question 24 Do you agree with our analysis assessing the extent of switching from 2Mbit/s PPCs to wholesale ISDN30 services? If not, please explain why.

The proposed charge controls reflect our duties and meet the Communications Act tests

Powers under section 87 and 88

5.222 As discussed in section 2, we are proposing to apply a price control as an SMP Condition under section 87 of the Act. Section 88 of the Act states that Ofcom should not set a price control condition except where it appears to it from the market analysis that there is a relevant risk of adverse effects arising from price distortion and it also appears that the setting of the condition is appropriate for the purposes of:

- promoting efficiency;

[164] As discussed further in Annex 9, until September 2012 PPC prices will be subject to the current LLCC which has imposed price caps on leased lines service baskets and sub caps within those baskets for certain charges. This provides BT with some flexibility to vary the prices of PPCs. To account for this pricing flexibility, we have modelled two PPC price scenarios, a Low PPC price (with the lowest prices possible) and a High PPC price (with the highest prices).

- promoting sustainable competition; and

- conferring the greatest possible benefits on the end-users of the public electronic communications services.

5.223 In proposing charge controls, section 88 also requires that we must take account of the extent of the investment in the matters it relates to.

5.224 In the Market Review we found that there was, based upon the evidence that was available at the time, a relevant risk of adverse effects arising from price distortion and therefore it was appropriate to set a condition under section 88. In our opinion, following our detailed assessment of the profitability of wholesale ISDN30 services, we consider that this risk still remains and it would be appropriate to set an SMP condition under section 87(9).

5.225 Additionally, we consider our proposed Condition AAA(IS)4A satisfies the tests under section 88, which we now address in turn below.

The proposed control will promote efficiency

5.226 We consider that the proposed SMP Condition is appropriate and proportionate for the purpose of promoting efficiency.

5.227 In the absence of sufficiently material competitive pressures, we believe that Openreach would have limited incentives to seek to reduce its costs of providing wholesale ISDN30 services. By proposing an RPI-X charge control Openreach is encouraged to increase its productive efficiency. This is achieved by allowing Openreach to keep any super-normal profits that it earns within a defined period by reducing its costs over and above the savings envisaged when the charge control was set. The benefits of any cost savings would potentially accrue to the regulated company in the short run and this would give Openreach incentives to make those efficiency savings. In the longer run, these cost savings could be passed to consumers through reductions in prices, either as a result of competition or through subsequent charge controls. This form of price regulation is also preferable to a rate of return type of control. In addition:

- By bringing prices more in line with costs, our charge control proposals will increase allocative efficiency.[165]

- When forecasting Openreach's forward looking costs for wholesale ISDN30 services, we have assumed underlying efficiency gains of 3.5% to 5.5%. In coming to a view of the likely efficiency of Openreach's costs, we have looked at a range of evidence including benchmarks from other markets (section 88(4) of the Act) and we have had regard to the appropriate cost accounting methods (section 88(4)(b)).

5.228 By proposing a single basket for wholesale ISDN30 connections and rentals, we also provide Openreach the flexibility to change its prices to meet the necessary demand conditions by recovering common costs in the most efficient manner across these two services.

[165] When prices better reflect the underlying costs of production, allocative efficiency is enhanced. Meeting demand at cost-reflective prices will result in resources being allocated to the goods or services that consumers value most.

The proposed control will promote sustainable competition

5.229 We also consider that the proposed charge controls are appropriate and proportionate to ensure sustainable competition and to confer the greatest possible benefits on users of public electronic communication services.

5.230 Preventing excessive pricing via an RPI-X type charge control will benefit consumers. Wholesale customers will benefit from bringing ISDN30 prices more in line with Openreach's overall costs. Since there is effective retail competition in this market, as found in the Market Review, this will result in retail competitors passing any reductions in wholesale ISDN30 prices onto end-users. This will ensure that end users' decision to migrate to more efficient IP services in future will be based on a comparison of the characteristics of the products when charged at the competitive level, rather than on artificial incentives to migrate away from ISDN30 because it is priced excessively.

5.231 Although our proposed charge control applies to baskets of services, we have proposed appropriate safe-guards to ensure that Openreach does not use the pricing flexibility offered to it in an anti-competitive manner to the detriment of any end-user.

5.232 Our proposals to keep the wholesale ISDN30 transfers charges at current levels in real terms will also help competition in the retail market to the benefit of end users. This means it is unlikely that OCPs will start charging for transferring customers from other CPs, or increase the length of the minimum contract periods (MCPs) or start introducing early termination charges (ETCs).

5.233 Finally, by setting the proposed charge controls at a level where the difference between the prices of 2Mbit/s PPCs and wholesale ISDN30 reflects the difference in their respective LRICs, we will ensure that OCPs will always have an incentive to choose the wholesale input which minimises overall costs to the benefit of end-users.

Investment matters

5.234 When proposing the charge controls we have also taken into account the need to ensure that Openreach has the correct incentives to invest and innovate. We have considered the risk, suggested by Openreach, that the proposed charge control might deter investment in new technologies. We consider that we have taken this properly into account:

- We have recognised the fact Openreach's asset base for wholesale ISDN30 services is heavily depreciated and we have adjusted for this to ensure that the costs included in our model are representative of an ongoing network at steady state. By doing so we have ensured that wholesale ISDN30 prices are not unduly depressed and end users' incentives to migrate to IP based services are not distorted.

- In modelling Openreach's likely costs, we have built in a reasonable return on capital employed to provide an adequate return on Openreach's investment, and we have projected costs on the basis of reasonable assumptions, as discussed in Annex 6.

- We have estimated the additional take up of wholesale ISDN30 services which may result from our proposed charge control and included this in our overall volume forecasts to ensure that Openreach is able to recover all of its costs.

5.235 We have proposed to keep the price of wholesale ISDN30 transfers at the current level, which is below the cost which Openreach allocates to transfers, in real terms. Our proposed charge controls will allow Openreach to recover the shortfall through the combined wholesale ISDN30 connections and rentals basket.

5.236 We think that our proposed charge control strikes a good balance between potential risk and reward. As the charge control is set for a fixed duration, Openreach can benefit under the control if it manages to increase market share or if outturn costs are lower than anticipated when the charge control was set.

We have considered the section 47 tests

5.237 As discussed in section 2 and Annex 12, any SMP condition must also satisfy the tests set out in section 47 of the Act, namely that it must be:

- objectively justifiable in relation to the networks, services or facilities to which it relates;
- not such as to discriminate unduly against particular persons or a particular description of persons;
- proportionate as to what the condition is intended to achieve; and
- in relation to what it is intended to achieve, transparent.

5.238 We are satisfied that this test is met.

The proposed controls are objectively justifiable

5.239 As regards objective justification, Openreach's SMP in the provision of wholesale ISDN30 services allows it to set charges unilaterally and, in the absence of any controls, prices likely to continue to be set above the competitive level. This would have adverse impacts on consumer welfare. Our proposed charge controls have been structured to ensure that average wholesale ISDN30 prices are brought in line with Openreach's overall costs, based on the provision of an efficient, ongoing service, whilst ensuring that Openreach is able to recover its costs, including a reasonable return on its investment. Additionally, we have reviewed each service within the market so that we have proposed an appropriate level of control for individual services where appropriate.

5.240 The proposed controls are also objectively justifiable in that the benefits of RPI-X price controls, which we are proposing to implement, are widely acknowledged as an effective mechanism to reduce prices in a situation where competition does not act to do so.

The proposed controls do not discriminate unduly

5.241 The proposed charge controls will not discriminate unduly against a particular person or particular persons because any CP (including BT itself) can access the services at the charge levels fixed. The proposed charges are set to ensure a fair return and price level for all customer groups. In any event, Ofcom considers that they do not discriminate unduly against Openreach as it is the only CP to hold SMP in this market (for the UK excluding the Hull Area) and the proposed controls seek to address that market position, including Openreach's ability and incentive to set excessive charges for services falling within the controls.

The proposed controls are proportionate

5.242 The proposed charge controls are proportionate for all the reasons set out above. Openreach's obligations apply to the minimum set of charges required for the delivery of bottleneck services. They are focused on ensuring that there are reasonable prices for those access services, which are critical to the development of a competitive market. Openreach is, however, allowed to recover a reasonable return on investment. Openreach will also have incentives to continue to invest and develop its access network. Moreover, the maximum charges Openreach is allowed to set over the period of the control has been formulated using information on its costs (adjusted to account for ISDN30's status as a legacy product) and a consideration of how these costs will change over time. We have also only imposed controls on services within the market that we consider need to be controlled.

5.243 For all the reasons set out above, we consider that the proposed charge controls pursue our policy objectives and the means employed to achieve those terms are both necessary and the least burdensome to address effectively the concerns we have set out.

The proposed controls are transparent

5.244 Finally, for reasons discussed above, we consider that the proposed charge controls are transparent. Their aims and effect are clear and they have been drafted so as to secure maximum transparency. The proposed texts of the Conditions themselves have also been published with this consultation. Their intended operation is also aided by our explanations in this consultation. We have also set out their likely impact on charges for the duration of the controls.

We have considered sections 3 and 4 of the Act

5.245 We also consider that the proposed charge control Condition fits with our duties under sections 3 and 4 of the Act.

5.246 For the reasons set out above, we consider that the proposed control will, in particular, further the interests of citizens and of consumers in relevant markets by the promotion of competition in line with section 3 of the Act. In particular, we have had regard to the desirability of promoting competition in relevant markets and the desirability of encouraging investment and innovation in relevant markets.

5.247 Further, we consider that, in line with section 4 of the Act, the charge control will, in particular, promote competition in relation to the provision of electronic communications networks and will encourage the provision of Network Access for the purpose of securing efficiency and sustainable competition in downstream markets for electronic communications networks and services, resulting in the maximum benefit for retail consumers of ISDN30 services by encouraging a pass through of any wholesale price reductions to the competitive retail market.

Section 6

Charge control implementation

Introduction

6.1 In this section we explain how the proposed charge control for wholesale ISDN30 services is structured and how the proposed conditions will work in practice. In particular we discuss the following:

- How the proposed condition would work alongside other regulation in the ISDN30 wholesale exchange line market;
- How the proposed condition sets the "baskets" of services discussed in section 5 above;
- The proposed values of X for each service;
- The effect of changes that Openreach make to the prices of controlled services;
- How we calculate whether Openreach is complying with the proposed charge ceilings created by the proposed RPI-X style of control, including;
    - How we determine what the overall change of prices has been for each service or group of services; and
    - What information we require from Openreach to enable us to monitor their compliance with the controls; and
- How the proposed condition allows for corrections where there has been over or under recovery.

6.2 In proposing this Control we have also had regard to the proposals made in relation to the WBA and WLR/LLU charge controls upon which Ofcom are currently consulting. We have proposed an RPI-X control that is consistent in its application and effect with the controls proposed in these other reviews.

6.3 We are also consulting on our proposals for 10 weeks. This is consistent with the consultation period set for the WBA charge control and reflects our guidance for "category 1" consultations as a major policy initiative. This is also consistent with the WLR/LLU charge control consultation.

6.4 We will, as required by the Act and as we have set out in paragraph 20 of the Notification of our proposals at Annex 12, notify the European Commission and to the regulatory authorities (NRAs) of every other member State of our proposals in accordance with sections 50(3) of the Act.

6.5 In addition, a copy of the draft decisions contained in the Notification will also be sent to the Secretary of State for Business, Enterprise and Regulatory Reform in accordance with section 50(1)(a) of the Act.

6.6 Any comments received from stakeholders, the European Commission and other NRAs will be taken into consideration by Ofcom when reaching the conclusions in its Final Statement.

Interaction with other remedies

6.7 The Market Review imposed a number of SMP conditions on Openreach in the wholesale ISDN30 exchange lines market. These conditions currently place a number of obligations on Openreach in relation to how they offer wholesale ISDN30 services. For example, Openreach are required to:

- provide network access on reasonable request (AAA(IS)1);
- not to unduly discriminate in relation to matters connected with network access (AAA(IS)2);
- publish a reference offer (AAA(IS)5);
- notify charges and technical information (AAA(IS)6(a) and (b);
- publish Key Performance Indicators ('KPIs') (AAA(IS)7 and KPI Direction); and
- provide wholesale ISDN30 exchange line services (AAA(IS)10).

6.8 Each of these conditions will remain in force and is unaltered by any of the proposals in this consultation. The above mentioned obligations would therefore, work alongside the charge controls proposed by this review. We discuss in section 5, how some conditions already constrain Openreach's ability to price freely, and that in some cases (such as for most ancillary services) this provides a sufficient constraint without the need to impose a specific price control remedy under section 87(9) of the Act.

The current fixed price ceiling will be revoked if, and when, the new charge control conditions become effective

6.9 Additionally, certain wholesale ISDN30 services are currently subject to an interim price control set under the Market Review. This control, set as SMP Condition AAA(IS)4, imposes fixed charge ceilings in relation to rental, connection and transfer services.

6.10 We are proposing to revoke SMP services condition AAA(IS)4 in its entirety as the new charge control proposed by this review will impose new, cost related, controls on these services that we consider are more appropriate than the short term interim measure imposed under the Market Review. AAA(IS)4 would only be revoked when, and if, proposed Condition AAA(IS)4A enters into force.

We propose no amendments to the current level of reporting for wholesale ISDN30 services

6.11 The Market Review also confirmed that the relevant financial reporting SMP conditions should continue to be imposed on this market. SMP Conditions OA1 – 34 set the framework for specific financial reporting obligations to be imposed on BT in the wholesale and retail markets to which they apply. A direction (made under SMP Condition OA2, and reviewed on an annual basis by Ofcom), then specifies what specific reports are required for each market. This direction is reviewed on an annual basis by Ofcom, prior to the end of a financial year, to ensure that it can be updated to incorporate any decision made in market reviews conducted since the last review.

6.12 As we have explained in section 5 above, the Market Review decided that cost accounting information should be reported by Openreach in relation to ISDN30 in order to support any price control imposed by this review. As any charge control imposed as a result of this review would not be in force until the 2011/2012 financial year, any amendment to the financial reporting direction would be made in the review that we anticipate conducting next year. Any SMP charge control condition, finally imposed under this review, will therefore provide the authority and scope for any proposal made to amend the financial reporting direction next year, where stakeholders will get a further opportunity to comment.

6.13 This review does not, therefore, propose any amendments to the current level of reporting, in that Openreach are required to report accounting separation data as currently specified in the financial reporting direction.

The proposed Condition

6.14 The new SMP services condition AAA(IS)4A will, as proposed, have three key effects; it will:

- set charge controls until 31 March 2014 for the services specified;
- ensure that average charges for services subject to charge controls do not change by more than the value of 'X' as specified; and
- require Openreach to provide information annually to Ofcom to enable compliance monitoring.

6.15 The proposed condition AAA(IS)4A is set out in full at Schedule 1 of Annex 12.

Basket Structure

6.16 In section 5 we have discussed our proposal for a combined basket for wholesale ISDN30 rentals and connections (with a safeguard cap on the average connection charge) and a separate basket for transfers. We have also proposed to include enhanced care services in this basket. In the same section we have also discussed our proposal for a safeguard cap on DDI services.

6.17 We have structured the Condition to effect those proposal:

- The proposed condition, at AAA(IS)4A.1(a), creates a combined basket for wholesale ISDN30 Rental Services, ISDN30 Connection Services and ISDN30 Enhanced Care Services:
  - ISDN30 Connection Services are defined to include the separate *per-installation* and *per-channel charges*. AAA(IS)4A.8 proposes a sub-cap of RPI+5% for the average charges for Connections Services. This would allow Openreach the freedom to set the individual per-installation and per-channel charges subject to the overall sub-cap.
  - ISDN30 Enhanced Care Services are defined to include the separate *Service Level 3 and Service Level 4* charges. AAA(IS)4A.9 proposes a sub-cap of RPI+0% for each of the enhanced care service.

- We have proposed that transfer services, for the reasons discussed in section 5, should be placed in a separate basket. AAA(IS)4A.1(b) creates that single service basket subject to an RPI-0% safeguard cap.[166]

- We have decided to propose a control each of the three separate DDI services which are separately identified in AAA(IS)4A.1(c), (d) and (e) as Planning, Connection and Rental services, respectively. This proposed structure means that each charge will be subject to an RPI-0% safeguard cap, such that that price of any element of the service will not be able to increase in real terms.

The proposed values of X

6.18 The proposed values of 'X' for service or basket are set out in Table 6.1.

Table 6.1 Proposed values of X and relating Conditions

Baskets	Proposed control	Proposed Condition
Rental and Connections - Line rental per channel per year - Connection charge per-installation - Connection charge per-channel - Service Maintenance Level 3 and 4 (enhances care services)	Year 1-3 RPI – 10.75%	Condition AAA(IS)4A.7a
Safe-guard cap on average connection price	RPI+5%	Condition AAA(IS)4A.8
Safe-guard cap on each enhanced care service	RPI-0%	Condition AAA(IS)4A.9
Transfer - Charge per 30 channel access bearer	Year 1-3 RPI-0%	Condition AAA(IS)4A.7b
DDI – Planning	RPI-0%	Condition AAA(IS)4A.7c
Connection per DDI	RPI-0%	Condition AAA(IS)4A.7d
Rental per DDI	RPI-0%	Condition AAA(IS)4A.7e

6.19 The above table sets out the "base case" Controlling Percentage figures that we are proposing to set in relation to each service. We are consulting on a wider range of

[166] As discussed in section 5 we are also consulting on the option of raising the transfer charge to DLRIC by the end of the proposed charge control.

Xs, and, should the control be confirmed, the absolute value of each X may be different in our final statement. We have set out our ranges, and why we have proposed them in Annex 6.

We have set formulae to show how the Percentage Change will be calculated for each service

6.20 We have proposed controls on both single product services and multi product baskets. At AAA(IS)4A.3 we have set out the formula that we will use (and expect Openreach to use) to determine the Percentage Change for single service baskets.

6.21 In relation to multi-service baskets, as set out at AAA(IS)4A.4, the formula is necessarily more complex in order to take account of the number of products/service within the basket. As we have discussed in section 4 we have proposed to monitor Openreach's compliance with the proposed controls using the prior-year revenue weight approach. The prior year revenue weight formula is shown at AAA(IS)4A.4 in relation to the proposed basket control.

6.22 We are also proposing a safe-guard cap of RPI+5% on the average connection charge. At AAA(IS)4A.8 we have set out the formula to be used based on the single basket formula, but tailored to reflect that it is the average of the per-channel and per-site charges to be controlled.

6.23 The formulae are consistent with the approach we have taken in previous charge controls and in the proposed controls for WBA and LLU/WLR services on which we are currently consulting.

6.24 Additionally, we have at AAA(IS)4A.2, proposed that Openreach take all reasonable steps to secure that the revenue it accrues as a result of all individual Charge Changes during any Relevant Year shall be no more than that which it would have accrued had all of those Charge Changes been made on a fixed point in the year (generally, 1 April; adjusted for the First Relevant Year). In order to assist Openreach, we have set out a formula that can be used to demonstrate compliance. If more than one Charge Change was made by Openreach, they would still need to ensure that they could show that they had satisfied this obligation.

We will adjust the value of X in the first year

6.25 The first controlled period, referred to in the Condition as the "First Relevant Year" will be (assuming our proposals are adopted) the period from the date the Condition comes into force to 31 March 2012. If the Condition comes into force after 1 April 2011, we will then need to make a number of modifications to the Condition so that it is appropriate to the shorter period for which the control will apply.

6.26 These modifications allow for the possibility that Openreach might change its prices between 1 April 2011 and the actual start of the new control. They are necessary in order to make sure that the value of X we set is appropriate to the level of charges at the start of the control period rather than to the level of charges on 31 March 2011. The aim will be to ensure that the effect of the control by the end of the control period is the same as it would have been, had the control come into effect on 1 April 2011. If we did not take account of price changes between 31 March 2011 and the start of the control, the value of X might be either too low or too high, resulting either in prices which were below projected cost, or which were above projected cost and so did not give the best deal for consumers.

6.27 The formula set out in the draft Condition has been designed to achieve this objective and is consistent with the WBA charge controls.[167] This "First Year X" will be calculated by using the following formula:

*First Year X = (1+ change in RPI) – [Sum{wi * Pm,i} / Sum{wi * P0,i)}]* (1+ change in RPI – X),*

Where:

wi is the weight of the service in the basket as calculated in paragraph AAA(IS)4A.6;

Po,i is the published charge made by the Dominant Provider for the individual service i that forms part of the basket immediately preceding the Relevant Year, excluding any Discounts offered by the Dominant Provider;

Pm,i is the published charge made by the Dominant Provider for the individual service i that forms part of the basket on 1 April 2011, excluding any Discounts offered by the Dominant Provider; change in RPI is the change in the Retail Prices Index in the period of 12 months ending on 31 October 2010 expressed as a percentage (rounded to two decimal places) of that Index as at the beginning of that period; and

X is value set out in the relevant paragraph of AAA(IS)4A.7.

6.28 This calculation does not affect the safe-guard caps imposed on DDI services and each enhanced care service.

6.29 Another way of achieving the same objective would be to write the condition so that the controlling percentage for the first year (that is, RPI-X) is applied to the level of charges at 31 March 2011, rather than to the level of charges at the start of the first control year. The control would then limit the maximum increase in charges to RPI-X% above their level on 31 March 2011. With this second approach, there is no need to adjust the value of X for the first year and it may therefore appear somewhat simpler than the approach set out above (which has an equivalent effect). This would be consistent with the approach adopted in the WLR/LLU charge controls.[168]

6.30 We would welcome views on the appropriateness of these two approaches for the wholesale ISDN30 charge control.

6.31 If adopted in their current form, our proposed charge controls will commence on 28 days after the publication of our final statement and end of 31 March 2014. This is reflected in the definition of the "Relevant Year" as defined at AAA(IS)4A.14.

[167] http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf
[168] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

The proposed rules that Openreach needs to follow to determine compliance with the controls

Openreach is allowed to carry over differences in the average charge for a basket to the next charge control year

6.32 For the main charge control baskets, namely wholesale ISDN30 Rentals and Connections, wholesale ISDN30 transfers and wholesale ISDN30 DDI baskets, Openreach will be able to carry over any price reductions it makes in excess of the requirements of the charge control for that year.

6.33 That is, if Openreach's average price change for these baskets at the end of the Relevant Year is lower than required by the associated RPI minus 'X' constraint, it will be able to carry over the difference into the following charge control years. This means that the benchmark for assessing Openreach's compliance with the control in the following year will be the level of charges Openreach was required to achieve, rather than the level it actually achieved.

6.34 Conversely, if its average charge is higher than the required level, it has to take the excess into account in the following year. These 'carry over' provisions will not apply to the sub-baskets within the main baskets, since the general expectation is for the charge levels to be lower than that required by the sub-basket conditions (i.e. where we have set a negative X, it would be necessary for at least one charge within each sub-basket to fall in real terms in order that the overall main basket condition is met).

6.35 Paragraphs AAA(IS)4A.5 and AAA(IS)4A.6 of the proposed condition define the "Excess" and "Deficiency" scenarios set out above to give effect to our intention.

6.36 It should also be noted that AAA(IS)4A.9 provides for the case where, in the last year of the control, if Openreach is likely to fail to secure that the change in price of a controlled service (the Percentage Change) does not exceed the relevant X (the Controlling Percentage), then Ofcom can direct that Openreach should make an appropriate adjustment of its charges.

We have set out the information Openreach is required to supply to Ofcom

6.37 We have set out at AAA(IS)4A.10 the information that we propose Openreach needs to supply to us in order for us to be able to monitor its compliance with the control. This information is required to be supplied by Openreach on an annual basis, by no later than the 31 June after the end of the relevant financial year (three months after 31 March). It should be noted that although the period of the control ends on 31 March 2014, the Condition itself would remain in force, in order to maintain the obligation to supply data (and should it be necessary to direct an adjustment of pricing in the event of non-compliance).

6.38 The level and nature of information required is consistent with that proposed in the other charge controls that we are currently consulting on, and is consistent with other recently set controls.

Conclusion

6.39 We consider that the proposed Condition AAA4(IS)4A is transparent in its intent, and is consistent with the way in which we have imposed RPI-X controls in the past, and how we are currently proposing to impose such controls in other markets. We

believe that the form of control as proposed is consistent with our duties and obligations under sections 3 and 4 of the Act, and, for the reasons set out above consistent with the tests under sections 47 and 88 of the Act.

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 10 June 20011**.

A1.2 Ofcom strongly prefers to receive responses using the online web form at http://stakeholders.ofcom.org.uk/consultations/isdn30-2011/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email ISDN30.chargecontrol@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Chia Seiler
Ofcom
Competition Group Riverside House
2A Southwark Bridge Road
London SE1 9HA
Fax: 020 7783 4109

A1.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Chia Seiler on 020 7981 3957.

Confidentiality

A1.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether

all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

A1.9 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/about/accoun/disclaimer/

Next steps

A1.11 Following the end of the consultation period, Ofcom intends to publish a statement in summer 2011.

A1.12 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: http://www.ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

A1.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.14 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.

A1.15 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Graham Howell, Director Scotland, who is Ofcom's consultation champion:

Graham Howell
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA

Tel: 020 7981 3601

Email: Graham.Howell@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.

A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website,www.ofcom.org.uk.

A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.

A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at www.ofcom.org.uk/consult/.

A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your coversheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing ☐ Name/contact details/job title ☐

Whole response ☐ Organisation ☐

Part of the response ☐ If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here. ☐

Name Signed (if hard copy)

Annex 4

Consultation questions

Section 3

Question 1 Do you agree that we should assess the profitability of wholesale ISDN30 services using the adjusted ROCE approach? Do you also agree that we should make an adjustment to Openreach's depreciated ISDN30 assets (line-cards and access electronics) by setting the NRC/GRC ratio of these assets to 47% (i.e. Option 4)? If not, please explain your rationale and propose alternative approaches.

Question 2 Do you agree that an RPI-X type charge control would be the appropriate form of price control for core wholesale ISDN30 services? If not, please explain why.

Section 4

Question 3 Do you agree that CCA FAC is the appropriate cost basis for setting the proposed charge controls? If not, please explain why.

Question 4 Do you agree that a three year duration for the charge controls on wholesale ISDN30 services is appropriate? If not, please explain why.

Question 5 Do you agree with our proposal to apply the anchor pricing approach to wholesale ISDN30 services and reflect migration to IP based alternatives? If not, please explain why.

Question 6 Do you agree that the proposed charge control on wholesale ISDN30 should be indexed to RPI?

Question 7 Do you agree with the use of prior year revenue weights when setting charge control baskets? If not, please explain why.

Section 5

Question 9 Do you agree with our proposal to implement a combined basket for wholesale ISDN30 connection and rental services and a separate basket for transfers? Do you also agree with our proposal not to impose a cost orientation obligation on core wholesale ISDN30 services? If not, please explain why.

Question 9 Do you agree with our proposal to impose a safe-guard cap of RPI+5% on the average connection charge? If not, please explain why.

Question 10 Do you agree with our proposal to include enhanced care services in the combined wholesale ISDN30 rental and connection basket? Do you agree that each of the enhanced care services should also be subject to a safe-guard cap of RPI-0%? If not, please explain why.

Question 11 Do you agree that the DDI rental and connection services should be subject to a safe-guard cap of RPI-0%, whilst other ancillary services should not be subject to a specific form of price control? If not, please explain why.

Question 12 Do you agree with our proposal that the costs of wholesale ISDN30 services should be based on BT's costs? If not, please explain why.

Question 13 Do you agree with our proposed adjustments to Openreach's cost base in 2009/10 for core wholesale ISDN30 services? If not, please explain why.

Question 14 Do you agree with our volume forecasts for wholesale ISDN30 rental, connection and transfer services? If not, please explain why.

Question 15 Do you agree with our proposed AVEs for line-cards and access electronics? If not, please explain why.

Question 16 Do you agree with our proposed approach to forecasting capital expenditure for core wholesale ISDN30 services? If not, please explain why.

Question 17 Do you agree with our proposed efficiency assumption range of 3.5% to 5.5% for core wholesale ISDN30 services? If not, please explain why.

Question 18 Do you agree with the range of WACC proposed for wholesale ISDN30 services? If not, please explain why.

Question 19 Do you agree with our proposed approach to inflate operating costs at 2.5% p.a., pay costs at 3.0% p.a. and holding gain/losses at an average RPI of 3.0% p.a.? If not, please explain why.

Question 20 Do you agree that one-off adjustments to the starting charges of wholesale ISDN30 rental services are not required? If not, please explain why.

Question 21 Do you agree that one-off adjustments to the starting charges of wholesale ISDN30 connection services are not required? If not, please explain why.

Question 22 Do you agree with Ofcom's approach to the pricing of wholesale ISDN30 transfer charges during the next charge control? If not, please explain why.

Question 23 Do you agree with our analysis of the LRIC differentials? If not, please explain why.

Question 24 Do you agree with our analysis assessing the extent of switching from 2Mbit/s PPCs to wholesale ISDN30 services? If not, please explain why.

Annex 5

Technical Description of ISDN30 Provision

A5.1 ISDN30 is an Openreach product name for ISDN Primary Rate Interface ('ISDN PRI') which is a digital telephone line service that provides up to 30 lines over a common digital bearer circuit.

A5.2 Openreach currently provides two versions of ISDN30:

- ISDN30e which is fully compliant with the European Telecommunications Standards Institute (ETSI) standards for ISDN PRI; and
- ISDN30 (DASS) which is a version of ISDN PRI launched by BT before work on the international standards for ISDN PRI were completed. It uses a proprietary signalling standard called DASS2 (Digital Access Signalling System No.2) which differs in some respects from the standardised ETSI call control signalling used in ISDN30e.

A5.3 The ISDN30 DASS service is provided for compatibility with older Private Branch Exchanges (PBX) [169] but newer PBXs are designed to work with the internationally standardised version ISDN30e.

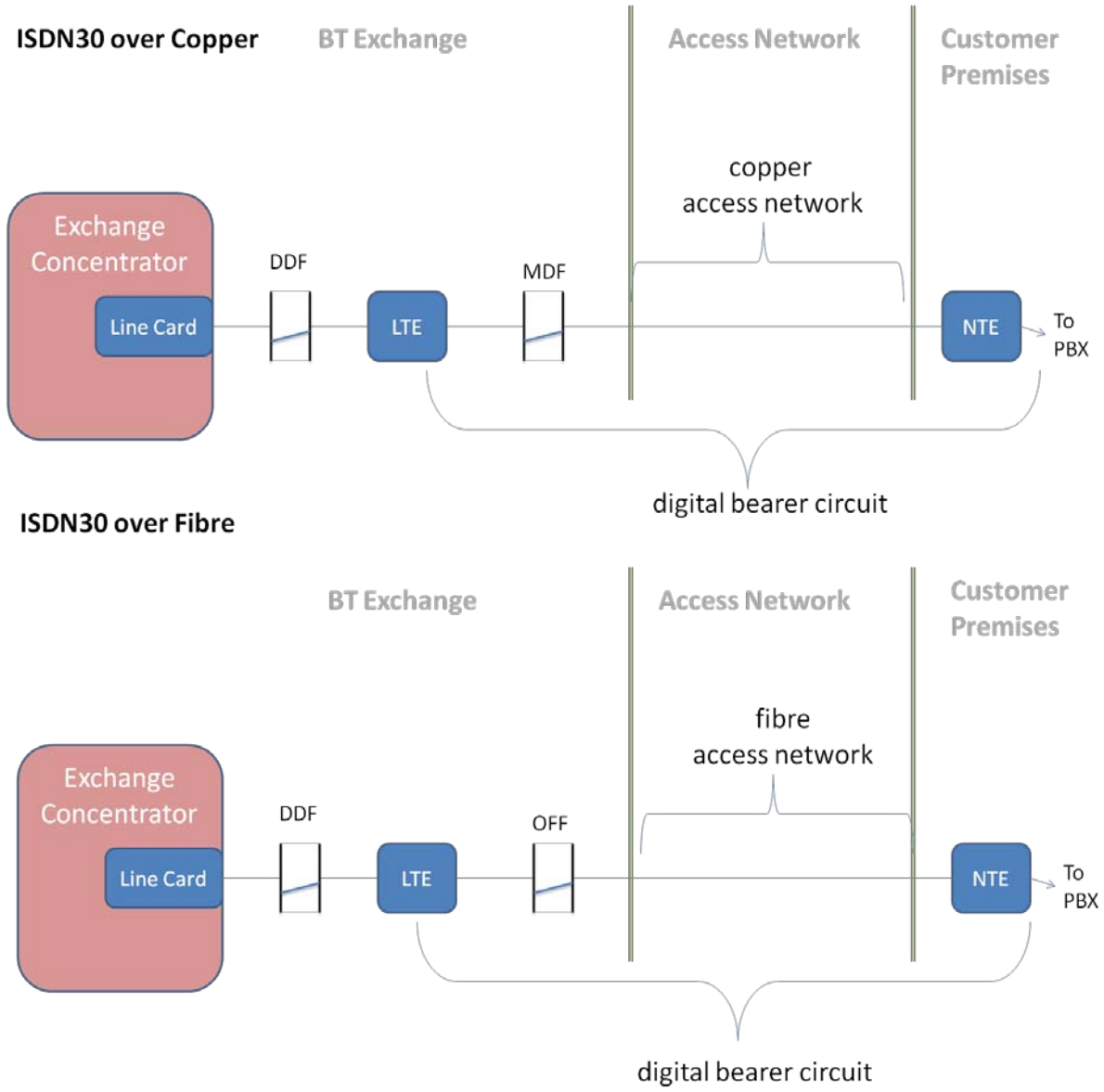
A5.4 From a technical perspective, ISDN30 consists of two main components:

- a 2 Mbit/s digital bearer circuit connecting the customer premises to the exchange; and
- call control and switching functions provided by the exchange.

A5.5 The diagram below shows the key components in an ISDN30 circuit.

[169] Private Branch Exchanges (or PBX) are telephone switching systems used by businesses to provide onsite telephony facilities such as extension numbering, inter-extension calling and outbound and inbound external calling.

Figure A5.1 ISDN30 circuit components



A5.6 They key components are described below:

- Exchange concentrator – the element of the local exchange to which customer lines are connected. The concentrator provides the telephone line interface, traffic concentration and multiplexing of traffic for transmission to the exchange processor[170] which is the local switching unit. Most of BT's exchange concentrator and exchange processor equipment is provided by two vendors. These systems known as System X and AXE10 both support ISDN30.

- Line-card –the line specific functions of the concentrator are provided on electronic circuit boards known as line-cards which are housed in the exchange concentrator. There is one line-card per ISDN30 circuit. The digital bearer circuits terminate on the line-cards.

[170] Generally called a Digital Local Exchange (DLE) in BT's network.

- Multiplexors (not illustrated)–in cases where concentrators are located beyond the maximum allowable transmission distance of the concentrator line-card additional multiplexor equipment is connected between the line terminating equipment (LTE) and line-card as a 'line extender' .Openreach have informed us these are only used in large buildings and normally exchange concentrator line-cards are connected directly to the LTE.

- Digital line system – high bandwidth circuits such as ISDN30 need a digital transmission system to transport the signals across the access network. In addition to the access network cables (copper or fibre) this comprises:

  - Line Terminating Equipment (LTE) –transmission equipment that transforms the signals into a form that can be transmitted over the bearer (either electrical or optical signals). In some cases the equipment may also perform a multiplexing function, combining several circuits onto a higher capacity bearer.

  - Network Terminating Equipment (NTE) – transmission equipment located at the customer premises. Performs similar function to LTE and also provides the customer interface.

- Exchange Flexibility Frames – these wiring frames are used within the exchanges to connect access network cables to electronic equipment inside the exchange and to interconnect electronic equipment within the exchange. For ISDN30 services, generally three different frames are used:

  - Main Distribution Frame (MDF) – copper access network cables terminate on the MDF and are then connected directly or indirectly to LTE equipment;

  - Optical Flexibility Frame (OFF) – the equivalent to the MDF for fibre access network cables; and

  - Digital Distribution Frame (DDF) – an internal frame used to interconnect digital circuits. For ISDN30 it is used to connect the LTE to the exchange concentrator line-card.

A5.7 ISDN30 has been available since the 1980s and over the years Openreach has used a number of different transmission systems for ISDN30, some of which have variants. Each system requires different LTE and NTE and in some cases a secondary NTE (NTE1a) is installed at the customer premises to provide protocol conversion for the ETSI variant of ISDN (ISDN30e).

A5.8 Some of the access bearer systems are capable of supporting more than one 2Mbit/s circuit. These can be used to provide additional ISDN30 services or other services. Some systems support circuits with higher bandwidths that can also be used to provide other services.

Other methods of provision

A5.9 In a small minority of cases, ISDN30 services are provided from exchange concentrators that are located in remote exchanges rather than the serving exchange. This can happen for several reasons:

- a small minority of predominantly rural exchanges are a type known as UXD5 that does not support ISDN30 services;

- where the serving exchange does not have sufficient spare line-card capacity to fulfil a customer order, service may be provided remotely to avoid a delay.

- sometimes the local concentrator is not the most appropriate place to terminate the ISDN30 line e.g. if a customer requires a large continuous number range that cannot be catered for locally; or

- where an exchange closure results in service being provided from a remote exchange.

A5.10 Exceptionally, in remote locations ISDN30 services are provided using point-to-point microwave radio links.

IP based services are now being offered as alternatives to ISDN30

A5.11 In the last few years there has been a marked shift to the use of IP-based technologies for communications networks. This trend is evident in:

- public networks where time division multiplexing (TDM) based telephony networks are beginning to be replaced with IP-based multiservice Next Generation Networks;

- business voice networks where IP-based PBXs are superseding TDM based PBXs; and

- IP and Ethernet transmission technologies are increasingly being used in access and backhaul networks as well as for leased lines in preference to older technologies such as Asynchronous Transfer Mode (ATM).

A5.12 New telephony services based on IP-based technologies that could potentially be substitutes for ISDN30 are now becoming available. There are three main types of IP based services:

- SIP Trunking[171] – an exchange line service that uses IP for voice and data transmission and Session Initiation Protocol (SIP) for the telephony control signalling. SIP Trunking services are generally multi-line services that are used to provide exchange line services to modern IP PBXs that support this type of interface.

- IP Centrex – an exchange line service that includes the functionality of a PBX within the OCP's network. This enables businesses to have the call management features of a PBX such as extension numbering and inter-extension calling without the need to purchase and operate a PBX. Centrex services have been available in various forms for many years and more recently IP-based variants have been introduced and these are commonly known as IP Centrex.[172]

[171] This is sometimes referred to as IP Business Trunks or IP Trunks.
[172] Typically, special IP telephones are used which communicate with a call server located in the OCP's network via an IP access connection and a data local area network (LAN) within the business premises. As with SIP Trunking, IP is used for voice and data transmission and SIP for telephony signalling.

- Hosted VoIP[173] - this is another term used to describe IP Centrex services. It is generally used to describe services provided to small sites that are accessed via an ordinary broadband internet connection.

A5.13 It is important to note that IP based services and the terminology used to describe them are still evolving. This is particularly true of IP Centrex and Hosted VoIP which are somewhat interchangeable.

A5.14 In the Market Review we considered in detail whether IP based services are demand or supply side substitutes for ISDN30. Based on the evidence gathered we concluded that for the period of our forward look, a narrow market definition based on ISDN30 only was still appropriate i.e. Hosted VoIP, IP Centrex or SIP Trunking are not sufficiently close substitutes for them to be regarded as part of a single market including ISDN30. However, we recognised the competitive constraints from IP based services in the SMP assessment.

[173] This is sometimes referred to as Hosted Telephony.

Annex 6

Financial Modelling

Introduction

A6.1 The purpose of this annex is to explain the modelling approach we have taken to forecast the costs of wholesale ISDN30 services from 2009/10 to 2013/14 and establish the "Ofcom base case". Specifically, we explain:

- the approach we have taken to identify the costs of the three wholesale ISDN30 services (rentals, connections and transfers) in the base year;
- the adjustments and assumptions we have made to forecast costs to 2013/14;
- the sensitivity analysis we have conducted on the key assumptions we have used in arriving at the Ofcom base case.

A6.2 Our modelling approach is consistent with the points we have discussed in sections 3, 4 and 5 of this consultation document. The purpose of this annex is to explain our modelling approach in more detail, in particular focusing on the mechanics of our calculations.

A6.3 We welcome stakeholder comments on the assumptions we have used. In order to assist understanding, we have created an 'Ofcom base case' set of assumptions. Based on this set of assumptions, the 2013/14 unit cost on an FAC basis of providing the ISDN30 services are shown in the table below.

Table A6.1 2013/14 Ofcom base case cost per channel for wholesale ISDN30 services

	ISDN30 rentals £ per channel	ISDN30 connections £ per channel	ISDN30 transfers £ per channel[174]
Current price (2009/10)	141.00	40.71	4.36
Operating unit cost (2013/14)	105.05	54.56	4.57
ROCE unit cost[175] (2013/14)	7.55	0.27	0.26
Total unit cost 2013/14	**112.60**	**54.83**	**4.83**

[174] The transfer cost stack is presented following our base case adjustment which removes costs over and above that required for the transfer X to equal 0%. These costs are recovered via the wholesale ISDN30 rentals and connections basket.
[175] The ROCE unit cost represents the weighted average cost of capital multiplied by the mean capital employed and constitutes an allowable return on the assets used in providing the service.

Base Year Costs

Approach to establishing base year costs

A6.4 In section 4 we have proposed that the ISDN30 charge controls should run to 31 March 2014 and be set using current cost accounting fully allocated costs (CCA FAC).

A6.5 The first step is to identify the CCA FAC for the base year 2009/10, in order to forecast these costs to 2013/14. As we have discussed in section 3, the 2009/10 ROCE reported for wholesale ISDN30 services in BT's regulatory financial statements (RFSs) is reported in aggregate as there is no obligation for BT to report costs and profitability at a service level for core wholesale ISDN30 services.

A6.6 Therefore we do not think it would be appropriate to rely solely on the RFSs for the purposes of identifying the costs of individual ISDN30 services. In order to understand the profitability of wholesale ISDN30 services, we need to identify the costs and revenues of the three core services: rentals, connections and transfers. This requires us to make a number of assumptions both in relation to the base year (2009/10) costs and for the purposes of forecasting these costs forward to 2013/14.

Basis for cost estimates

A6.7 Wholesale ISDN30 services are provided by Openreach. In the WLR/LLU charge controls we have used two models to establish the base year costs (and forecast these to 2013/14) for all Openreach services, including wholesale ISDN30 services and we rely on these for the purposes of this consultation. We explain how these models work in more detail below. To assist stakeholders' understanding of these models, we intend to make non-confidential versions of the models available following the WLR/LLU charge controls[176]. In addition, more detailed narrative about the working of the models can be found in section 7 and the annexes to that consultation.

A6.8 In the 2009 Openreach Financial Framework Review statement (OFFR statement),[177] the cost modelling was performed in two stages, as follows:

- First, we created a forecast of operating costs and capital expenditure at an Openreach level (the Cost Forecast model). We calculated these using an activity based costing model, using data based on historically observed activity levels and costs together with estimates of future level of demand.

- Second, we allocated this cost and asset data to individual services to derive unit cost estimates (the Cost Allocation model). This Cost Allocation model also contains legacy asset information and inputs from an additional model which reflects the required Regulatory Asset Value (RAV) adjustment. We discuss the RAV adjustment in more detail below.

A6.9 The Cost Forecast model is an activity based cost model (this identifies activities within an organisation and assigns costs to the relevant activities). We project Openreach's costs based on our expectations of the assets that will be in use and

[176] We refer readers to section 6 of the WLR/LLU charge controls which provides a detailed discussion on model disclosure relevant to the Cost Forecast and Cost Allocation models.

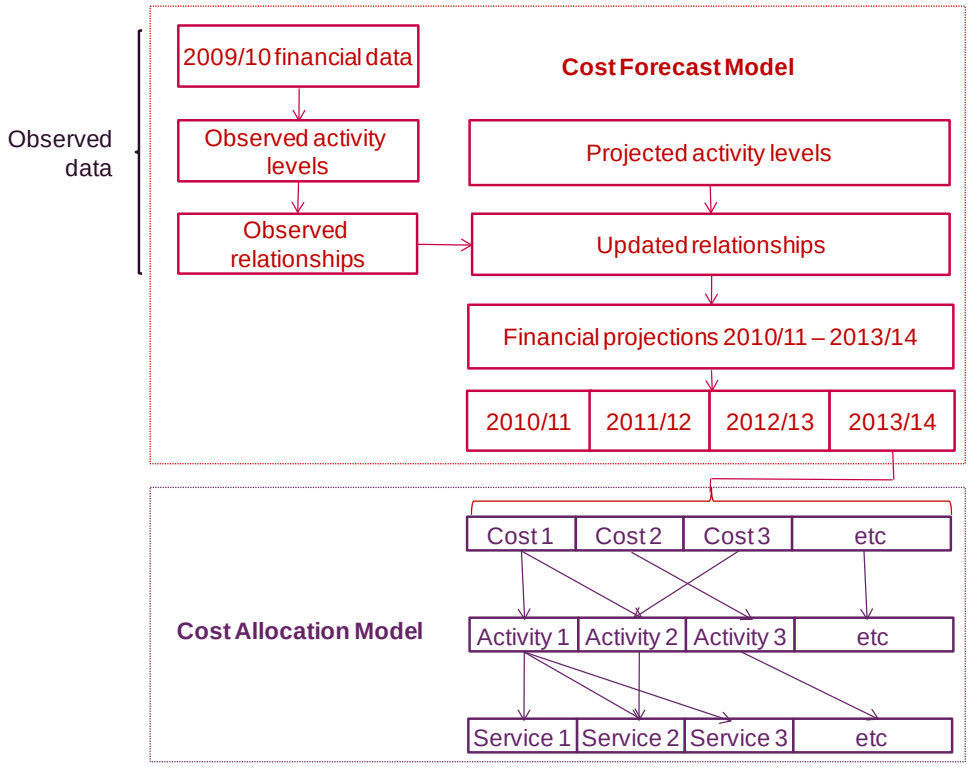
[177] http://stakeholders.ofcom.org.uk/binaries/consultations/openreachframework/statement/statement.pdf

the costs that will be incurred as a result of activities that Openreach is and will be performing to 2013/14.[178] These costs are then allocated to activities which are in turn allocated to individual services.

A6.10 A summary of the relationship between the two models used to forecast the costs of ISDN30 is shown below. We include a more detailed explanation of each model below this.

A6.11 The Cost Forecast and Cost Allocation models are both expressed in nominal terms, with an inflation assumption included in the Cost Forecast model as part of the forecast of costs to 2013/14. The cost stacks that we show throughout this consultation are therefore in nominal terms.

Figure A6.1 Flow diagrams for the Cost Forecast and Cost Allocation models



A6.12 For the purpose of the latest WLR/LLU charge controls, we have built our own models based on the models used in the 2009 consultation. Specifically, we have:

- modified the Cost Forecast model and extended it to include 2013/14. This model has been audited by Ernst & Young (E&Y).
- commissioned E&Y to modify and extend the Cost Allocation model on our behalf.[179]

[178] This approach differs from previous approaches to modelling used in the past for example the LLCC statement and the NCC statement. These models used BT's RFS cost data and forecast these forward using relevant asset volume elasticities (AVEs) and cost volume elasticities (CVEs).

[179] We refer readers to section 6 of the WLR/LLU charge control consultation which discusses model disclosure of the Cost Forecast and Cost Allocation models and section 7 which provides a detailed narrative on the modelling approach.

A6.13 As part of this exercise, we have updated the base year to 2009/10 (in line with BT's most recent audited RFSs) and extended the models to 2013/14, in line with the proposed duration of this control. This model is populated with data obtained from Openreach under Ofcom's formal powers and also includes various assumptions we have made. The models therefore provide an Ofcom forecast of Openreach's costs for the period to 2013/14.

A6.14 For the purpose of our cost modelling, we have ensured that costs relating to the roll-out of NGA are not included in the cost stack for copper products or ISDN30. Cost categories that relate exclusively to NGA, in particular NGA equipment costs, have been excluded from the cost model. Common costs have been allocated across services including NGA. This is different from a model of existing technology in which a greater share of common costs would be allocated to copper products (since NGA would be assumed not to exist) but in which the assumed volumes of copper-based service would include the combined volumes of current generation and NGA services.

A6.15 We have carried out cross checks to ensure that ISDN30 costs do not rise as a result of NGA. This is consistent with our anchor pricing approach. We find that the costs resulting from our modelling are lower than those that would result from a model excluding NGA products as, in our model, common costs are shared with NGA products. This outweighs the tendency for average costs to be higher due to the exclusion of NGA volumes.

The Cost Forecast model

A6.16 Ofcom's Cost Forecast model uses actual 2009/10 and budgeted 2010/11 BT data including data on the relationship between activities, tasks and service volumes which requires data on:

- Service volumes (volumes for each Openreach product/service);
- Visit ratios (The number of times an activity will be carried out to complete a task);
- Activity task times (Number of hours taken to complete a task);
- Labour categorisation (e.g. employee or contractor); and
- Employee numbers, rates and hours worked (measure in Kilo-man-hours 'KMH').

A6.17 The Cost Forecast model also contains regulatory accounting data that enables capital expenditure to be allocated to the appropriate asset types. The base year of the model is 2009/10 and reflects the actual hours spent on each activity.

A6.18 The 2010/11 data is a mixture of actual time spent in the year to September 2010 (extracted from Openreach's monthly management accounting system) and forecast activity levels.

A6.19 The cost forecasts are a function of assumed product volumes applied to product/activity relationships, while the task times are subject to Ofcom's efficiency assumptions. The model uses effective annual hour and cost per employee assumptions (including training, fleet, stores etc). Volume parameters include orders, connections, number of lines, rentals, faults per lines and capital expenditure programmes.

A6.20 The outputs of the Cost Forecast model (including labour hours, total volumes and total costs) are fed into the Cost Allocation model along with data from other sources (including data on the RAV and transfer charges).

A6.21 In addition, within the Cost Forecast model, we also calculate the level of future capital expenditure (capex).

A6.22 We obtained the following data from Openreach;

- The amount of actual and forecast labour time spent on non-volume driven operational capital programmes (termed Complex Kilo-Man-Hours (KMH)), for example on Fault Rate Reduction;
- The product volume to Operational activity usage factors and the 2009/10 capitalisation ratios for each Operational activity (including Complex KMH). We assumed these ratios to be fixed going forward to 2013/14; and
- The mapping of Capitalised Operational activity (including Complex KMH) to Capex Programmes.

A6.23 We then applied this information to our KMH forecasts, built up from our volume forecasts and Openreach forecast Complex KMH. From this we forecast Operational Capex KMH and then converted these KMHs into costs using FTE assumptions and then allocated the costs to Capex programmes using the mapping provided by Openreach.

A6.24 We then compared the labour element of the 2009/10 and 2010/11 Capex programmes with the total programme costs which were provided by Openreach which were consistent with the RFSs. As expected, in most cases Openreach incurs additional costs to labour. This is because for example, when laying Duct, in addition to the labour cost of Openreach's employees, there is the cost of using contractors to dig up where the duct is being laid and the material cost of installing the PVC pipes, pumps etc. Dividing total costs by labour costs produced a 'gross up' factor. The "gross up" factors for 2009/10 and 2010/11 were compared and discussed with Openreach. In our modelling we concluded that the 2010/11 'gross up' factors were appropriate to apply to our forecast labour Capex Programme costs through to 2013/14.

A6.25 Openreach also provided its forecast Programme Capex not driven by Operations. We converted the Programme Capex costs into Fixed Asset categories in order to forecast asset and depreciation costs. To do this BT supplied the allocation mapping used in the 2009/10 RFSs to allocate Programme Capex to Classes of Work (COW- such as LDC - D side Copper) and the subsequent mapping of these COWs to Fixed Asset categories. We assumed these 'gross up' factors would remain the same through to 2013/14 and used them to calculate Fixed Asset Capex values that were input into the CA model.

A6.26 Finally for the Cost Forecast model, Openreach supplied RFSs data, also in response to under the Act, on the asset life of each COW and the forecast depreciation charge for legacy assets. Incremental depreciation on Capex calculated in the model was combined with the legacy depreciation and the aggregated depreciation charge output to the CA model.

The Cost Allocation model

A6.27 The Cost Allocation model calculates profitability and unit costs on a CCA basis for all services provided by Openreach. To do this it uses the outputs from the Cost Forecast model combined with:

- asset data (including gross replacement costs, net replacement costs and depreciation)
- CCA adjustments (regulatory adjustments necessary to ensure the data is modelled on a CCA basis)
- activity to product usage factors (rules for allocating activities to individual products).

A6.28 In the Cost Allocation model, costs are first allocated to "activities", broadly similar to the "cost components" used in BT's RFSs. ISDN30 specific activities include 'rental of BTW line-cards (ISDN30)' and 'service centre assurance WLR ISDN30'.

A6.29 There are a number of different allocation basis used to allocate costs to activities. A review of these has been undertaken as part of the WLR/LLU charge controls (see Annex 7 of that consultation) but broadly speaking, there are four main methods of allocations:

- Labour (based on forecast hours spent on work related activities)
- Specific (based on a method which is directly relevant to that cost category (e.g. accommodation costs are allocated on the basis of the floor space each activity occupies.) Where it is possible to match costs to specific activities, the allocation basis reflects this.
- Blended (a combination of labour and specific)
- Depreciation (based on the assets to which they relate)

A6.30 Activity costs are then allocated to products and services. Where the activity relates to a specific product, the activity cost is allocated directly to that product (for example ISDN30 line-cards are allocated directly to ISDN30 rentals). In other cases, the costs are shared between the relevant products and services (for example the rental of access electronics is shared between ISDN30 and e-PPC products).

A6.31 Openreach has provided revised usage factors for activities within the ISDN30 connections and transfers cost stacks. This involves the movement of certain sales and general administrative costs from Connections to Transfers and 'ISDN30 connection' costs (engineering costs associated with circuit provision) from Transfers to Connections. This is a complex adjustment, and the overall impact of the revised usage factors is minimal. We have therefore decided to base the model on the original usage factors, which are consistent with the RFSs.

A6.32 The Cost Allocation model produces unit cost breakdowns split according to activity (e.g. rental of BTW items, use of access fibre and duct etc.) and according to cost category (e.g. pay, motor transport or accommodation).

A6.33 We consider that these models provide a sound basis for forecasting costs, because:

- The models are based on models original prepared by BT for internal planning purposes;
- These models were subject to close scrutiny during the 2009 appeal of Ofcom's statement entitled "*A new pricing framework for Openreach*" (the OFFR appeal) process, during which no material errors were identified;
- The Cost Forecast model has been updated by Ofcom (taking account of the issues arising during the OFFR Appeal, including the need for simplification) and audited by E&Y, on Ofcom's behalf;
- The Cost Allocation model has been updated by E&Y (taking account of the issues arising during the Appeal, including the need for simplification);
- The base year (2009/10) cost data is consistent with BT's RFSs and is reconciled to the audited RFSs;
- The first forecast year (2010/11) is consistent with Openreach's internal forecasts for the year; and
- The results in each year have been reviewed for reasonableness.

A6.34 Our modelling approach, together with its outputs, is fully explained in section 7 to the WLR/LLU charge controls and the supporting annexes. To supplement this information, where possible we are making non-confidential versions of the charge control models available to stakeholders who request them. The charge control models have been developed using highly disaggregated data from Openreach. In developing our proposals on model disclosure and transparency, we have had regard to our obligations under the Communications Act 2003 (the Act).

A6.35 We are providing disclosure of the models as part of the WLR/LLU charge controls as follows:

- Two non-confidential versions of the Cost Allocation model will be made available to stakeholders. An "empty model" is available to stakeholders who request it from today. This will provide visibility of the full functionality of the model. We will also provide a further non-confidential version of the Cost Allocation model showing information on the allocation of costs for in scope services and activities. This model will be available as soon as possible, and we will notify stakeholders of this.
- Two non-confidential versions of the Cost Forecast model will also be made available. An "empty model" is available to stakeholders who request it from today. We will also provide a further non-confidential version of the Cost Forecast model showing information relevant to the consultation. This model will be available as soon as possible, and we will notify stakeholders of this.

A6.36 We refer readers to section 6 of the WLR/LLU charge controls for more detail on disclosure of these models.

Application to ISDN30

A6.37 We consider that it is appropriate to use the Cost Forecast and Cost Allocation models for wholesale ISDN30 services because they form part of Openreach's total cost stack and share a number of common costs with products such as WLR, LLU or e-PPCs which are also included in these models. In addition, as set out above, these models have been audited and reconciled to BT's RFSs which ensures that the cost stacks are sufficiently robust for our purposes.

A6.38 Although the output from the Cost Allocation model provides a good starting point for estimating the costs of wholesale ISDN30 services, we need to make a number of ISDN30 specific adjustments (for example our proposed WACC and steady state adjustment) to ensure the costs are appropriate for forecasting purposes. We discuss these adjustments in detail below.

A6.39 We have reconciled the ISDN30 base year cost stacks to the aggregate data in BT's RFSs. Table A6.2 below shows a reconciliation of the Openreach base case cost stacks to the RFSs for each of the services.

Table A6.2 Cost Forecast and Cost Allocation models

Reconciliation	**2009/10 £m**
CCA costs per RFSs	132
Northern Ireland[180]	(2)
Cost of capital on BTO equipment	10
Allocation changes from RFSs to modelling	(2)
Rounding	2
CCA costs per Openreach data in Cost Allocation model	**140**

A6.40 The cost per RFSs represents the aggregate ISDN30 costs excluding the duct revaluation adjustments. Within the RFSs, Openreach applied the Openreach cost of capital of 10.1% to assets within the ISDN30 asset base. Within the modelling, assets transferred from BT Operate (Access electronics, backhaul electronics and line-cards) have been subject to the higher, "rest of BT rate" of 11% for 2009/10.

A6.41 The cost stacks which are derived from the Cost Allocation model are based on Openreach's base year data. We have made a number of general (consistent with the WLR/LLU charge controls) and ISDN30 specific assumptions to forecast costs from 2009/10 to 2013/14. We discuss the adjustments that are relevant to ISDN30 in detail below. Broadly speaking, these are:

[180] Costs relating to Northern Ireland are included in the RFSs, but for reasons of practicality are not included within Openreach in the Undertakings.

- As discussed in section 3, we have made a steady state adjustment to the asset base. This is because certain ISDN30 assets are heavily depreciated and the underlying costs are not consistent with a hypothetical network at steady state.

- We have made a number of additional adjustments to the base year numbers in order to ensure the costs are an appropriate starting point for the purposes of forecasting to 2013/14.

- We have used a number of assumptions for the purposes of forecasting the 2009/10 cost stack to 2013/14.

A6.42 Within the WLR/LLU charge controls, there are a number of additional assumptions used which form part of the modelling. Where these do not affect the ISDN30 cost stack, we have not included a discussion of these assumptions. For a full discussion of all assumptions used in the models, we refer readers to the WLR/LLU charge control consultation.

We propose to uplift the asset values to reflect steady state

A6.43 Towards the end of a product's life, assets may not get replaced and in addition the asset base is likely to include fully depreciated assets. This is likely to introduce three potential distortions to the underlying costs:

- The mean capital employed (MCE[181]) is lower than in the case of an on-going network at steady state because assets are being depreciated, but not being replaced. This means that the return on capital employed included in the cost stack is also lower than it would be.

- Where assets are fully depreciated, but still in use, the level of depreciation in the accounts would be lower than would otherwise be the case.

- Increased levels of operating expenditure may be incurred to make up for the reduced levels of capital expenditure.

A6.44 As discussed in section 3, certain assets within the ISDN30 asset base are heavily depreciated, as assets have been in use for long periods of time, and are not being replaced. The heavily depreciated assets can be identified as those with a low ratio of net replacement cost (NRC) to gross replacement cost (GRC).

A6.45 The NRC of an asset reflects the current purchase price of an identical new asset today less an amount of depreciation to reflect the fact that a truly equivalent replacement would not be new, but would have the same remaining useful economic life. The GRC is an asset's current purchase price. Where assets have been purchased and fully depreciated but still in use, they will be part of the GRC but not NRC.

A6.46 Throughout an asset's life, the NRC to GRC ratio declines from "one", when the asset is new, to "zero" at the end of an asset's life. An example of a steady state

[181] The MCE is the average capital employed over the year, from which we calculate the return on capital employed (ROCE) for any given product. This means the MCE is used as part of a profitability measure (i.e. how much profit is generated per unit of capital employed in the product). It also acts as a basis from which we calculate the allowable return which an investor should receive in a competitive market. We identify this by multiplying the capital employed by the weighted average cost of capital (WACC). This forms part of the FAC of the product.

adjustment would be to assume that in the steady state, with volumes roughly constant over time, assets will on average be half way through their economic lives. Hence, if the accounting and economic lives are equal and we assume straight line depreciation, in the steady state the NRC/GRC ratio should be around 0.5. In this case, a steady state adjustment would consist of uplifting the asset's NRC such that the NRC/GRC ratio is close to 0.5 and adjusting the asset's depreciation based on a correct estimate of its economic life (this is further explained below).

A6.47 If we assess profitability based on heavily depreciated assets for a product nearing the end of its life, we would conclude that even with constant operating costs and revenues the ROCE would be very high. This would suggest a charge control which reduces prices significantly. An artificially low price could, however, send the wrong price signals to users, leading to an increase in demand which could only be met by new investment, the costs of which could not be recovered at the low prevailing prices. This could in turn prolong the life of inefficient technology.

A6.48 We therefore consider that a steady state adjustment is appropriate for the purposes of identifying the base year (2009/10) profitability for ISDN30 services. We apply this adjustment to the rental service only, on the basis that this service alone includes the relevant (heavily depreciated) assets. In addition, we propose to apply this adjustment to 2009/10 and forecast it to 2013/14.

A6.49 There are various options for calculating an adjusted ROCE to reflect a 'steady state' level for wholesale ISDN30 services. The options we have considered are:

- Option 1: Do nothing on the grounds that Openreach may have already recovered these costs in the past and therefore make no adjustment;
- Option 2: Go back to the date of the asset purchase and recalculate the depreciation and capital employed based on asset lives now known;
- Option 3: Restate the present asset values based on the assumption that a steady state prevailed on an ongoing basis (50% NRC/GRC ratio) and adjust depreciation;
- Option 4: Restate the present asset values based on another value (e.g. average NRC/GRC ratio of the remaining assets) and adjust depreciation; and
- Option 5: Reinstate asset values of a previous period where the assets were deemed to be in a 'steady state'.

A6.50 We have discussed the policy implications of the above options in detail in section 3 and we do not repeat these arguments here again. In section 3 we have also proposed to implement Option 4.

A6.51 In our view Option 4 is the most appropriate method to calculate Openreach's adjusted ROCE and costs for ISDN30 services. This approach is relatively simple to implement and is based on financial data which can be reconciled to BT's RFSs. We also think that an NRC/GRC ratio of 47% is appropriate, as this is the NRC/GRC ratio for the remaining asset base of ISDN30 assets. We believe this is a reasonable proxy of what we would expect for this network in a steady state.

A6.52 Using Option 4, Openreach's adjusted ROCE in 2009/10 for wholesale ISDN30 services would have been **24%.** This is still significantly above the '"rest of BT"

WACC of 11%[182] (in aggregate) in 2009/10. In addition, the impact of our proposed Option 4 is to increase Openreach's base year costs for ISDN30 rentals by up to **£71.2m** or **£33.17/channel.** This adjustment is made of the following components:

Table A6.3 Components of the Ofcom steady state adjustment for 2009/10.

Asset	ROCE adjustment £/channel	Depreciation adjustment £/channel	Total adjustment £/channel
ISDN30 Line-cards	1.82	3.94	5.76
Access Electronics	4.50	22.91	27.40
Total	**6.32**	**26.85**	**33.17**

A6.53 We explain below the steps we have followed in implementing the asset adjustments:

Step 1 – Identify assets which require adjustment

A6.54 We have identified the NRC and GRC of the assets within the ISDN30 asset base using data provided by Openreach requested under our formal powers.

A6.55 For the assets with a significant GRC (above £50m) we considered the ratio of the NRC to GRC. If a product is in a steady state with investment equal to depreciation, we would expect the ratio to be around 50%. Where the product is nearing the end of its life (and no new investment is therefore taking place) this ratio will be much lower. In addition, where prudent accounting assumptions have been used, the assets will be more heavily depreciated than appropriate which in turn will reduce the NRC/GRC ratio further.

A6.56 The NRC/GRC ratio of assets within the ISDN30 rental asset base is shown in Table A6.4 below. We have separated out the assets with a GRC greater than £50m and an NRC/GRC ratio significantly below 50%.

Table A6.4 ISDN30 Rental assets: NRC/GRC ratios at 2009/10

Asset	NRC /GRC ratio
ISDN30 line-cards	8%
Access Electronics	13%
Other assets within ISDN30	47%
Total ISDN30 asset base	29%

[182] We are of the view that wholesale ISDN30 services should be classified within BT's core network for the purposes of an assessment of risk levels and should be subject to the "rest of BT" rate. The range for the rest of BT rate as proposed in the WBA charge control is 8.5% to 10.0% with a mid-point of 9.3%.

Step 2 – Adjust the NRC/GRC ratio for the base year

A6.57 Having identified the assets which require adjusting, we have uplifted the relevant NRC to 47% of the GRC. This is done by calculating the GRC for the base year (2009/10) and multiplying it by 0.47 to calculate an adjusted NRC from which we can calculate the ROCE unit cost.

A6.58 The ROCE unit cost is then calculated as the adjusted NRC multiplied by the proposed WACC of 9.3%. See Annex 7 for a more detailed discussion on our proposed WACC for wholesale ISDN30 services.

A6.59 The base year adjustment for the ROCE increases the cost stack for ISDN30 rentals by £6.32 per channel.

Step 3 – Calculate the depreciation for the base year

A6.60 We have assumed that the GRC in the base year is accurate and divided this by the approximate accounting asset lives[183] which are:

- ISDN30 line-cards (10 years); and
- Access Electronics (5 years).

A6.61 We have assumed that the above accounting lives are appropriate for the purposes of the steady state adjustment. In the past, economic lives have exceeded accounting lives. But we expect economic lives to be shorter in future, because of the likely reduction in ISDN30 demand, and more in line with accounting lives. Therefore as wholesale ISDN30 services are facing a steady decline, we consider that the remaining useful economic life and the accounting asset lives will be similar.

A6.62 Our base year adjustment for depreciation is £26.85 per channel for ISDN30 rentals.

Step 4 – Calculate base year adjustment

A6.63 From Steps 2 and 3, we can identify the total adjustment necessary for the base year as £33.17 per channel for ISDN30 rentals.

A6.64 We discuss how we propose to forecast this base year adjustment to 2013/14 from paragraph A6.87 below.

Step 5 - Consider base year operating costs

A6.65 We also need to consider whether operating costs need to be adjusted to reflect a network at steady state. It is reasonable to assume that as the ISDN30 assets become increasingly depreciated, the cost of maintaining these assets will increase. The result of higher maintenance costs is operating costs that are above those required to maintain a hypothetical ongoing network. As we have not previously imposed reporting requirements in relation to wholesale ISDN30 services, we do not have comparable historical data which would assist us in identifying the relevant

[183] The assets within the ISDN30 asset base have been subject to different accounting asset life assumptions, however we consider that the approximate accounting asset lives above represent reasonable proxies for the accounting asset life.

maintenance costs. We have therefore been unable to ascertain whether operating costs need to be adjusted. However, we think it is reasonable to assume that we would not be required to make such an adjustment as our analysis of ISDN30 fault rates has shown this to be quite low.[184]

A6.66 In addition we note that we do apply an Openreach wide efficiency rate when forecasting base year operating costs forward. This also includes the relevant wholesale ISDN30 services. This is discussed in more detail below.

Adjustments to base year costs

A6.67 In addition to the steady state adjustment discussed above, there are a number of further adjustments that we propose to make to base year costs. This enables us to establish the Ofcom base year costs (2009/10) for wholesale ISDN30 services. We make these adjustments to Openreach's costs to ensure that the base year is an appropriate starting point for forecasting costs to 2013/14. The adjustments we propose to make to the base year costs for wholesale ISDN30 rentals[185] are summarised below. We would welcome stakeholder views on whether these adjustments are appropriate for the ISDN30 services.

A6.68 Some of these adjustments have been made at a total Openreach level, in line with the WLR/LLU charge controls. As such these are incorporated into the Cost Forecast and/or Cost Allocation models. In addition, we have made some ISDN30 specific adjustments outside these models. Both the general Openreach adjustments which impact ISDN30 and the 'off-line' ISDN30 adjustments are detailed below.

[184] We have analysed Openreach's fault rate data based on Openreach KPIs from January 2010 to October 2010 and note that the percentage of the ISDN30 installed base reported as faulty is low compared to other services and remains low over the period.

[185] We show the impact on ISDN30 rentals in the table below, as the majority of base year adjustments affect the rental product only. Where there is an additional impact on either ISDN30 connections or transfers we discuss this as part of the qualitative explanation of the adjustments.

Table A6.5 Impact of base year cost adjustments on the wholesale ISDN30 rental cost stack in 2009/10

Adjustment	Impact £/channel	Description
Starting cost per channel	**66.38**	**Cost from Cost Allocation model using Openreach's input data**[186]
Steady state adjustment (discussed above)	33.17	Adjustment to heavily depreciated assets described in above
Duct revaluation reversal	-0.10	Reversal of the re-valued duct amount
RAV adjustment	-0.20	RAV adjustment
Use of 'rest of BT' WACC	-0.64	Use of proposed rest of BT WACC of 9.3% compared to Openreach WACC in Cost Allocation model of 10.1%
Reallocation of transfer costs	1.88	Re-allocation of excess costs from transfer cost stack
Rounding	-0.03	
Final cost per channel	**100.46**	

We propose to take into account the Regulatory Asset Value (RAV) for pre-97 access copper and duct

A6.69 Since 2005, BT's pre-1997 duct assets have been accounted for through the use of a Regulatory Asset Value (RAV) which is designed to allow BT to recover its costs without risk of an over-recovery that would be detrimental to competition. The introduction of a replacement cost approach in 1997, when applied to all the duct assets owned by BT, caused an increase in value, in comparison with the HCA approach in force when those assets were built. Asking BT's competitors to pay BT's holding gains for assets that were built before the CCA approach was adopted would have constituted an unfair windfall for BT, to the detriment of competition. Separating the RAV from the post-1997 assets allowed the pre-1997 to remain valued by HCA, at a level that allowed a fair return for BT's past expenditure.

A6.70 The RAV adjustment is made in order to restate the value of copper and duct assets acquired prior to August 1997 from a CCA value to an indexed HCA value.

A6.71 We have used a model built by BT to generate the indexed value of the pre-1997 assets and the CCA valuation of the post 1997 assets. The RAV model, on a total BT basis, sets out, on a historic basis the value of assets, additions, disposals, depreciation. It also has a record of the actual current cost adjustments made and holding gains and losses which have accrued. The model calculates the asset and depreciation cost on a forward looking basis. The outputs of the model are historical and forecast CCA and RAV values for the copper and duct asset base, as well as depreciation charge and holding gains. These outputs are multiplied by the relevant

[186] This represents Ofcom's replication of Openreach data.

percentage appropriate to the Access network to produce inputs into the Cost Allocation model.

A6.72 As part of the WLR/LLU charge controls, we have reviewed the key inputs and calculations and, subject to the comments below regarding the duct valuation, have found no material error. On this basis, our view is that the model provides a reasonable basis for determining the RAV adjustments, subject to the appropriate choice of assumptions.

A6.73 We reconciled RAV model outputs for duct and copper to BT's RFSs. Historic capital expenditure agreed to disaggregated data from the RFSs. Depreciation and disposals were recalculated and appeared consistent with the RFS.

A6.74 We also examined the key forward looking assumptions. Capital expenditure was modelled by Openreach based on the 09/10 actual data and was broadly consistent with Ofcom's forecasts. We replaced the Openreach capital expenditure forecasts with our own generated from the Cost Forecast Model. Assets are retired in the year when they become fully depreciated. Depreciation appears reasonable at 18 years on average for copper and 40 years for duct.

A6.75 As duct and copper form part of the ISDN30 rental asset base, we consider there to be no good reason to take a different approach for wholesale ISDN30 services.

A6.76 The RAV adjustment does not form a significant part of the cost stack for ISDN30 services. The impact of including the RAV adjustment on the ISDN30 rental base year costs is to reduce the ISDN30 rental unit cost by approximately £0.20 per channel. The RAV adjustment has no impact on ISDN30 connection or transfer costs as it relates to copper and duct assets, which do not form part of the asset base of either of these services.

We propose to exclude BT's revaluation of duct

A6.77 BT has increased the 2009/10 valuation of duct to £6.5bn which represents a £1.8bn increase compared to the 2008/9 equivalent valuation. As part of this, BT has estimated that the replacement value of post-1997 assets is £2.9bn.

A6.78 As part of the WLR/LLU charge controls, we have reviewed BT's methodology and have considered alternative methodologies. We refer readers to Annex 4 of the WLR/LLU charge control consultation for a full discussion on the treatment of duct.[187]

A6.79 For the purposes of modelling, we have used a different valuation of duct of £2.1bn rather than BT's estimate of £2.9bn. The impact of using £2.1bn, compared to BT's absolute valuation, is a decrease of approximately £0.10 per channel in the unit cost of ISDN30 rentals. The revaluation of duct does not impact the cost stacks of ISDN30 connections or transfers because duct does not form part of the asset base of these services.

Cost Forecasting to 2013/4

A6.80 Having established the proposed base year costs for 2009/10, we then need to forecast these for the proposed charge control period of three years. In order to do

[187] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

this, we propose to use a number of assumptions which we discuss in the paragraphs below. We further note that:

- Some of the assumptions, such as volumes and steady state adjustments, have been considered at an ISDN30 specific level.
- Other assumptions, such as efficiency and inflation, have been considered at an Openreach level and are therefore consistent with the WLR/LLU charge controls. Where we have considered assumptions at a total Openreach level, we have assessed whether it is appropriate to apply these to wholesale ISDN30 services. We would welcome stakeholder views on the suitability of these assumptions for ISDN30 services.
- We have also performed a sensitivity analysis aimed at capturing the sensitivity of wholesale ISDN30 cost forecasts to changes in key assumptions.

Volume forecasts

A6.81 We propose to use a two stage approach to forecasting volumes for ISDN30 services. We discuss this in detail in Annex 8.

A6.82 This involves forecasting an initial set of volumes for the three core services assuming no change to prices from current levels (Stage 1 volume forecasts). These volume forecasts are shown below.

Table A6.6 Stage 1 volume forecasts

	2009/10	2010/11	2011/12	2012/13	2013/14
Rentals	2,145,752	1,979,995	1,827,042	1,685,905	1,555,670
Connections	186,403	115,211	106,311	98,099	90,521
Transfers	295,763	290,054	284,456	278,965	273,581

A6.83 We input these volumes into the Cost Forecast model and into the additional off-line ISDN30 adjustments (where we calculate ISDN30 specific adjustments such as the steady state adjustment). We then calculate the price change required (i.e. the value of X) for the proposed rentals and connections basket such that revenues are equal to FAC by 2013/14.

A6.84 From this, we are able to run a Stage 2 volume scenario which takes into account the impact of the proposed Stage 1 price changes. The Stage 2 volume forecasts are shown below.

Table A6.7 Stage 2 volume forecasts

	2009/10	2010/11	2011/12	2012/13	2013/14
Rentals	2,145,752	1,979,995	1,894,599	1,812,887	1,734,699
Connections	186,413	115,211	183,455	175,543	167,972
Transfers	295,763	290,054	284,456	278,965	273,581

A6.85 The impact of this approach on the costs and revenues of the wholesale ISDN30 rentals and connections basket is shown below

Table A6.8 Stage 1 and Stage 2 costs for wholesale ISDN30 rentals and connections basket (including enhanced care costs and revenues)

	Rental and Connections 2013/14 – Stage 1	Rental and Connections 2013/14 – Stage 2
	£m	£m
Revenues	233	262
Costs	190	210

A6.86 Table A6.8 shows the impact of the Stage 2 volumes on the revenues and costs of ISDN30 rentals and connections. As the Stage 2 volumes are higher than the Stage 1 volumes, both the revenues and costs increase.

We propose to forecast costs after the steady state adjustment to 2013/14

A6.87 In order to project costs to 2013/14 starting from a steady state we need to forecast the capital expenditure, depreciation and assumed disposal value over the period.

A6.88 As discussed above, in a steady state with a 47% NRC/GRC ratio, using the accounting asset lives, total depreciation for access electronics and line-cards would be equal to £93m in 2009/10.

A6.89 In the steady state, we would expect depreciation to be equal to both capital expenditure and annual disposals. Therefore our 2009/10 assumed capital expenditure and disposals are also £93m.

A6.90 We can forecast capital expenditure to 2013/14, by first applying inflation applicable to assets of RPI (see below) and then the efficiency target of 4.5% to the prior year capital expenditure.

A6.91 The additional capex element is the change in cost as a result of changing volumes of the relevant service relative to the steady state. If volumes increase this will be positive, if volumes fall this will be negative. This is calculated by reference to the proposed AVE for the relevant asset of 0.5 for access electronics and 1 for line-cards. We discuss these in more detail below.

A6.92 The capital expenditure, as a result of these assumptions is estimated to be £66m in 2013/14.

A6.93 We describe the calculations for the relevant cost stacks below.

A6.94 We intend to publish a "stripped out" version of the model used to create the steady state adjustment to enable stakeholders to understand our methodology and, alongside the qualitative explanation in this annex, understand key data that drives the results.[188]

Table A6.9 Steady state adjustment: capital cost calculations

Cost category	Base year	Forecast
GRC	From s.135 data OR	GRC(t) = GRC(t-1)*(1+infl)+total capex(t)-disp(t)
Capital expenditure (capex)	= depreciation	Capex(t) = Capex(t-1)*(1+infl)*(1-eff)
Additional capex (ad capex)	n/a	Ad capex(t) = GRC(t-1)*(1+infl)*AVE*Vol change %
Total capex	=capex+ad capex	Total capex(t)=capex(t)+ad capex(t)
Disposal	= depreciation	Disp(t)=Disp(t-1)*(1+infl)
Depreciation (depn)	= GRC/asset lives	= GRC/asset lives
NRC	= GRC * 0.47	NRC(t)=NRC(t-1)*(1+infl)+Capex(t)-depn(t)

A6.95 The abbreviations and assumptions used in calculating the above costs are shown in the table below.

Table A6.10 Abbreviations for capital cost calculations

Abbreviation	Description
Infl	Inflation (set at asset inflation rate equal to RPI in 10/11 and 3% thereafter)
Eff	Efficiency (described above proposed target 4.5%)
AVE	Asset volume elasticity (1 for line-cards 0.5 for access electronics
Vol change %	Ofcom forecast volume change per annum (ISDN 30 rentals)

A6.96 As a result of the above forecasts, the unit cost adjustment to 2013/14 is £39 per channel.

[188] We explain our methodology concerning model disclosure in more detail in section 2.

We propose to use an AVE of 0.5 for Access Electronics and 1 for line-cards

A6.97 The Cost Forecast model is an activity based model which does not use AVEs or CVEs. The steady state adjustment however is an off-model adjustment which requires us to forecast capital costs to 2013/14. For the purposes of our steady state adjustment, we need to consider how the uplift in the assets over time changes with volumes. In order to do this, we consider the AVEs for the relevant assets.

A6.98 As volumes decline, we would expect the GRC of the assets to decline. We can calculate the extent of this decline by considering the AVE. This is the extent to which the GRC changes for a given change in volumes (measured from -1 to +1). This approach has been widely used in other charge controls we imposed on BT (for example the NCC and LLCC).

A6.99 We assume that the AVE for ISDN30 line-cards is 1. We consider that line-cards move in line with volumes and do not benefit from economies of scale, this means that the GRC for line-cards reduces by the same proportion as the volumes (measured in lines) for ISDN30 rentals.

A6.100 For Access Electronics, we assume that the AVE is 0.5, so for every 1% reduction in volumes, the GRC is reduced by 0.5%. We consider that access products in general benefit from economies of scale and therefore a 1% change in volumes would have a smaller effect on the cost of access products. We propose to apply an AVE of 0.5 to forecast forward the GRC of access electronics. This is consistent with an AVE for access products which we have used in some previous charge controls.[189]

A6.101 As explained in Annex 8, our base case volumes are completed in two stages. There is an initial calculation of volumes which feeds into a Stage 1 price reduction for the ISDN30 services. This price reduction is then used to calculate switching to ISDN30 services which produces a Stage 2 volume scenario. To be consistent with this, we forecast the asset adjustment in two stages. This means we calculate the capital expenditure based on volume decline using the Stage 1 volumes. This then provides a Stage 1 adjustment which is used to calculate the Stage 1 price reduction. The new volumes are then calculated taking into account any switching, and these Stage 2 volumes are used to forecast the final adjustment for the capital expenditure.

A6.102 The impact of using these AVE is included within the £39 above. If we were to use an AVE of 1 for each asset, the steady state adjustment in 2013/14 would reduce by £6 per channel.

We propose to use the rest of BT WACC

A6.103 We propose to use the "rest of BT" WACC of 9.3% for our base case cost stack for ISDN30 services. We discuss the reasons for using the 'rest of BT' WACC and the underlying calculation of this number further in Annex 7.

[189] For example, in the 1996 Price Control Review Statement Oftel stated "*Oftel has considered each of the cost and asset volume relationships for growth in access lines and the volume of calls over the network. Oftel has used, in relation to access, asset volume and cost volume relationships in the region of 0.4-0.6 (that is a 1% increase in the volume of access lines would lead to an increase in assets and costs of between 0.4 and 0.6%)*" (paragraph 6.30).
http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/chap6.htm

A6.104 The Cost Allocation model uses the Openreach WACC of 10.1% for 2009/10 and 8.6% thereafter. In order to apply the higher rest of BT rate to ISDN30 services, we have made an off-model adjustment where, instead of using the ROCE unit cost as calculated in the Cost Allocation model, we have multiplied the MCE by 9.3%.

A6.105 The impact of using the rest of BT WACC is a reduction of £0.64 per channel to the rental cost stack in the base year. In addition, when calculating our steady state adjustment, we multiply the revised NRC by the rest of BT WACC to identify the appropriate uplift for the heavily depreciated assets.

We propose to use an efficiency rate of 4.5%

A6.106 We propose to use a 4.5% efficiency target per annum applied to all costs including capital expenditure.

A6.107 This is in line with the proposed efficiency range in the WLR/LLU charge controls of 3.5%-5.5%. As discussed in Annex 6 of the WLR/LLU charge controls, this range has been arrived at considering previous efficiency studies for Openreach which have been updated and published alongside the WLR/LLU charge controls. We refer readers to this annex for more information on the calculation of the efficiency range. To summarise, we have taken account of the following sources in arriving at our efficiency range:

- Statistical analysis performed by NERA for the purposes of the 2009 OFFR statement which was based on Stochastic Frontier Analysis (SFA) of BT's costs against the regional telephone network monopolies operating in the USA. BT commissioned Deloitte to respond to this during the 2009 review, and this report has been updated to take account of more recent data (Deloitte 2010 study).

- Cost review performed by KPMG for the purposes of the 2009 OFFR statement to estimate the efficiency gains that could be achieved by Openreach through benchmarking operating cost components. We commissioned KPMG to update this report (KPMG report) as part of the WLR/LLU charge controls.

- Industry benchmarking, this is external research provided by Openreach which provides comparative efficiency levels across a range of international fixed line operators. This was initially provided during the 2009 OFFR statement, and has been updated for 2010.

- Historical trend analysis which identifies previous efficiency savings achieved by Openreach in 2009/10 and 2010/11.

- BT's internal planning documents (BT Medium Term Plan) which set out the financial outlook and target efficiency for Openreach for the next three years.

- The Competition Commission (CC) determination on the OFFR appeal which commented on the appropriate efficiency range to apply.

A6.108 We consider that the efficiency range proposed in the WLR/LU charge controls is also appropriate for wholesale ISDN30 services. This is because ISDN30 costs form part of the total Openreach costs which were reviewed as part of the studies listed above.

A6.109 In particular, within the KPMG report, where cost items have not been explicitly benchmarked, KPMG considered which benchmarked costs share similar

characteristics and cost drivers. KPMG stated that ISDN30 costs relating to access electronics, backhaul electronics and line-cards can be extrapolated in line with IT services. This extrapolation creates an implied efficiency target for the ISDN30 costs which contributes to the total efficiency range for Openreach included in the KPMG report. These costs represent 70% of the 2009/10 unadjusted cost stack for the ISDN30 rentals product.

A6.110 The majority of the remaining cost stack is common with WLR/LLU (70% of remaining cost stack) and therefore has also either been benchmarked or extrapolated as above, based on costs sharing similar characteristics.

A6.111 The remaining analysis discussed above (industry benchmarking, historical trend analysis etc.) was done at an Openreach level, which will include the costs attributed to ISDN30. We therefore consider that the efficiency range identified in the WLR/LLU charge controls is appropriate.

A6.112 As discussed in the WLR/LLU charge controls, we have modelled Openreach's costs using a single efficiency assumption that is applied to all costs in the cost forecast model. This combines the effect of all of the various factors that might contribute to the delivery of these savings. These include savings achieved by doing things less often (reduced fault rates), more quickly (reduced task times) and for less money (more efficient task planning).

A6.113 We have also applied the efficiency adjustment to the projected capital expenditure which we derive from our estimate of steady state capital employed assumed in the steady state adjustment. This is discussed further in the section on the steady state adjustment above.

A6.114 Our base case therefore assumes an efficiency target of 4.5% per annum.

We propose to use 2.5% inflation rate

A6.115 The Cost Forecast model is calculated in nominal terms, therefore requires an inflation assumption to be applied to input costs and pay costs.

A6.116 In the 2009 OFFR Statement, we explained that, while the use of RPI may provide a reasonable basis for forecasting cost inflation in the longer term, it was less appropriate in the short term as the cost movements taken into account to determine RPI do not provide an appropriate proxy for short term movements in Openreach's costs.

A6.117 We consider that similar circumstances apply today. However, while the effect in 2009 was that short term RPI forecasts were likely to understate Openreach's input cost inflation (due to recent reductions in mortgage interest rates and VAT rates), current RPI forecasts are now likely to overstate Openreach's input cost inflation (as they include the effect of the increase in the VAT rate in January 2011 and longer term forecasts reflect an expectation that mortgage interest rates will rise). Overall, we estimate that the effect of these two factors mean that in the period to 2013/14, RPI forecasts are, on average around 0.5% pa higher than they would have been, had VAT been expected to remain constant and mortgage interest rates remain relatively stable.

A6.118 We have therefore assumed that Openreach's costs will increase at a rate below that currently forecast for RPI. RPI is difficult to forecast precisely. However, based on HM Treasury forecasts, we consider that an average rate of around 3% per

annum is reasonable. Therefore, for the purpose of our base case, we have assumed an annual rate of 2.5% for the next three years.

A6.119 In our cost modelling, we have applied this rate to all costs, except pay costs, which we consider are likely to increase at a higher rate. Historically, pay costs have tended to be more closely related to RPI (even if they are not explicitly linked). For the purposes of our cost modelling, we have assumed an average annual rate of 3% for pay costs.

We propose to use an average RPI to forecast holding gains

A6.120 Under a CCA approach to setting prices, assets are valued by reference to the cost of replacing the asset at today's prices – their current cost - rather than their original, or historic, cost. If prices go up, the asset value is higher than it otherwise would have been. As a result, the annual depreciation charge would increase as it is based on a higher asset value. However, over the lifetime of the asset, this increase in the annual depreciation charge – which would cause costs to increase - is offset exactly by the holding gain (the gain made by holding the asset while it increases in value). If asset prices fall however, a decline in the annual depreciation charge is offset by a holding loss (the loss made by holding an asset which is declining in value).

A6.121 Asset inflation also affects the calculation of the mean capital employed and increasing asset prices causes the assessment of the reasonable return on those assets to increase. It is therefore necessary to predict how asset values might change during the control period.

A6.122 As explained above, in line with the WLR/LLU charge controls we are proposing to continue to use the RAV approach to valuing pre-1997 assets that we adopted in the 2005 cost of copper review. In accordance with that 2005 decision, the indexed HCA value of the pre-1997 assets will be projected forwards in line with RPI. For the purpose of this calculation we have used the RPI forecast identified in the WBA charge controls for 2010/11 and 3% thereafter to represent an estimate of the average inflation from 2011/12 to 2013/14:

Table A6.11 RPI forecasts

Source	2010/11	2011/12	2012/13	2013/14
WBA charge control	4.4%	3.6%	2.7%	3.0%
Cost Forecast/RAV model	4.4%	3.0%	3.0%	3.0%

A6.123 This is applied to all assets within the Cost Forecast, Cost Allocation and RAV models. We do not consider that there are any reasons to use a different rate for the purposes of the wholesale ISDN30 charge controls.

We propose to include the costs of enhanced care in the wholesale ISDN30 rentals and connections basket

A6.124 As discussed in section 5, we propose to include the costs and revenues of enhanced care for ISDN30 in the rentals and connections basket.

A6.125 We have been unable to obtain an accurate breakdown of the costs of these services from Openreach as they do not disaggregate the costs of ISDN30 enhanced care from WLR enhanced care.

A6.126 We have estimated enhanced care revenues on the assumption that the proportion of customers taking enhanced care stays unchanged at 25% throughout the period to 2013/14. Given our projection of ISDN30 volumes, this means that there will be 1.7m wholesale ISDN30 customers taking enhanced care in 2013/14. At the current price of £25, revenues would then be approximately £11m.

A6.127 Openreach have informed us that costs across all enhanced care services included within the 'WLR enhanced maintenance product' represent approximately ✂% of revenues, Therefore we have estimated the costs of enhanced care to be £✂. This has been included in the rentals and connections basket.

We have reduced the cost of 'ISDN SGA' costs in line with volumes

A6.128 Within the cost forecast model, there is a cost category entitled ISDN SGA. This relates to sales and general admin costs for the ISDN30 product. This cost is included in the ISDN30 connections cost stack.

A6.129 Openreach have provided an updated allocation basis which allocates the cost between ISDN30 connections and transfers. As discussed above due to the complexity of the adjustment and the immaterial impact on the cost stack, we have not included this update in the Cost Allocation model.

A6.130 The total cost for ISDN SGA does not decrease over time with volumes and Openreach's forecast cost remains constant over the period. We propose to make an adjustment to reflect the fact that as the level of connections fall, we would expect SGA costs to also fall.

A6.131 We have estimated the cost volume relationship in line with other SGA costs within the model and believe that a CVE of 1 is appropriate. We therefore have reduced the costs in line with volumes in an off-line adjustment.

A6.132 The impact of this on 2013/14 ISDN30 connections cost stack is a reduction in costs of £3.50 per connection.

We propose to include some costs relating to ISDN30 Transfers in the Rental cost stack

A6.133 The base year cost stacks for ISDN30 transfers show costs above revenues. As set out in section 5, we consider recovering the costs which are above revenues through the ISDN30 rental cost stack. This increases the base year cost stack for ISDN30 rental product. We have included this as part of our base case.

A6.134 We have made an off-line adjustment to the cost stack derived from the Cost Allocation model. We calculate the projected transfer costs and revenues in each year to 2013/14 on the assumption that transfer charges change at RPI-0%. We

then calculate the difference between the costs and revenues calculated on this basis and move the excess of transfer costs over transfer revenues (£4.03m in 2009/10) to the rental cost stack.

A6.135 The impact of this adjustment is to increase the unit cost of rentals in the base year by £1.88 per channel and to reduce the cost stack for transfers by £13.63 per transfer. The difference in unit cost impact is due to the much higher volumes for rentals.

We have created an Ofcom base case to reflect the above adjustments

A6.136 As a result of the above adjustments and assumptions, we have established an 'Ofcom Base Case' for ISDN30 costs from 2009/10 to 2013/14. This incorporates our adjustment to the asset base, and the other adjustments discussed above.

A6.137 We present the total cost forecasts for the two key baskets of services in the tables below.

Table A6.12 Total cost stacks for wholesale ISDN30 rentals and connections basket

	Combined connections, rentals and enhanced care basket				
	2009/10	2010/11	2011/12	2012/13	2013/14
	£m	£m	£m	£m	£m
Current Pay	7	7	7	8	8
Other Operating Costs (inc. Enhanced care costs)	9	8	8	8	7
Transfer Charges[190]	21	17	18	19	18
Internal Cost of Sales[191]	87	74	72	79	82
Other Operating Income	-1	-1	0	0	0
Internal Capitalisation	0	0	0	0	0
Depreciation excl holding gains	19	18	16	15	15
Holding Gains	-1	-9	-6	-5	-5
Operating Cost inc Depreciation	**140**	**114**	**114**	**124**	**125**
Off-model cost adjustments:					
Steady state adjustment	71	76	77	71	68
Reduction in connection Sales + General admin	0	-1	0	0	-1
Reallocation of excess transfer costs	4	5	5	5	5
ROCE @ 9.3%	16	15	14	14	13
Total Cost	**231**	**209**	**210**	**214**	**210**
MCE per model[192]	**172**	**158**	**152**	**151**	**141**

[190] Transfer charges are Openreach's share of BT Group costs such as accommodation and corporate overheads.
[191] BT Operate levies charges against Openreach, referred to as Internal cost of sales charges. These charges comprise line-cards rental costs, and other costs such as access and backhaul electronics. These are levied on the basis of costs incurred.
[192] The MCE in these cost stacks is from the Cost Allocation model. This does not include the steady state adjustment as the uplift in ROCE is already included within the steady state adjustment.

Table A6.13 Total cost stacks for wholesale ISDN30 transfers basket

	ISDN30 - Transfers				
	2009/10	2010/11	2011/12	2012/13	2013/14
	£m	£m	£m	£m	£m
Current Pay	0	0	0	0	1
Other Operating Costs	0	0	0	0	0
Transfer Charges	4	4	4	4	4
Internal Cost of Sales	0	0	0	0	0
Other Operating Income	0	0	0	0	0
Internal Capitalisation	0	0	0	0	0
Depreciation excl holding gains	1	1	1	1	1
Holding Gains	0	0	0	0	0
Operating Cost inc Depreciation	**5**	**6**	**6**	**6**	**6**
Off-model cost adjustments:					
Steady state adjustment	0	0	0	0	0
Reduction in connection Sales + General admin	0	0	0	0	0
Reallocation of excess transfer costs	-4	-5	-5	-5	-5
ROCE @ 9.3%	0	0	0	0	0
Total Cost	**1**	**1**	**1**	**1**	**1**
MCE per model	1	1	1	1	1
Volumes (k)	**296**	**290**	**284**	**279**	**274**

Deriving Xs from the cost estimates

A6.138 We propose to set prices by reference to the cost stacks in 2013/14. As explained in section 4, we consider it appropriate for prices to move by reference to a glide-path. We consider it appropriate to set the glide-path by reference to the current prices of the ISDN30 service. As explained in section 5, we do not propose to make any one-off price adjustments.

A6.139 For the purpose of the price control, we propose that RPI will be taken from the October in the preceding year. The RPI figure from October 2010 was 4.5%. Consistent with our underlying inflation forecasts (which are linked, but not equal, to RPI), we have assumed that RPI will be around 3% in October 2011 and 2012. On this basis, a price control linked to RPI would deliver an increase of just under

11% over three years before adjusting for the X, equivalent to an average annual increase of around 3.5%.

A6.140 The calculation of the X required to deliver a glide-path that should move the prices for the core rental services into line with our base case cost estimates over the next three years (rounded to the nearest 0.1%) is summarised below.

$$\left\{\left(\frac{\text{Base cost estimate } 2013/14}{\text{Revenues } 2013/14}\right)^{\left(\frac{1}{3}\right)} - 1\right\} - \text{RPI estimate}$$

A6.141 Using our base case estimate of costs for the rental and connections basket, and the revenues based on the current prices, we propose that the basket should be reduced by RPI-10.75% over the three years (rounded from 10.65% to the nearest 0.25). However, we provide sensitivity analysis below to show the impact of changing base case assumptions to give our proposed range of Xs of 8.29% to 12.17%.

Sensitivity analysis

A6.142 We have performed sensitivity analysis on the key assumptions used when forecasting costs for ISDN30 services. Table A6.14 below shows the estimated impact on the proposed X for the rental and connection basket.

A6.143 We have not shown sensitivity analysis for ISDN30 transfers basket as we propose that the X for transfers will be 0. Any changes to the transfer cost stack as a result of our sensitivity analysis will be reflected in changes to the rental cost stack. As described above, additional costs in the transfer cost stack are recovered through the rental cost stack (i.e. included in the rental and connection basket.)

A6.144 The sensitivity analysis has been performed on a 2 stage basis in line with our 2 stage volume forecast. This means that we update the Cost Forecast model (and make any off-line adjustments) with the sensitivity using the Stage 1 volumes. We then calculate the required price decrease as a result of this assumption (using base case assumptions for all other sensitivities). We then use that price decrease to calculate the Stage 2 volumes. We update the model (and make any offline adjustments) to reflect the Stage 2 volumes to arrive at the revised X as a result of the sensitivity analysis.

Table A6.14 Sensitivity analysis for the values of X

Assumption 1 (WACC)		
Base case (9.3%)	10.65%	Applied WACC to MCE to calculate an allowable ROCE in the cost stack. This is also used in the calculation of the steady state adjustment.
Sensitivity 1 (10%)	10.33%	Increase in ROCE unit cost in the cost stack, including the impact on the steady state adjustment of using a higher WACC.
Sensitivity 2 (8.5%)	11.16%	Decrease in ROCE unit cost in the cost stack, including the impact on the steady state adjustment of using a lower WACC (proposed WACC for Openreach).
Assumption 2 (**Enhanced care revenues and costs)**		
Base case (Include enhanced care)	10.65%	Enhanced care revenues and costs are included in the ISDN30 rentals and connections basket.
Sensitivity 1 - (exclude enhanced care)	✂[193]	Enhanced care revenues and costs are excluded from the ISDN30 rentals and connections basket.
Assumption 3 (Volume adjustment)		
Base case (Stage 2 volume decline of 19%)	10.65%	Using the two stage volume decline as discussed in Annex 8, with Stage 1 decline of 27.5% over the forecast period and Stage 2 decline of 19%.
Sensitivity 1 (Openreach forecast decline – lowest volumes)	8.29%	Using Openreach's forecast decline of ✂% for rentals, ✂% for connections and ✂% for transfers as the Stage 2 decline over the forecast period.
Sensitivity 2 (highest volumes on Openreach network)	11.75%	For Stage 1 volumes it uses the lowest values of the ranges considered (i.e. a 20% decline in rental volumes and a 5% in transfer volumes). Uses the highest value of the range considered for the retail elasticity (i.e., -0.3) in Stage 2. This results in the highest volumes on Openreach's network.
Assumption 4 (Asset volume elasticities)		
Base case (AVE 1 + 0.5)	10.65%	Using an AVE of 0.5 to forecast the steady state adjustment for access electronics and 1 for line-cards.
Sensitivity 1 (AVE 1)	12.17%	Using an AVE of 1 for both access electronics and line-cards.

[193] We have redacted the X due to confidentiality concerns, however the impact is less than 0.5% reduction in the value of X.

Assumption 5 (NRC/GRC target ratio)		
Base case (NRC/GRC ratio 47%)	10.65%	Uplifting the NRC of relevant assets in the steady state adjustment to the ratio of the remaining ISDN30 assets i.e. 47% of GRC.
Sensitivity 1 (NRC/GRC ratio 50%)	10.45%	Uplifting the NRC of relevant assets in the steady state adjustment to 50% of the GRC.
Assumption 5 (Efficiency)		
Base case (4.5%)	10.65%	Using an efficiency rate of 4.5% on all cash costs (including capital costs).
Sensitivity 1 (3.5%)	10.18%	Using an efficiency rate of 3.5% on all cash costs (including capital costs).
Sensitivity 2 (5.5%)	11.13%	Using an efficiency rate of 5.5% on all cash costs (including capital costs).

Annex 7

Cost of capital

Introduction

A7.1 When we refer to the cost of capital we mean the rate of return required by investors that a firm must generate in order to raise money in the capital markets. Companies have two basic ways of obtaining funding, through debt or equity. By knowing the proportion of each type of funding, and estimating the cost of each, we can estimate the weighted average cost of capital (WACC). We usually set charge controls so that BT is able to earn an expected rate of return equal to the WACC.

A7.2 As part of our consultation on the Wholesale Broadband Access (WBA) charge control, we have proposed updated estimates of BT's WACC that we have also reproduced in the WLR/LLU charge control consultation document. As before we have estimated a range for the cost of capital for BT Group using the Capital Asset Pricing Model (CAPM). We have then disaggregated this into two separate ranges (one for Openreach's copper access services and one for the rest of BT).

A7.3 We have published these estimates in the WBA charge control consultation, however, they can be applied to any BT service, including wholesale ISDN30. We need to decide which of the two ranges (the 'copper access' or the 'rest of BT') is appropriate to wholesale ISDN30.

A7.4 In this annex we explain our approach to determining the appropriate WACC for wholesale ISDN30 services. We discuss the rationale for applying two different cost of capital rates to BT, and the factors that determine which of these two rates is the most appropriate for a given service or product. Finally, we propose the rate that should apply to ISDN30 services and provide the rationale for our proposal.

A7.5 For a detailed explanation of how we have estimated the cost of capital ranges applicable to BT, we refer readers to the WLR/LLU charge control consultation.[194]

Proposal

A7.6 We propose to use the "rest of BT" rate of 9.3% as the appropriate WACC for wholesale ISDN30 services.

A7.7 We have based our proposal on an assessment of the cyclicality of demand for ISDN30 services and, to a lesser extent, an analysis of the underlying asset base for ISDN30 services.

Which rate is appropriate for wholesale ISDN30?

A7.8 In deciding which rate is appropriate for wholesale ISDN30 services, we have taken into account the recent Competition Commission (CC) decisions in the LLCC and OFFR appeals, in particular regarding:

[194] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

- whether it is reasonable for Ofcom to estimate only two disaggregated costs of capital, one for copper access services and one for the rest of BT; and

- if so, how should Ofcom decide which rate is appropriate to any particular service.

Should Ofcom estimate more than two distinct rates?

A7.9 The CC concluded that an approach based on disaggregating BT's beta is likely to be preferable to one based on identifying a set of (inevitably imperfectly) comparable companies[195].

A7.10 The CC agreed that we should only estimate more than two distinct rates if the necessary conditions for estimating a service-specific rate are satisfied. These conditions were set out in our 2005 statement "*Ofcom's approach to risk in the assessment of the cost of capital*"[196] (the 2005 Cost of Capital Statement). Our view, set out in that Statement, is that the case for assessing the cost of capital on a service-specific basis is likely to be stronger under the following circumstances[197]:

- *"Strong a priori reasons for believing that the risk faced by the activity was different from that of the overall company; availability of evidence to assess differences in risk.*

- *Evidence which can be used to assess variations in risk, e.g.:*

    - *It is possible to identify benchmark firms that are close to 'pure play' comparators in terms of having similar risk characteristics to individual projects within the firm*

    - *It is possible to use other quantitative analysis...to assess variations in risk*

    - *Data on the firm are available at a disaggregated level (e.g. via separated accounts).*

- *Correctly identifying variations in risk, and reflecting this in an adjusted rate of return, is likely to bring about significant gains for consumers."*

A7.11 As detailed in Ofcom's 2005 Cost of Capital Statement[198], we have so far disaggregated BT's cost of capital in order to have a separate rate for the 'copper access network' (the Openreach rate) and the 'rest of BT'. The reason for this is to reflect the different levels of systematic risk faced by different parts of BT's business. We continue to believe that our criteria for assessing the cost of capital on a service-specific basis are only satisfied for copper access services. In particular, in 2005 we were able to obtain "reasonably good evidence that income elasticities of demand on exchange lines are relatively low" but did not find similar evidence for other services.

[195] See for example paragraph 2.361 of the ORFF decision http://www.competition-commission.org.uk/appeals/communications_act/llu_determination.pdf.
[196] Summarised at paragraph 4.243 of the LLCC decision http://www.catribunal.org.uk/files/1112_Cable_Wireless_Determination_300610.pdf
[197] This list is non-exhaustive and not all conditions need to be satisfied, but the more that are satisfied the more likely it is that a disaggregated approach will be appropriate.
[198] http://stakeholders.ofcom.org.uk/binaries/consultations/cost_capital2/statement/final.pdf

A7.12 We believe it is impractical to identify further product specific cost of capital for other BT services due to the lack of quantitative evidence and the absence of any pure-play comparators for these activities. On the face of it, we believe that if we further disaggregated BT's cost of capital there would be a large margin of error associated with our cost of capital estimates.

A7.13 We, therefore, remain of the view that there are two rates which could apply to the cost of capital of a given BT product. These are:

- Rest of BT rate 9.3%
- Copper Access rate[199] 8.6%

A7.14 The calculations supporting these rates are detailed in the WLR/LLU charge control consultation document.[200] In the table below we summarise the estimates presented in that document, which include our estimates of the WACC at January 2011, alongside the previous rates established in May 2009.

Table A7.1 Cost of capital estimates for BT – May 2009 vs. January 2011: pre-tax nominal WACC estimate.

	Openreach Copper Access services	BT Group	Rest of BT
May 2009	10.1%	10.6%	11.0%
Jan 2011	**7.9-9.4%**	**8.2-9.7%**	**8.5-10.0%**
Jan 2011 mid-point	**8.6%**	**8.9%**	**9.3%**

How to determine the appropriate rate to use

A7.15 Following the approach we set out in our 2005 Cost of Capital Statement, in order to determine which of the two cost of capital rates is more appropriate for a given product or service, we must consider:

- the sensitivity of demand to the economic cycle; and, to a lesser extent,
- the type of assets used in the provision of that product or service.

Sensitivity of demand to the economic cycle

A7.16 According to the CAPM, a key determinant of a company's WACC is its "systematic" risk[201] which reflects movements in returns to shareholders relative to

[199] In the 2005 Cost of Capital Statement, we defined the application of the "copper access business" to 'the building blocks for BT's WLR and LLU products'. The statement specifically excluded copper-based PPC tail segments from the copper access business.
[200] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

[201] In the CAPM, this is reflected in the size of the company's equity "beta". For a description see, Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, Statement, 18 August 2005, available at:
http://stakeholders.ofcom.org.uk/binaries/consultations/cost_capital2/statement/final.pdf.

movements in the return from the equity market as a whole. Systematic risk broadly depends on the extent to which demand for a service varies over the economic cycle. The larger the correlation between demand for the service and the level of activity in the economy as a whole, the higher its systematic risk and the higher the cost of capital.

A7.17 The intuition behind this is that when a risk is specific to a particular service, it is assumed that investors will be able to diversify away from these risks (for example, by investing in services that are not affected by that specific risk). Therefore, investors do not need to be compensated for diversifiable risks through returns on the firm's equity.[202] For example, Openreach's basic copper access services are particularly low-risk because demand is relatively stable over the cycle and, hence, they attract a lower cost of capital than the rest of BT.

A7.18 In contrast, some risks cannot be diversified away by investors, since, to varying extents, they will have at least some bearing on nearly all firms within the economy. Examples include factors that would have an impact on demand, such as fluctuations in GDP growth (e.g. economic downturn), oil prices and interest rates[203]. In the recent determination on the LLCC appeal[204] the CC agreed with us that the correlation of a service's demand with the economic cycle is the most important factor in determining its appropriate cost of capital.

A7.19 The sensitivity of demand (for a service) to the economic cycle is related to the ability of its customers to vary the quantity of the service that they purchase. Higher demand cyclicality is typically associated with services which are primarily bought by business customers, who are more likely to reduce their demand in response to an economic downturn. An example of a service which is primarily purchased by business customers is leased lines.

A7.20 In contrast, copper access services typically present a more stable demand over the economic cycle, due to the fact that they are primarily a residential service and households are less likely to reduce their demand for telephony or broadband services in response to an economic downturn. For this reason copper access services tend to present a lower systematic risk and, on that basis, they can be distinguished from the rest of BT's services.

A7.21 However, it is not sufficient to merely identify a service as a business service to conclude that it is subject to more systematic risk than copper access services. It would be necessary to show that its customers have the ability to vary their usage to a greater extent than in the case of copper access services (whose customers typically only have the binary choice to connect or disconnect). In particular, if it can be shown that the demand for a service varies, or is likely to vary, with the economic cycle to a greater degree than for copper access services, this is likely to suggest that the 'rest of BT' rate would be more appropriate. In this regard, in its determination of the LLCC appeal the CC stated:

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[202] Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, Statement, 18 August 2005, paragraphs 3.6 – 3.11, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/cost_capital2/statement/final.pdf

[203] Ibid, paragraph 3.9.

[204] See the LLCC Appeal decision, paragraph 4.315, available at: http://www.competition-commission.org.uk/appeals/communications_act/final_determination_excised_version_for_publication.pdf

> "*However, we were persuaded by Ofcom's evidence that it had not merely formed its judgment based on the identity of the customer, but had also considered the extent to which the nature of the product that was being sold led to variations in BT's sales volumes and revenue over the economic cycle. We thought that Ofcom and BT both made strong arguments when pointing to differences in the ways that business and residential customers adjusted demand in the face of a downturn, specifically the fact that:*
>
> *(a) businesses purchasing leased lines services could reduce their consumption of bandwidth and could rationalize the number of circuits that they purchased and in doing so reduce the charges they paid to BT; whereas*
>
> *(b) the way that residential products were sold meant that it was only if households chose to disconnect their line that BT suffered a loss of revenue.*
>
> *The arguments presented by Ofcom and BT tended to support the view that demand for leased lines services was more sensitive to economic conditions than demand for Openreach services. Empirical data submitted to us by BT seemed to demonstrate that this had been borne out by recent experience in that it showed a sharp drop in high bandwidth leased lines services at the end of 2008 whereas demand for copper lines fell only marginally. We note that evidence of this type has to be treated with some caution, but in our view it supports Ofcom's approach*"

A7.22 Therefore, although complex analysis is not required to establish the appropriate cost of capital rate, the *a priori* reasoning should be supported by evidence where available. We discuss the evidence that we have considered for ISDN30 services below.

Underlying assets of a product or service

A7.23 In principle, the type of assets used in the provision of a product or service can affect its systematic risk, because the nature of the assets can affect the firm's ability to vary cash outflows as demand varies[205].

A7.24 However, as highlighted by the CC in the LLCC appeal[206], when assessing the appropriate cost of capital, the nature of the underlying assets is a much less relevant consideration than the project's sensitivity to demand fluctuations which determines the project's cash inflows. Variations in demand are likely to have a more significant impact on the service's systematic risk (i.e. the service's correlation with the economy wide level of activity).

A7.25 However, for completeness, we have also assessed the extent to which the assets used in ISDN30 differ from the assets used in the provision of the copper access

[205] For example, a company whose costs are mostly variable is likely to be able to adjust better to changes in demand and, hence, other things being equal, have a lower systematic risk than a company with a higher share of fixed costs.
[206] See the LLCC Appeal decision, paragraph 4.315, available at: http://www.competition-commission.org.uk/appeals/communications_act/final_determination_excised_version_for_publication.pdf

products (after the ISDN30 asset adjustment described in Annex 6). Although wholesale ISDN30 services have some assets in common with copper access services, such as duct and copper, these only represent 16% of the ISDN30 asset base in our Cost Forecast model. We also note that the assets used to supply ISDN30 have much in common with those used to supply PPC local ends, which attract the higher "rest of BT" cost of capital. In fact, when compared to 2Mbit/s ePPCs local ends, we estimate that 86% of the ISDN30 asset base in our Cost Forecast model is common to 2Mbit/s ePPC local ends.

A7.26 As discussed above, we believe that the nature of the asset base is a secondary assessment and, in our view, the cyclicality of demand will be the most important factor in determining the appropriate cost of capital. The rest of our analysis is therefore concerned with the cyclicality of ISDN30 demand.

Evidence specific to wholesale ISDN30

Evidence on the cyclicality of demand

A7.27 In order to assess the cyclicality of demand faced by wholesale ISDN30 services we have produced a similar analysis to that undertaken by the CC in the LLCC appeal.

A7.28 The CC considered evidence submitted by BT[207] which showed that it was more difficult to forecast demand for leased lines than for copper lines (i.e., that the error in forecasting leased lines tended to be larger than for copper lines) and that leased lines had been subject to higher demand cyclicality, in particular during the economic downturn.

A7.29 The evidence was consistent with the view that, in the face of the downturn, businesses had adjusted their demand for leased lines more significantly than had the mainly residential customers of copper lines.[208] The CC concluded that this showed that demand for leased lines was likely to be more correlated with the economy wide level of activity and that, consequently, the use of the 'rest of BT' rate for leased lines was justified. We agree with the CC that evidence of this type is likely to be helpful.

A7.30 In the following sections we set out an analysis similar to that submitted to the LLCC appeal, but adapted for wholesale ISDN30.

The uncertainty in forecasting demand for wholesale ISDN30

A7.31 One of the fundamental principles of finance theory is that the rate of return that investors will require from investing in an asset increases as the investment becomes more risky. This principle is based on the assumption that investors are risk averse, and require compensation for any risk that they choose to bear rather than investing in risk-free assets.

[207] See BT's response to the CC's questions on beta of 26 February 2010 in the LLCC Appeal.
[208] Competition Commission, *Cable & Wireless UK v Office of Communications – Case 1112/3/3/09*, Determination, 30 June 2010, paragraph 4.310 - 4.311, available at: http://www.competition-commission.org.uk/appeals/communications_act/final_determination_excised_version_for_publication.pdf

A7.32 One way to assess the level of risk involved in an investment is to look at how difficult it may be to forecast its future demand. For this purpose, we have analysed BT's group volume forecasts (GVF) which are used internally for budgeting and planning purposes. Before the start of each financial year BT agrees a volume forecast with each line of business that will be used to assess its revenue requirements. This process generates a 12 month forward-looking forecast that is populated with actual volumes at the end of the year. Openreach has provided to us the same GVF data that was used in the submission to the CC in the LLCC appeal, with the only exception that in our case it also includes information on wholesale ISDN30 volumes (which were not included in the submission to the CC).[209]

A7.33 In order to assess the uncertainty in forecasting future demand, we look at the absolute percentage difference between GVF's 12 month forecast and the actual volumes for that year. This difference shows by how much the GVF has erred in estimating the future demand for Openreach's wholesale services. Table A7.2 below shows this percentage difference for the rental services of copper lines, leased lines of different bandwidth and wholesale ISDN30.

Table A7.2 Absolute percentage difference between BT's 12 month forecast and actual volumes for year – rentals

RENTALS	04/05	05/06	06/07	07/08	08/09	09/10	Average
Copper lines	0%	0%	1%	0%	0%	0%	0%
Leased lines - Below 2Mbit/s	10%	11%	4%	2%	4%	3%	6%
Leased lines - 2Mbit/s	5%	1%	1%	1%	3%	3%	2%
Leased lines - Greater than 2Mbit/s	21%	2%	1%	1%	4%	8%	6%
WHOLESALE ISDN30	**5%**	**5%**	**2%**	**0%**	**0%**	**1%**	**2%**

A7.34 The evidence above shows that the GVF's error in forecasting the actual rental volumes of wholesale ISDN30 has tended to be aligned most closely with that of 2Mbit/s leased lines, which is greater than that of copper lines. Table A7.3 below looks at the GVFs for the connection services of the same wholesale products. In this case, the GVF's error in predicting wholesale ISDN30 connection volumes was significantly larger than for copper lines and indeed greater than that of low bandwidth leased lines.

[209] There is an additional difference between the two datasets which relates to the connections volumes for the year 2004/05. According to Openreach, there was an error in the information that was submitted to the CC, in particular, in the volumes of leased lines of 2Mbit/s, less than 2Mbit/s and greater than 2Mbit/s. In the case of the latter two, the spreadsheet submitted to the CC double counted the total volumes of leased lines. The data we use in our analysis corrects these two errors.

Table A7.3 Absolute percentage differences between BT's 12 month forecast and actual volumes for year – connections

CONNECTIONS	04/05	05/06	06/07	07/08	08/09	09/10	Average
Copper lines	2%	1%	2%	4%	4%	11%	4%
Leased lines - Below 2Mbit/s	10%	14%	17%	4%	2%	41%	15%
Leased lines - 2Mbit/s	5%	4%	2%	0%	6%	27%	7%
Leased lines - Greater than 2Mbit/s	18%	12%	8%	7%	8%	536%	98%
WHOLESALE ISDN30	**5%**	**4%**	**9%**	**30%**	**59%**	**45%**	**26%**

A7.35 Overall, the above evidence could be interpreted as meaning that it is relatively more difficult to predict future demand for wholesale ISDN30 than for copper lines and that, on the basis of the difficulties in forecasting future demand, wholesale ISDN30 seems to be more similar to leased lines than copper lines. On these grounds, it could be argued that demand for wholesale ISDN30 is subject to a higher degree of uncertainty than copper lines and that the level of uncertainty in predicting wholesale ISDN30 demand is more closely aligned with that of leased lines. However, we believe that it cannot be concluded from this evidence alone that wholesale ISDN30 should be subject to a higher WACC rate than copper access lines.

A7.36 Under the CAPM mentioned above, the return on an investment is only determined by its systematic risk. In other words, reward is not so much determined by the random fluctuations apparent from a forecast error, such as the GVF, but by the correlation of a service's demand with the economic cycle. We acknowledge that the difficulties in forecasting demand may provide an indication of how demand may fluctuate unexpectedly. However, the error in forecasting demand could also be attributed to the quality of the forecasting model or effectively not be driven by the underlying cyclicality of the good or service.

The demand cyclicality of wholesale ISDN30

A7.37 In this section we assess the cyclicality of demand of wholesale ISDN30, and in particular the extent to which demand for these services has been correlated with the economic downturn.

A7.38 Before we conduct the analysis of the demand for wholesale ISDN30 services, our *a priori* thinking is that wholesale ISDN30 is more likely to be classified within the 'rest of BT', rather than within the 'Openreach' WACC rate, for an assessment of risk levels. Wholesale ISDN30 services are mostly bought by small to medium sized enterprises (SME) and corporate customers of Openreach, therefore, we would expect that future demand for these services is likely to be more closely correlated with the economy wide level of economic activity than other access services.

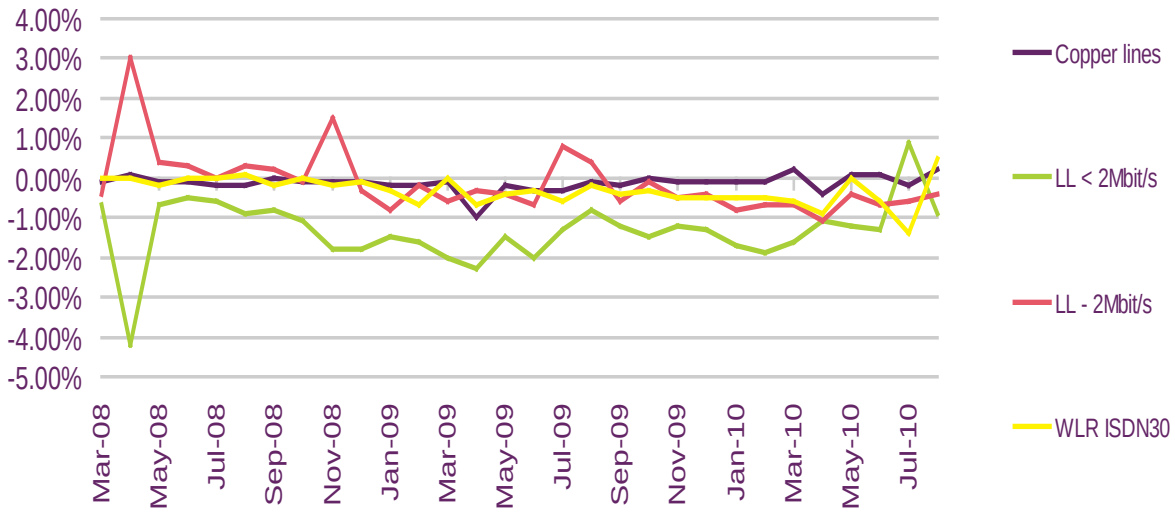
A7.39 However, we recognise that it cannot be concluded that the highest WACC rate is more appropriate for ISDN30 solely on the basis that it is predominantly used by business customers. Instead, we consider below the extent to which the nature of

the wholesale ISDN30 product leads to variations in Openreach's volumes and revenues.

A7.40 In assessing the demand cyclicality of wholesale ISDN30 services we have tried to replicate the analysis conducted by BT in its submission to the CC in the LLCC appeal, which used the same GVF data described above. The GVF data used here is prepared onthe same basis as the one used in the analysis of the forecasting error and is, therefore, consistent with it.

A7.41 Figure A7.1 below shows the monthly percentage change in the volumes of copper lines, leased lines and wholesale ISDN30 from March 2008 to August 2010.

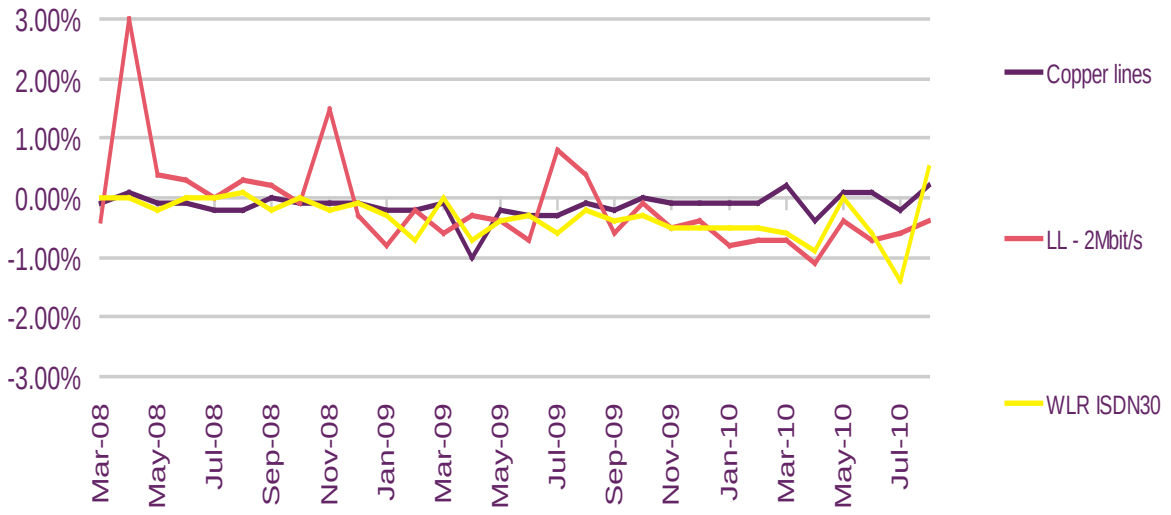
Figure A7.1 Percentage monthly change in volumes of copper lines, leased lines, and wholesale ISDN30[210]



A7.42 The chart shows that wholesale ISDN30 has experienced higher variability of demand than copper lines since the start of 2009 and, particularly, by the end of the period considered. This can be more easily seen in Figure A7.2 below, which only includes copper lines, 2Mbit/s leased lines and wholesale ISDN30 to allow a better reading of the chart.

[210] We have excluded leased lines of bandwidth greater than 2Mbit/s because they present a significantly higher variation in two months and make it more difficult to interpret the chart. However, its exclusion does not alter our conclusions.

Figure A7.2 Percentage changes in monthly volumes of copper lines, leased lines of 2Mbit/s and wholesale ISDN30



A7.43 In light of the above evidence, in particular the higher variability in the demand of wholesale ISDN30 observed since 2009, it could be argued that wholesale ISDN30 is more correlated with the economic cycle than copper lines. Finally, to complete our analysis, we compare the annual change in volumes of copper lines, leased lines of different bandwidth and wholesale ISDN30 using the information in BT's RFSs.

Table A7.4 Change in annual volumes of copper lines, leased lines and wholesale ISDN30

RENTALS	05/06	06/07	07/08	08/09	09/10
Copper lines	**-0.2%**	**-0.4%**	**-0.2%**	**-0.5%**	**-2.5%**
Percentage points (p.p) difference		*-0.2 p.p.*	*0.2 p.p.*	*-0.3 p.p.*	*-2.0 p.p.*
< 2Mbit/s local end		**-38.9%**	**-26.9%**	**17.4%**	**-14.0%**
Percentage points (p.p) difference			*12.0 p.p.*	*44.3 p.p.*	*-31.4 p.p.*
2Mbit/s local end		**-37.9%**	**9.4%**	**2.4%**	**-20.4%**
Percentage points (p.p) difference			*47.3 p.p.*	*-7.0 p.p.*	*-22.8 p.p.*
34/45Mbit/s local end		**-22.0%**	**16.1%**	**-6.9%**	**-18.0%**
Percentage points (p.p) difference			*38.1 p.p.*	*-23.0 p.p.*	*-11.1 p.p.*
140/155Mbit/s local end		**-2.2%**	**-15.5%**	**-12.7%**	**-37.6%**
Percentage points (p.p) difference			*-13.3 p.p.*	*2.9 p.p.*	*-24.9 p.p.*
WHOLESALE ISDN30	**1.8%**	**3.3%**	**2.4%**	**3.1%**	**-7.4%**
Percentage points (p.p) difference		*1.5 p.p.*	*-0.9 p.p.*	*0.7 p.p.*	*-10.5 p.p.*

Source: BT Regulatory Financial Statements for each year.

A7.44 The volume data in the RFSs shows that copper lines have been steadily decreasing throughout the period considered. We believe this is driven by the specific conditions of traditional copper lines, which have experienced substitution by mobile, cable and next generation access networks (as well as a steady decline in the number of second lines), rather than any systematic economic fluctuation. We acknowledge that copper lines have experienced an acceleration in their rate of decline during the last year, which we consider may be related to the economic cycle. However, we believe that the impact of the economic downturn has been less significant in the case of copper lines than in the case of leased lines or wholesale ISDN30.

A7.45 Leased lines are the wholesale services that have experienced the highest variability of demand, with a more accentuated decline in volumes in 2009/10 due to the economic downturn. Wholesale ISDN30 seems to have been particularly hit by the economic recession, given that its volumes have experienced a shift from positive to negative growth in 2009/10 (a change of -10.5 percentage points, compared to only -2.0 percentage points in the case of copper lines).

A7.46 We consider this to be convincing evidence that ISDN30 is more subject to systematic risk than copper lines. We believe that the above indicates that businesses are more likely to reduce their consumption of ISDN30 services in response to a downturn in the economy, whereas residential customers are less likely to dispense with their single broadband connection when faced with a similar downturn. Typically, residential customers of copper access only face the binary choice between connecting or disconnecting their broadband subscription. Instead, ISDN30 customers can reduce the number of channels they require if, for example, they expect the volumes of calls to decline[211], they decide to close some sites or if they experience a decline in their number of employees.

Conclusion

A7.47 Having considered the nature of demand and, to a lesser extent the composition of the asset base, we believe that the “rest of BT” rate is appropriate for ISDN30 wholesale services.

A7.48 In addition to the above considerations, when assessing BT’s cost of capital we have normally adopted a cautious approach, preferring to accept some risk of setting it too high over a risk of setting it too low. This is the appropriate approach because the costs of setting the WACC too high or too low are asymmetric. In fact, we would tend to be more concerned with the potential lack of investment arising from setting the WACC too low than with the risk of slightly higher prices resulting from an excessive WACC.

A7.49 In light of the above, we believe wholesale ISDN30 services should not be classified within BT’s copper access business for the purposes of an assessment of risk levels and, instead, should be subject to the “rest of BT” rate (i.e. 9.3%).

[211] It should be noted that businesses typically purchase a lower number of ISDN30 channels than the total of their employees or telephone lines, on the basis that it is unlikely that all employees will use their telephone services at the same time. Therefore, businesses do not generally require an ISDN30 channel per employee and could potentially reduce their demand for ISDN30 if they expect a lower volume of calls.

Annex 8

Volume Forecasts

Introduction

A8.1 In this section we describe the approach we have taken to forecast the volumes of core wholesale ISDN30 services up to the end date of the proposed charge control period (i.e. between 2009/10 and 2013/14). We use these volumes forecast as an input in the Cost Forecast model, which estimates the values of X for the core wholesale ISDN30 services.

A8.2 This annex is structured as follows:

- We first describe our general approach in forecasting demand for ISDN30;
- We then set out our methodology for calculating the future volumes of wholesale ISDN30 rentals, including an assessment of the likely impact of our charge control proposals on rental volumes; and,
- We finally describe our forecasts for connections and transfers, which are largely based on our forecast of rental volumes.

Proposal

A8.3 We have estimated a 19% decline in wholesale ISDN30 rental volumes from our base year (2009/10) to the end of the charge control period (2013/14). We have estimated a smaller decline of 10% for connection volumes, derived from our rental forecast.

A8.4 We have estimated a smaller decline of 7.5% in transfer volumes. The smaller decline reflects the assumption that competition will intensify in future, as CPs compete more aggressively for the remaining ISDN30 customers, and that this will tend to generate additional transfers.

A8.5 We have based our proposals on an assessment of all the information available to us on the future developments of the ISDN30 retail market. We have also accounted for the likely impact of our charge control proposals on demand for ISDN30.

Our approach in forecasting future demand for ISDN30

We have used all evidence available to us

A8.6 We recognise that forecasting the demand of a telecommunications service is a complex task. This is a dynamic sector subject to rapid technological change and attempting to guess its future development is highly challenging. For this reason, we have tried to give due weight to each source of information available to us, in particular:

- the views from stakeholders on the likely evolution of demand for ISDN30 and the extent of future switching to IP based alternatives;

- third party studies on the future take up of IP based services; and,
- end users' responses to the market research conducted in our Market Review.

We have not made an explicit forecast of Openreach's share of the wholesale ISDN30 market

A8.7 In forecasting demand for wholesale ISDN30 we have limited our analysis to the period ending in the final year of the proposed charge control, i.e. 2013/14. Our analysis has focused on trends in the retail market, from which demand for Openreach's wholesale offering is derived, and we have not made an explicit forecast of changes in operators' market shares over the period considered. Since 2004 most of the decline in BT's retail market share has been driven by an increase in the volumes supplied by re-sellers that use Openreach's network. This means that Openreach's share of the wholesale market has remained fairly constant at around 71% of the total wholesale market.[212] Furthermore, as discussed below, in Openreach's view the main driver of the expected decline in wholesale ISDN30 volumes will be the expected increase in take up of IP alternatives to ISDN30, rather than competition from OCPs using alternative inputs to supply ISDN30.

A8.8 It is possible that the CPs' current wholesale market shares could change during the period of the proposed charge control. One operator indicated that its demand for wholesale ISDN30 would decline by more than the average for the market, as it intended to make more use of its own infrastructure. But because the majority of its ISDN30 provision is already based on its own infrastructure, the effect on wholesale ISDN30 volumes is very small. In general, we do not expect significant further investment from OCPs in upstream infrastructure to supply wholesale ISDN30 in competition with Openreach. This is firstly because the ISDN30 market is in long-term decline and secondly because we expect the price reductions resulting from our proposed price control to encourage some OCPs to use wholesale ISDN30 to a greater extent in future. We allow for this effect using the Switching model which we describe in Annex 9 and which reflects expected variation in Openreach's wholesale market share over the period of the charge control.

We have taken into account the impact of our charge control proposals by forecasting demand in two stages

A8.9 Throughout the Market Review and the current price control review, stakeholders have expressed their concern that a decrease in the prices of wholesale ISDN30 could result in an unforeseen increase in its demand. We have addressed this concern by forecasting demand in two stages.

- In Stage 1, we forecast volumes of core services at current prices (Stage 1 volume forecast). This initial volume forecast is then used to derive the initial values of X for the three core wholesale ISDN30 services.
- In Stage 2, we adjust our initial volume forecast for connections and rentals to account for the likely impact on demand of the price changes implied by the X derived in Stage 1. Adding the impact of our charge control proposals to our initial volume forecast we derive the Stage 2 volume forecasts.

[212] Ofcom, *Review of retail and wholesale ISDN30 markets*, Table 7.1, page 54, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf

A8.10 We are not proposing to adjust the volume forecast for transfers in the same way as we do for connections and rentals. We are currently consulting on imposing an RPI-0% (Option 1) or bringing transfer prices in line with DLRIC (Option 2). However, as discussed in section 5, we would be unlikely to adopt Option 2 if the result would be the introduction of retail transfer charges or other changes which could result in a significant reduction in willingness to switch between operators. Therefore, we do not expect any impact of our charge control proposals on transfer volumes.

A8.11 In light of this, we have estimated that transfer volumes will decrease by between 5% to 10% during the period of the charge control to reflect the decline in the size of the overall market partly offset by some possible increase in the intensity of competition (as discussed further below). For modelling purposes we propose to use the middle of the range, i.e. a total decrease in volumes of 7.5%.

A8.12 Using this two stage approach, we have assessed the impact of our charge control proposals on additional demand for ISDN30. Our analysis indicates that by the end of the charge control, our proposals are likely to increase future demand for ISDN30 by around 11.5% (relative to our estimates in the absence of our proposed changes in prices). However, we estimate that the impact of these increased volumes on the final value of X on the combined connections and rentals basket is relatively small and the X will only increase by less than one percentage point (all other things being equal).

A8.13 In theory, we could undertake a third stage analysis. The higher volumes projected in the second stage will tend to reduce unit costs, because of economies of scale, and this could allow us to set a higher value of X. We have not done so because the impact of the change in volumes in the second stage on the values of X is relatively small (as described below). As we round the value of X to the nearest 0.25%, we are confident that additional stages in the forecast would not cause us to change the value of X.

Our forecast of future wholesale ISDN30 rental volumes

Our Stage 1 volume forecast predicts a 27.5% decline in ISDN30 volumes

Openreach expects a higher decline in ISDN30 volumes than OCPs

A8.14 Table A8.1 below summarises the decline in ISDN30 rental volumes expected by those stakeholders which have provided to us explicit forecasts.

Table A8.1 Percentage decline in volumes over the period 2009/10 – 2013/14 (stakeholders forecasts)[213]

	wholesale ISDN30	Self-supply
Openreach submission 10 October 2010	- 40% to – 50%	N/A
OCP 1	- 30% to – 40%	- 30% to – 40%
OCP 2	- 0% to -10%	- 0% to 10%

[213] We have placed all CPs forecasts in a 10% range to preserve confidentiality.

A8.15 Openreach forecasts a decline in total wholesale ISDN30 channels in the range of 40% to 50%. This is mainly due to its expectation of high take up of IP based alternatives. It considers that its forecast is justified by the latest evidence on:

- increased customer adoption / investment in IP voice technology;
- competitor announcements in the last few years;
- BT's rollout plans for NGA; and
- a consolidated view of BT's overall portfolio plans.

A8.16 In particular, Openreach has pointed to the fact that the take-up of IP-based products such as Ethernet in The Final Mile (EFM), Wholesale Broadband Connect (WBC), and Next Generation Access (NGA) along with existing fibre based Ethernet services is accelerating as result of a lower total cost of ownership, increased functionality derived from the convergence of IP services and greater customer acceptance of IP delivered voice.

A8.17 As shown in Figure A8.1 below, Openreach expects that the aggregate volumes for ISDN30 and IP channels will increase slightly during the period of the charge control. However, it expects that demand will shift from ISDN30 towards IP based services, ✂. This shows that most of the decline that Openreach expects in ISDN30 volumes will result from switching towards IP based services.

Figure A8.1 Openreach actual and forecast of wholesale ISDN30 and IP channels

✂

A8.18 Other stakeholders predict a less significant decline in the ISDN30 market. One OCP predicts that their wholesale ISDN30 demand will decrease more significantly (in the range of 30% to 40%) than demand for its self-supplied volumes (in the range of 30% to 40%), showing that it expects to increase the share of its total on net customer base as its network coverage increases. However, the share of the market supplied using wholesale ISDN30 by OCPs who also have their own infrastructure is already very small (see Figure 3.1). The largest user of wholesale ISDN30 is BT Retail. For this reason we consider that the self supply decline is more likely to be representative of the future evolution of the market as a whole and, hence, of demand for Openreach's wholesale ISDN30 service. Another OCP has indicated to us that it expects demand for its ISDN30 services to remain relatively unchanged over the period of the charge control, with declines in volumes in the range of 0% to 10%.

A8.19 Another stakeholder, not shown in Table A8.1 above, did not submit a volume forecast but told us that, in its view, switching to IP based alternatives had been delayed by the economic downturn and would not affect ISDN30 volumes until after the end of the proposed charge control period.

We have taken into account our market research findings

A8.20 The market research we conducted as part of the Market Review asked end users "*how long do you envisage continuing to use ISDN30 services for*".[214] 53% of respondents answered that they only planned to use it for the next five years. After

[214] Ofcom, *Narrowband Multi-channels Market Research*, available at http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf

adjusting for the fact that the market research was conducted in December 2009 and that the charge control period ends in 2013/14, we interpret this as meaning that around 44% of current retail customers might stop using ISDN30 by the end of the charge control.[215]

A8.21 The same market research also asked end users if they were "currently considering switching away from ISDN30 services".[216] It found that only 14% of ISDN30 users were considering switching away from ISDN30, with 85% of respondents answering "No" to the question. We believe it is quite difficult for respondents to speculate about their choice of technology five years into the future and, therefore, in the absence of corroborating evidence, we would consider that more weight should be given to the latter question, as it focussed on end users' current situation rather than their expected future behaviour. On its own, we think that the survey evidence would suggest that a decline of closer to 14% than to 44% is likely to better represent end users' future behaviour during the period of the charge control. In any case, we highlight that the mid-point decline in ISDN30 volumes derived from the two survey questions (i.e. 29%) is in line with our Stage 1 volume forecast discussed further below, taking other evidence into account.

We have had regard to third party forecasts

A8.22 In its submissions to the Market Review, Openreach suggested that there would be a significant increase in the take up of IP based services in the period to 2013/2014. They quoted from consultants' studies showing that take up of IP based services would experience a significant increase in the period to 2013/14. One of the reports cited, from IDC, suggested that IP voice is expected to capture 50% of the business voice market by 2014. Since then, Openreach has told us that an updated report by IDC,[217] issued on July 2010, suggests a much smaller uptake of IP services (reduced by almost ✂) in Europe than it had previously forecasted.[218] The reasons for this are as follows:

✂

A8.23 Openreach suggested that the reasons suggested by the report may not apply to the UK market, implying that the reduction of their forecast may not be appropriate within the UK.

[215] In order to obtain an expected decline for the period March 2010 to March 2014 which is comparable to the findings of the market research (conducted in December 2009), we have made the following adjustments. First, we have calculated the total volumes that would remain on ISDN30 by March 2014 (i.e. the end of the charge control) if we assumed the 53% decline resulting from the market research (this gives rental volumes equal to 1.6m channels). Second, using this and the actual ISDN30 volumes in March 2010, as submitted by stakeholders in their S135 information requests (i.e. 2.9m channels), we have obtained the expected decline for the period running from March 2010 to March 2014. This is equal to ((1.6m – 2.9m)/2.9m) x 100 = 44%.

[216] See question QC6 of the market research, http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf

[217] IDC, *Western Europe SIP Trunking Market Update*, July 2010.

[218] The difference in the two forecasts is very significant. The previous forecast expected around ✂m SIP Trunking channels by 2014, current view is that they will be around ✂k. If we assume that the decrease in ISDN30 can be attributed in its entirety to switching to IP alternatives and that IDC's analysis of the European market can be directly applied to the UK market we consider that their IP forecast would suggest a 20% to 30% total decline in the ISDN30 market. This takes into account that there was 2.9m retail channels in March 2010, IDC's IP forecast would imply that ✂m ISDN30 channels would remain by March 2014.

A8.24 However, IDC's findings are to some extent consistent with the current development of Openreach's IP offerings in the UK. As shown in Figure A8.2 below, the demand for Openreach's IP offering has been lagging behind the level it had forecasted in its submission to the Market Review in December 2009. In September 2010, the total volume of IP channels on Openreach's network was ✂% below the level it had forecasted for that period in December 2009.

Figure A8.2 IP channels on Openreach network (forecast and actual)

Source: Openreach email sent on 17 November 2010.

A8.25 According to Openreach, this is mainly due ✂.

We have considered the short term trend but believe that the economic downturn has had an impact on the demand for ISDN30

A8.26 We recognise that retail ISDN30 volumes have experienced a significant decrease in the last year. In the period running from June 2009 to June 2010, volumes fell by around 6.6%. This would translate to a decrease in retail volumes of around 24% by 2013/14 if we simply projected out this recent change.[219]

A8.27 We do not propose to put much weight on this short term trend analysis because we consider that the majority of the recent decline in volumes is dominated by the economic downturn. To show this, Table A8.2 below compares the annual growth before and after June 2008, when the effects of the economic downturn started to impact the ISDN30 and IP markets. As can be seen below, the recession has reduced significantly the demand for both services, not only ISDN30.

Table A8.2 Annual growth rate in Openreach ISDN30 and IP channels

	Dec – 06 to Jun - 08[220]	Jun – 08 to Jun – 10[221]
Openreach wholesale ISDN30	4.1%	-5.7%
Self supply volumes	✂	✂
Openreach IP channels	✂	✂
Total ISDN30 (WLR and self-supply)	✂	✂

A8.28 The decline of wholesale ISDN30 volumes during the period from June 2008 to June 2010 has not been reflected in an increase in the growth of Openreach IP channels for that period, relative to the period running from December 2006 to June 2008.This suggests that other factors rather than switching to IP explain the recent increase in the decline of wholesale ISDN30. In fact, in light of the above evidence,

[219] Calculated as (1-0.066)^4-1, that is, an annual 6.6% decline in volumes for a period of four more years (up to 2013/14).
[220] We take December 2006 as the initial date for our analysis because it is the first date for which we have a comprehensive quarterly volumes dataset for all CPs. June 2008 is the last quarter in which the total ISDN30 volumes experienced an increase.
[221] June 2010 is the last period for which we have actual volumes data for all CPs.

as well as other submissions from stakeholders highlighting that take up of IP alternatives had been affected by the economic downturn, we consider that the recent decline in ISDN30 is likely to have been dominated by the economic recession. Therefore, basing the forecast of ISDN30 on the decrease in volumes observed in the last year would not be appropriate.

In light of the above evidence, we expect a less significant take up of IP based services

A8.29 In Table A8.3 below we summarise all the evidence we have considered in arriving at our estimate of the future demand for ISDN30.

Table A8.3 Summary of evidence used to forecast future ISDN30 demand for the period of the charge control

	Range of assumptions
Stakeholder forecasts	- 0% to -50%[222]
Market research	- 14% to -44%[223]
External consultants forecast	-20 to -30%[224]
Forecast based on 2009-2010 trend in retail ISDN30 volumes	-24%[225]

A8.30 As discussed above, we believe that the short term trend is not a good basis for forecasting future demand for ISDN30 as it is likely to be dominated by the effect of the economic downturn. This is unlikely to continue at this rate for the period of the control, but the date and extent of any upturn, and its effect on ISDN30 demand, are inherently hard to predict. Similarly, the recent decline in ISDN30 may not reflect switching to the extent that is likely to materialise in future.

A8.31 The forecasts from OCPs show that there is significant uncertainty surrounding the likely developments of the ISDN30 market and take up of IP based alternatives. This is also confirmed by the third party's update on the take up of SIP Trunking in Europe.

A8.32 Based on the above and Table A8.3 we believe that a Stage 1 volume forecast predicting a decline in wholesale ISDN30 rental volumes in the range of 20% to 30% is representative of a mid-point of the evidence discussed.

[222] The lowest decline corresponds to OCP 2's expectation that ISDN30 volumes will remain relatively unchanged for the period of the charge control. The highest decline represents Openreach's forecast.
[223] These figures correspond to our market research results, described in paragraphs A8.20 to A8.21 above.
[224] As explained above, this has been calculated assuming that all of the decline in ISDN30 volumes can be attributed to switching to IP. Taking into account that there were 2.9m ISDN30 channels in March 2010 and that IDC has forecasted that there will be around ✂ IP channels in 2014, this implies a 20% to 30% decline in ISDN30 retail volumes.
[225] We have obtained this figure by assuming a 6.6% annual decline in volumes for the period of the charge control. As described above, this follows from the decline experienced in the year running from Jun – 09 to Jun – 10, the latest available evidence.

A8.33 For our Stage 1 volume forecasts we take a value slightly above the middle between these two estimates, that is, a decrease in volumes of 27.5% for the period considered. A decrease of 27.5%:

- Is consistent with the balance of the forecasts submitted by our stakeholders, two of whom expected declines in the range from 30% to 50%, and one of whom projected fairly constant volumes (with declines in the range of 0% to 10%);
- Is below the mid-point of the range suggested by responses to our survey (i.e a decrease of 29%), giving more weight to the lower value which we consider more reliable;
- Is broadly consistent with the short-term trend in ISDN30 volumes and with the forecasts of third party consultants.

Our Stage 2 volume forecast predicts a decline in future ISDN30 volumes of around 19%

A8.34 In order to estimate the impact of our charge control proposals on our volumes forecast we have used the values of X resulting from our Stage 1 volume forecast. Assuming that volumes of wholesale ISDN30 would decrease by 27.5% in Stage 1, we derive the values of X from our Cost Forecast model.[226] As discussed in Annex 6, the initial values of X are:

- RPI-10.0% on the combined connections and rental basket; and,
- RPI-0% on the transfer's basket.

A8.35 We consider that the decrease in ISDN30 prices resulting from these values of X would have three effects, relative to our Stage 1 volume forecast:

- Expansion in retail market. It would generate an increase in the retail demand for ISDN30 services. Our initial calculations indicate that the impact of this effect is likely to increase wholesale ISDN30 volumes in 2013/14 by around 5.0%.
- Reduction of switching to IP. Our proposed decrease in prices is likely to reduce the extent of switching from wholesale ISDN30 to IP based alternatives. We estimate that this may increase wholesale ISDN30 volumes in 2013/14 by 5.7%.
- Switching from PPCs to wholesale ISDN30. It would affect OCPs' choice of wholesale inputs (PPCs vs. wholesale ISDN30) when providing ISDN30. Our initial calculations indicate that out of the total ISDN30 channels that would have been supplied using PPCs during the period of the charge control[227] (which currently only represent 3% of the ISDN30 retail market), around 9.1% would switch to supply using wholesale ISDN30 if we decreased the prices of the combined wholesale ISDN30 rentals and connections annually by -10.0%. We estimate that switching from supply using PPCs to wholesale ISDN30 is likely to increase our Stage 1 volumes forecast for wholesale ISDN30 rentals by around 0.7% in 2013/14.

[226] For the purposes of estimating the initial value of X on the combined connection and rental basket we have also used the Stage 1 volume forecast of connections and transfers, these forecasts are described in the next sections.

[227] As described further below, this includes both switching from customers that are currently being supplied using PPCs, as well as future customers that would have been supplied using PPCs but are likely to be supplied using wholesale ISDN30 as a result of our charge control proposals.

A8.36 In summary, we estimate that the impact of all the above effects is to increase the initial volume forecast for wholesale ISDN30 rentals by around 11.5%. After we increase our Stage 1 volume forecast by these additional volumes to take into account the impact of our charge control proposals, the decline in wholesale ISDN30 rental volumes for the period 2009/10 to 2013/14 is around 19%.

A8.37 We describe our calculations for each of the three effects below.

We have estimated the impact of our charge control proposals on retail demand for ISDN30 and switching to IP based services

A8.38 To estimate the increase in retail demand and the reduction in the extent of switching to IP services discussed above, we have:

- estimated the likely decrease in wholesale ISDN30 connection and rental prices resulting from our proposed charge control proposals derived using the volumes forecasted in Stage 1;
- estimated the impact of this likely decrease in prices on retail demand; and
- estimated the impact of this likely decrease in prices on switching to IP based alternatives, using the market research conducted during our Market Review, which asked ISDN30 customers about their switching behaviour after an hypothetical 10% decrease in prices.

A8.39 We discuss in detail each of these steps below.

The estimation of the likely decrease in wholesale ISDN30 prices

A8.40 As discussed in section 5, we are proposing to set a combined basket for connections and rentals and a safeguard cap on the average connection charges. This means that we are giving some flexibility to Openreach to re-balance its connection and rental charges. Therefore, given this flexibility, we have had to make assumptions on the way Openreach will vary its connection and rental prices to meet our charge control conditions.

A8.41 For this purpose, we have assumed that Openreach will use its flexibility to increase connection prices in full (i.e. will increase connection prices by the maximum allowed by the safeguard cap, RPI+5%) and will derive rental prices as a residual, by taking into account the constraint imposed by the prior year revenue weighting and the cap on the combined basket (i.e. the RPI–10.0% annual decrease on the combined basket)[228]. To derive the prior year revenue weight, we have used our Stage 1 volumes forecast for connections and rentals.[229]

[228] Initially we ran another ISDN30 price scenario that assumed that Openreach would apply the value of X on the combined basket (i.e. RPI-10.0%) to both the connection and rental charges. Assuming this produced similar results to the ones obtained under the scenario adopted (described above) and, consequently, we do not report these additional estimates here..

[229] For example, in year 2010/11 (the first in which the decrease in wholesale ISDN30 prices will have to be implemented) we derive the previous year revenue weight for connections and rentals by multiplying the previous year volumes (2009/10) of each service, calculated in Stage 1, by their previous year prices (which we know are the current wholesale ISDN30 prices for both services). The connection price will then be the previous year's connection charge increased by 5%, so in the case of 2010/11 this would be £40.71 x (1+5%) = £42.75. Then, the rental price is derived as a residual. We first estimate the value of X on rentals as:

A8.42 Once we obtain the rental and connection prices , we need to further adjust these prices to account for the following:

- The connection charge is a one-off charge and end users are likely to view this charge as a sunk cost that they would spread over the entire life of their ISDN30 service. Therefore, we have converted the connection price into an equivalent annual value over a period of five years (with five years representing the average ISDN30 customer lifetime).[230]

- The ISDN30 prices derived using the approach described above refer to Openreach wholesale prices, however, the impacts considered (i.e. expansion of retail demand and reduction in switching to IP) will be driven by end users' retail demand. Therefore, once we have the annual aggregate price (i.e. including connection and rental) we need to further adjust this to obtain the relevant reduction in retail prices. To do this we take into account the 'dilution effect' (i.e. the extent to which a reduction in wholesale prices will be passed on to end users' prices).In our Market Review we assumed that wholesale prices accounted for approximately 85% of the corresponding retail price.[231] Therefore, assuming that wholesale prices are passed on to consumers in full, which we believe is a reasonable assumption given the Market Review finding that the retail ISDN30 market was competitive, we have applied this 'dilution effect' to the aggregate connection and rental price. This way we obtain the percentage change in the aggregate retail price for each year of the charge control.

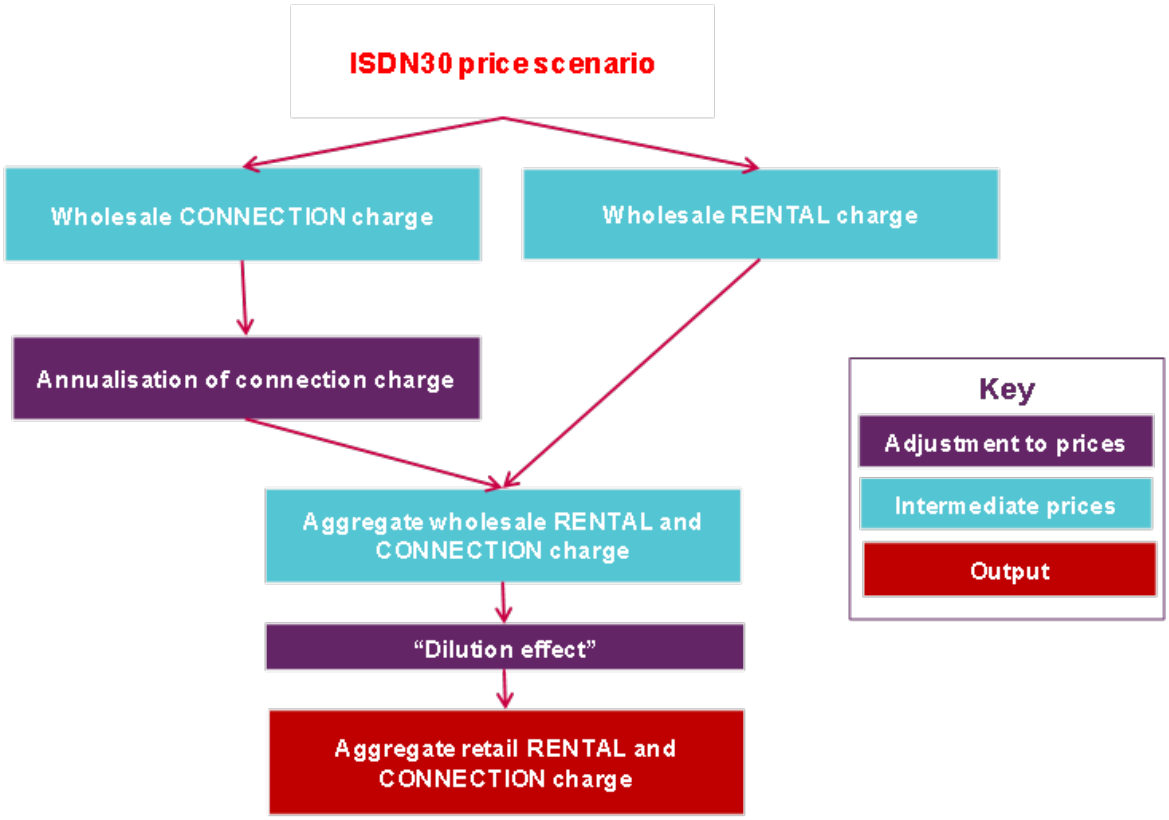
A8.43 For clarity, these adjustments are summarised in Figure A8.3.

$X\ rentals = \frac{X\ combined\ \ basket - X\ connections\ \ x\ Prior\ \ year\ \ revenue\ \ weight\ of\ \ connections}{Prior\ \ year\ \ revenue\ \ weight\ of\ \ rentals}$, where we know that the 'X combined basket' is -10.0%; the 'X connections' is +5% and the weights are calculated as described above. Then, we calculate the price of rentals in 2010/11 as the price in the previous year multiplied by the derived value of X, that is, £141 x (1 + X rentals).

[230] For this adjustment we have used a 5 year period and a discount rate equal to our proposed WACC rate of 9.3%. All OCPs have found difficulties in providing an accurate estimate of their customers' average lifetime. We have decided to use the 5 year period given that several OCPs indicated to us that it would be an approximate estimate of their customers' average lifetime and for consistency reasons, given that it was the period used in the Switching model, described in Annex 9. Additionally, the market research conducted during our Market Review found that, on average, ISDN30 customers stay with an OCP for between five to six years (see page 23 of our market research).

[231] See paragraph 6.37 of our consultation document, http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf

Figure A8.3 Adjustments to wholesale ISDN30 prices to derive final aggregate retail prices



A8.44 For the reasons discussed in paragraph A8.10 above, we do not believe that transfer charges will have an impact on retail demand.

Expansion of retail demand

A8.45 As discussed above, once we have calculated the expected percentage change in prices using the above methodology, we can derive the impact of our charge control proposals on retail demand by multiplying the annual aggregate price change by the assumed price elasticity of demand.[232] Stakeholders were not able to provide us with information on the elasticity of demand for wholesale ISDN30 services at different price levels. We have therefore consulted the economic literature to obtain elasticity estimates for fixed telephony services. In general, price elasticity of demand for telephony services tends to be relatively low. In the case of ISDN30, this was confirmed by our market research conducted during the Market Review, which found that end users tended to value the reliability of ISDN30 services above any price considerations.

A8.46 The economic literature consulted indicates that it is reasonable to assume an own-price elasticity of demand in the range of -0.1 to -0.3[233].For the purposes of our

[232] The elasticity of demand indicates by how much the demand of a service will vary as a response to a 1% change in the price of this service.
[233] For example, the Carphone Warehouse plc response to the OFFR cites a Vodafone review of price elasticities of fixed line services estimating that they range between -0.02 and -0.17, see page 46, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/openreach/responses/CarphoneWarehouseplc.pdf.

base case scenario, we have estimated the likely impact of our charge control proposals on retail demand by assuming a price elasticity of demand in the middle of the above range, that is, equal to -0.2. Table A8.4 presents the estimated volumes increase in each year due to the additional retail demand estimated using this elasticity and the likely decrease in wholesale ISDN30 prices calculated using the methodology described above.

We have also looked at a review of empirical studies on own-price elasticity of demand for telephone services in major economies (such as the US). This evidence seems to suggest an average high range of -0.3 elasticity of demand for the local telephony services in large economies such as the USA. We have used this value as our upper bound range. For the review of empirical studies see Manfrim, G. and S. Da Silva (2007), 'Estimating demand elasticities of fixed telephony in Brazil', *Economics Bulletin*, Vol. 12, No. 5 pp. 1 – 19, available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.98.1939&rep=rep1&type=pdf.

Table A8.4 Estimation of the impact of our charge control proposals on additional retail demand for ISDN30 (Stage 1)[234]

Years	11/12	12/13	13/14
Rental price[235]	£126.49	£113.42	£101.64
Connection price[201]	£42.75	£44.88	£47.13
Annualised connection price[201]	£11.08	£11.63	£12.21
Aggregate price[236]	£137.56	£125.04	£113.85
Price change[237]	-9.23%	-9.10%	-8.95%
After 85% dilution[238]	-7.84%	-7.74%	-7.61%
Elasticity[239]	-0.2	-0.2	-0.2
% change in volumes[240]	1.57%	1.55%	1.52%
Stage 1 volumes[241]	1,827,042	1,685,905	1,555,670
Increase in volumes (channels)[242]	28,661	26,082	23,682

A8.47 As shown above, we estimate that it is likely that retail demand will expand by a total of 78,426 channels (i.e. the sum of the impacts for the three years, shown above). This is equal to an increase of around 5.0% with respect to the Stage 1 volumes forecast at the end of the charge control.

[234] The prices shown in Table A8.4 are derived from the 2009/10 prices and applying our proposed values of X, which calculate the price decreases in real terms. Therefore, the above prices are in real terms with basis on year 2009/10. We only show the three years in which the reduction in connection and rental prices will take place. We do not show the initial year of the charge control (2010/11) given that we are not proposing any one-off adjustment to wholesale ISDN30 prices and, hence, we do not expect any impact of our charge control proposals on retail demand for that year.
[235] The rental and connection price have been calculated using the approach discussed in paragraph A8.40 above. The annualised connection price has been calculated using the approach described in paragraph A8.42 above.
[236] The aggregate price reflects the sum of the rental and the annualised connection price for that year.
[237] The percentage change in the aggregate price with respect to the previous year. The prices in year 2010/11 are not shown as they are equal to the current prices, i.e. £141/channel for rentals and £40.71/channel for connections. The aggregate price for both services in 2010/11 after the annualisation of the connection charge is £151.55/channel.
[238] The change in the aggregate price after applying an 85% dilution effect to the wholesale price change (i.e. equal to the price change multiplied by 85%).
[239] The price elasticity of demand assumed in our base case scenario. As described above, it falls in the middle of the -0.1 to -0.3 range.
[240] The percentage change in volumes is obtained by multiplying the aggregate price change after applying the dilution effect by the assumed elasticity.
[241] The initial volume forecast for rentals in our base case scenario. This is derived by assuming a 27.5% decline in rental volumes from Mar-10 to Mar-14 (equal to an annual decrease of 7.7%).
[242] The annual increase in volumes is obtained by multiplying the percentage increase in volumes by the Stage 1 volumes forecast for that year.

Reduced switching to IP

A8.48 In addition to the expansion in demand described above, a decrease in the prices of wholesale ISDN30 rentals is also likely to affect existing customers' decision to switch to IP based services[243]. Our Stage 1 volume forecast has implicitly assumed a rate of switching to IP alternatives at current wholesale ISDN30 prices (i.e. 27.5% of the 2009/10 installed base). However, we believe that the likely decrease in the prices of wholesale ISDN30 rentals resulting from our charge control proposals (calculated as described above) is likely to reduce switching to IP.

A8.49 To understand how our charge control proposals will affect switching to IP, we have used some of the questions in the market research conducted during our Market Review that dealt with customers' responses to changes in ISDN30 prices. In particular, our market research asked end users "*if the price of ISDN30 fell by 10%, to what extent would this affect their decision to move away from ISDN30*"[244]. After an adjustment[245], 42% of respondents considered that it would have little effect or was unlikely to impact their decision. 55% of respondents considered that it would be more likely or that they would definitely stay with ISDN30. The remaining 3% did not answer.

A8.50 However, if we only take into account the responses of the end users that were considering switching (14% of all respondents), 69% considered that a price decrease of 10% would have little effect or was unlikely to impact their decision. Only 26% stated that the price decrease was likely to affect their decision to switch, responding that it would be less likely or that they would definitely stay with ISDN30. On this basis, we have considered it appropriate to assume that around 26%of customers switching to IP every year would decide to remain using ISDN30 if we decreased prices by an annual 10%.

A8.51 As shown in Table A8.5 below, we have estimated that our charge control proposals will result in price changes that are below the 10% price decrease that was the object of our market research question and closer to annual decreases of around 9% after the different adjustments considered. Therefore, to estimate how switching is likely to be affected by price changes that are around 9%, rather than the 10% asked in our market research, we have used the following approach. First, we have estimated the decrease in switching that would result if we assumed that the decision to switch to IP was linear with the changes in prices, which gives us an annual decrease in switching equal to around 23% for annual price decreases of

[243] We note that only rental charges are likely to affect existing customers' decision to switch to IP alternatives because these are annual recurring charges. Instead, connection prices are unlikely to affect their decision, given that existing customers will have already incurred these costs and they will be regarded as sunk. We acknowledge that there may be existing customers considering whether to increase their amount of ISDN30 channels (in which case they would incur connection charges for any additional channel they would like to add to their existing volumes) or switch to IP. However, we believe that the impact of our charge control proposals on these customers will have already been accounted for in our estimation of the impact of our price changes on retail demand, which estimates the additional demand that is likely to result from our proposed price changes.

[244] See question QC10 of the market research.

[245] The market research made a follow-up question asking how probable people believed their reaction would be in a real world situation and different probabilities were attached to their answers: "definitely" (100%), "probably certain" (67%), "probably uncertain" (33%) and "definitely would not" (0%). The responses to the initial question were adjusted using the probabilities from the follow-up question.

roughly 9% (see Table A8.5 below)[246]. Second, we have estimated a final annual decrease in switching by rounding down our linear estimate, that is, the annual decrease in switching calculated assuming linearity with prices (i.e. the roughly 23% for a roughly 9% price decrease calculated every year, as shown in Table A8.5 below)[247]. This results in a final decrease in switching of around 21%.

A8.52 In order to estimate the volumes of channels that are likely to remain on ISDN30 as a result of our charge control in every year, we have multiplied the annual decrease in switching calculated above by the change in the volumes of wholesale ISDN30 rentals in every year (on the basis that we are assuming that all difference in rental volumes in every year can be attributed to switching to IP). Table A8.5 presents the additional volumes resulting from the decrease in switching in every year of the charge control following the price decreases calculated using the approach described above.

[246] In other words, we have assumed that if a 10% price change would result in a decrease in switching of 26% (i.e. the decrease estimated using the market research findings), then a 9% price decrease would result in a decrease in switching equal to roughly 23% (i.e. equal to 9% x 26%/10%).
[247] We have rounded our linear estimate of the decrease in switching to account for the fact that switching to IP generally requires incurring equipment costs (e.g. installation and purchase of a PBX). In such cases, small price changes may have a relatively small impact on switching until a certain threshold is attained (e.g. a price change that makes incurring the additional costs economical). Therefore, higher price decreases are likely to have a proportionally stronger impact on switching than lower price decreases. For this reason, we have slightly reduced the impact on switching from 23% to 21%.

Table A8.5 Estimation of the impact of our charge control proposals on switching from ISDN30 to IP alternatives

Years[248]	11/12	12/13	13/14
Volumes switching[249]	152,953	141,137	130,235
Rental price[250]	£126.5	£113.4	£101.6
Price change[251]	-10.3%	-10.3%	-10.4%
After 85% dilution[252]	-8.75%	-8.78%	-8.83%
% decrease in switching if linear[253]	23%	23%	23%
Final % decrease in switching[254]	21%	21%	21%
Increase in volumes (channels)[255]	32,120	29,639	27,349

A8.53 As shown above, we estimate that the impact of our charge control proposals on switching is likely to increase our Stage 1 volume forecast by around 89,108 channels by the end of the charge control (i.e. the sum of the impact in each of the three years of the charge control shown in Table A8.5 above). This represents around 5.7% of the total Stage 1 volumes forecast at the end of the charge control.

The impact of our charge control proposals on switching from 2Mbit/s PPCs to wholesale ISDN30

A8.54 In addition to the impacts discussed above, we consider that our charge control proposals are likely to affect OCPs' choice of wholesale inputs when supplying ISDN30 services to end users. In particular, our charge control proposals will change the relative prices of wholesale ISDN30 and 2Mbit/s PPCs and is likely to

[248] We only show the three years in which the reduction in connection and rental prices will take place. We do not show the initial year of the charge control (2010/11) given that we are not proposing any one-off adjustment to wholesale ISDN30 prices and, hence, we do not expect any impact of our charge control proposals on retail demand for that year.
[249] The volumes switching are calculated as the difference between the wholesale ISDN30 rental volumes in that year and the previous year (under the assumption that all the decrease in wholesale ISDN30 volumes can be attributed to switching to IP). The volumes considered are the ones calculated in our initial volume forecast (which assumed a decrease in rental volumes of 27.5% by the end of the charge control, equal to an annual 7.7% decrease).
[250] The rental price in every year of the charge control, assuming the combined basket X of -10.0%. For the reasons described in paragraph A8.48 we do not account for any impact of the reduction in connection prices on switching to IP here.
[251] The percentage change in the price of wholesale ISDN30 rental with respect to the previous year's price. The prices in year 2010/11 are not shown as they are equal to the current prices, i.e. £141/channel.
[252]The change in the rental price after applying an 85% dilution effect to the wholesale price change (i.e. the percentage price change multiplied by 85%).
[253] The percentage decrease in switching if we assume that the decision to switch is linear with the changes in prices, as described above in paragraph A8.51).
[254] The final decrease in switching is obtained by rounding down the linear annual decrease in switching of roughly 23% to around 21%, as described above.
[255] The annual increase in volumes is obtained by multiplying the final percentage decrease in switching by the volumes switching derived from the Stage 1 volumes forecast for that year.

affect OCPs' choice between the two. There are two ways in which this change in the relative prices of the two inputs may affect demand for wholesale ISDN30:

- OCPs may decide to switch some of their *existing* customers (currently supplied using PPCs) to wholesale ISDN30; and,
- OCPs may decide to supply *future* customers using wholesale ISDN30 whilst at current prices (i.e. before implementation of our charge control proposals) they would have used PPCs.

A8.55 In order to estimate these supply side effects, we have developed a "switching model" (discussed in more detail in Annex 9), that estimates the potential for switching from 2Mbit/s PPCs to wholesale ISDN30 following our charge control proposals. This model estimates whether it is more economical for an OCP to provide ISDN30 services using Openreach's offering rather than PPCs given the wholesale costs of supply using PPCs and our proposed prices for wholesale ISDN30 (i.e. the wholesale costs of supply using Openreach's offering).

A8.56 We have assumed the same wholesale ISDN30 price profile used in the case of the market expansion and decrease in switching impacts described above. The results from the switching model indicate that if the price of ISDN30 rental and connection services decrease by the amounts shown in Table A8.4 above (i.e. annual price decreases of roughly 9% after the different adjustments), around 11,494 channels or 9% of the total ISDN30 channels that would have been supplied using PPCs are likely to switch to Openreach's wholesale ISDN30 product (including both, switching from *existing* customers and *future* customers, as described above).[256] This is likely to increase our Stage 1 volume forecast for wholesale ISDN30 rental services by around 0.7% by the end of the charge control period.

Summary of the impact of our charge control proposals on demand for wholesale ISDN30 rentals

A8.57 We summarise all the impacts that we expect from our charge control proposals on rental volumes in Table A8.6 below.

Table A8.6 Summary of the impacts of our charge control proposals on rentals (base case scenario)

	Volumes 2013/14	Share of Stage 1 forecast
Stage 1 forecast	**1,555,670**	**N/a**
Switching from 2Mbit/s PPCs	11,494	0.7%
Expansion of retail demand	78,426	5.0%
Decrease in switching to IP	89,108	5.7%
Stage 2 forecast	**1,734,699**	**11.5%**

A8.58 As shown above, on aggregate we expect that our charge control proposals will increase by 11.5% (i.e. 179,029 channels) the volumes initially forecasted. We

[256] This is described in more detail in Annex 9.

estimate that the volumes of wholesale ISDN30 rentals are, therefore, likely to decrease by 19% from the year 2009/10 to the end of the charge control period in 2013/14.

Our forecast of future wholesale ISDN30 connection volumes

A8.59 We have forecast connection volumes in a consistent manner with rental volumes following the same approach.

A8.60 In Table A8.7 we present stakeholders' estimates of the expected decline in the annual volumes of connections for the period 2009/10 to 2013/14 and we compare it to the same rental forecasts.

Table A8.7 Percentage decline in connection and rental volumes over the period 2009/10 – 2013/14 (stakeholders forecasts)

	Connections	Rentals
Openreach submission 10 October 2010	- 40 to -50%	- 40% to -50%
OCP 1	- 0% to – 10%	- 0% to -10%

A8.61 In order to ensure consistency with our Stage 1 volume forecast for rentals, we have derived our Stage 1 connection volumes from the rental Stage 1 volumes. To do this we have assumed that the difference in the rental volumes of two consecutive years is proportional to the amount of gross connections (i.e. the number of new subscribers to ISDN30) less churn (i.e. the loss of customers subscribing to ISDN30)[257]. In other words, we have followed this relationship:

$$Rentals_t - Rentals_{t-1} = Gross\ connections_t - Churn_t$$

A8.62 Using the above relationship, we have first calculated wholesale ISDN30 gross connection volumes. First, we have estimated the annual churn rate for the period between 2004/05 and 2009/10 as shown in the last row of Table A8.8 below.

[257] We note that transfers do not affect the calculation of connections, given that they only relate to a transfer of an end customer over Openreach's network (i.e. a transfer from one OCP using Openreach's network to another OCP using Openreach's network).

Table A8.8 Derivation of churn volumes for the period 2004/05 to 2009/10

		04/05	05/06	06/07	07/08	08/09	09/10
a	Rentals[258]	2,038,864	2,133,850	2,159,625	2,224,647	2,271,656	2,066,327
b	Difference[259]	N/a[260]	94,986	25,776	65,022	47,009	-205,330
c	Connections[261]	N/a[210]	417,000	389,000	272,000	276,000	200,869
d	Churn (c – b)[262]	N/a[210]	322,014	363,224	206,978	228,991	406,199
	% rentals[263]	N/a[210]	15.1%	16.8%	9.3%	10.1%	19.7%

A8.63 Second, using all the annual churn rates in the last row of the table above, we calculate the average churn rate for the period running from 2004/05 to 2009/10, equal to 14.2% of rental volumes.[264] Then, we can apply this average churn rate to our Stage 1 rental volumes forecast to obtain the churn volumes for each year of the period running from 2010/11 to 2013/14. Finally, we obtain the annual gross connection volumes for the period 2010/11 to 2013/14 by adding these churn volumes to the difference in the rental volumes calculated in Stage 1, as follows:

$$Gross\ connections_t = Rentals_t - Rentals_{t-1} + Churn_t$$

A8.64 This is shown in Table A8.9 below. The 2009/10 actual rental volumes were supplied by Openreach as part of our S135 request and were equal to 2,145,752 channels.[265]

[258] Rental volumes for the period considered provided by Openreach.
[259] The difference between one year's rental volumes and the previous year's rental volumes.
[260] We have no estimates for this year given that the first actual data corresponds to the year 2004/05.
[261] Connection volumes for the period considered provided by Openreach.
[262] Churn volumes calculated as shown above.
[263] Each year's churn volumes as a share of that year's total rental volumes. The average churn rate of 14.2% is calculated averaging these percentages.
[264] That is the average churn rate of 14.2% is calculated as the average of 15.1% (the 2005/06 churn rate, as shown in the last row of Table A8.8), 16.8% (2006/07), 9.3% (2007/08), 10.1% (2008/09) and 19.7% (2009/10).
[265] In our Cost Forecast model we use mid-year figures which are consistent with BT's RFS. The reason for the difference between this rental channels figure and the one shown in Table A8.8 for year 2009/10 is due to the fact that in Table A8.8 we reproduce Openreach's S135 submission, whereas in our volumes forecast we have used the same base year volumes used in our Cost Forecast model (i.e. 2,145,752). The difference between the two estimates is due to the fact that our Cost Forecast model includes volumes from Northern Ireland and they are mid-year (Openreach's S135 submission being end of year).

Table A8.9 Derivation of connection volumes for the period 2010/11 to 2013/14

		Ofcom forecast			
		10/11	11/12	12/13	13/14
a	Rentals calculated in Stage 1[266]	1,979,995	1,827,042	1,685,905	1,555,670
b	Difference[267]	-165,757	-152,953	-141,137	-130,235
c	Churn[268]	280,969	259,264	239,236	220,755
d	Connections (b + c)[269]	115,211	106,311	98,099	90,521

A8.65 Using this approach we have estimated that connections would decrease by 51% from 2009/10 until the end of the charge control period in 2013/14 if current prices remained unchanged. To obtain the final gross connection volumes in Stage 2 we need to account for the impact of our charge control proposals on connection volumes. We do this by using our Stage 2 rental volumes forecast and applying the same methodology used to estimate the Stage 1 connection volumes. Using this approach we obtain the Stage 2 connection volume forecast shown in Table A8.10 below.

Table A8.10 Derivation of the Stage 2 volume forecast for connections for the period 2010/11 to 2013/14

		Ofcom forecast			
		10/11	11/12	12/13	13/14
a	Rentals calculated in Stage 2[270]	1,979,995	1,894,599	1,812,887	1,734,699
b	Difference[271]	-165,757	-85,395	-81,712	-78,188
c	Churn[272]	280,969	268,851	257,255	246,160
d	Connections (b + c)[273]	115,211	183,455	175,543	167,972

A8.66 As shown above, we estimate that connection volumes will decrease by around 10%[274] by the end of the charge control, after accounting for the impact of our

[266] Our initial volumes forecast for rentals.
[267] The difference between one year's rental volumes forecast and the previous year's rental volumes forecast.
[268] Churn volumes have been calculated multiplying the rental volumes by the 14.2% average churn rate calculated previously.
[269] Connections volumes calculated as described above.
[270] Our adjusted volumes forecast for rentals.
[271] The difference between one year's rental volumes forecast and the previous year's rental volumes forecast.
[272] Churn volumes have been calculated multiplying the rental volumes by the 14.2% average churn rate calculated previously.
[273] Connections volumes calculated as described above.

proposals. As can be seen in Table A8.10 there is a significant increase in the connection volumes in 2011/12 relative to that same year Stage 1 volume forecast. This is due to the additional volumes resulting from the expected impact of our charge control proposals on demand for ISDN30. However, this increase (relative to the Stage 1 volume forecast) declines slightly over the period of the charge control, given that we predict a structural decline in ISDN30 volumes.[275]

Our forecast of future wholesale ISDN30 transfer volumes

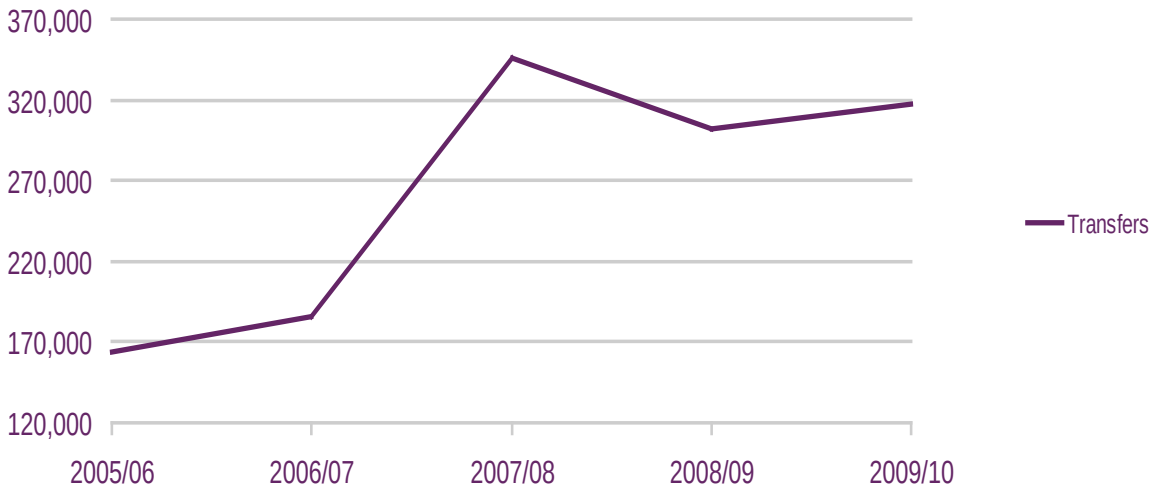
A8.67 To estimate the volumes of transfers we have firstly looked at Openreach's expected transfer volumes for the period to 2013/14.

Table A8.11 Percentage decline in transfer volumes over the period 2009/10 – 2013/14

	Transfers
Openreach submission 10 October 2010	- 60% to – 70%

A8.68 We believe that Openreach has significantly overestimated the decline in transfer volumes. Transfers relate to migrations from OCPs (including BT Retail) over Openreach's wholesale network. Therefore, we would expect that they would be less correlated with the expected decrease in the total retail market than rentals and connections. In fact, as shown in Figure A8.4 below, the volumes of transfers have remained fairly stable over the last three years.

Figure A8.4 Transfer volumes (05/06 – 09/10)



A8.69 We believe that it is reasonable to assume that even if the wholesale ISDN30 market is expected to decline, transfers could remain fairly stable on the basis that BT Retail and re-sellers are likely to compete more aggressively for the remaining customers. For this reason, we expect that there will be a slight increase in the number of transfers as a percentage of the rental volumes, to around 15% of total

[274] That is (167,972/186,413 – 1) = - 10%.
[275] The effect on the X of adopting a different forecast profile for connections is not significant, given that they only represent around 3% of the total revenues of the combined connections and rentals basket.

rental volumes, recognising that there is likely to be an increase in the intensity of competition. Therefore, bearing in mind that our Stage 2 volume forecast has predicted a 19% decline in rental volumes by 2013/14, we have considered it reasonable to assume a smaller decline in transfer volumes in the range of 5% to 10% during the period of the charge control. For the purposes of the calculation of the values of X we have used the middle range between the two, i.e. a total decrease in volumes of 7.5%, in our Cost Forecast model.

A8.70 In Table A8.12 below we show that, as discussed above, we predict a slight increase in the number of transfers as a share of rental volumes, to around 15% for the period of the charge control. We believe this is justified in light of the likely intensification of competition for the remaining ISDN30 customers as the total market shrinks.

Table A8.12 Transfer volumes share of rental volumes before and after period of charge control

	2004/05	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Rental volumes	2,038,864	2,133,850	2,159,625	2,224,647	2,271,656	2,145,752
Transfer volumes	110,367	164,000	186,000	346,000	302,000	295,763
% share	**5.41%**	**7.69%**	**8.61%**	**15.55%**	**13.29%**	**13.78%**
	2010/11	**2011/12**	**2012/13**	**2013/14**		
Rental volumes	1,979,995	1,894,599	1,812,887	1,734,699		
Transfer volumes	290,054	284,456	278,965	273,581		
% share	14.65%	15.01%	15.39%	15.77%		

Summary of the Stage 2 volume forecast of wholesale ISDN30 core services

A8.71 The final adjusted volumes forecast for all three core services used in our Cost Forecast model is presented in Table A8.13 below.

Table A8.13 Final core services forecast for the period 2009/10 to 2013/14

	Actual	Ofcom forecast			
	09/10	**10/11**	**11/12**	**12/13**	**13/14**
Rentals[276]	2,145,752	1,979,995	1,894,599	1,812,887	1,734,699
Connections[277]	186,413	115,211	183,455	175,543	167,972
Transfers[278]	295,763	290,054	284,456	278,965	273,581

[276] The final rental volumes for the entire period of the charge control are calculated by using the final estimated volumes in 2013/14 (shown in Table A8.6) which accounts for all the impacts of our proposals, deriving an annual decrease relative to the Stage 1 2010/11 volumes (equal in this case to an annual percentage decline of 4%) and, using this, estimating the volumes of rental channels in every year of the charge control period (i.e. from 2011/12 to 2013/14).
[277] The connection volumes as shown in Table A8.10 above.
[278] The transfer volumes as shown in Table A8.12 above.

Annex 9

Switching Analysis

Introduction

A9.1 As discussed in section 5, retail ISDN30 services can be provided using different upstream wholesale inputs. In particular, in addition to wholesale ISDN30, OCPs use 2Mbit/s Partial Private Circuits (PPCs) to provide retail ISDN30 services. When deciding whether to use wholesale ISDN30 or PPCs, several factors determine OCPs' choice, including the prices that Openreach charges for the supply of wholesale ISDN30. In order to assess the impact of the decrease in wholesale ISDN30 prices proposed by our charge control on OCPs' choice of wholesale inputs, we have developed a model (the switching model). This model estimates the extent to which the reduction in wholesale ISDN30 prices resulting from the proposed charge control would result in OCPs switching supply from PPCs to Openreach's wholesale ISDN30 offering.

A9.2 The purpose of this annex is to set out the analysis and key assumptions that support our estimates of the number of channels switching from PPCs to wholesale ISDN30 as a result of our proposed charge control.

A9.3 This annex is structured as follows:

- We first provide a brief overview of the factors that determine OCPs' choice of form of supply;
- We describe the costs incurred by OCPs in the provision of retail ISDN30 services using PPCs;
- We describe the structure of the switching model and the key assumptions we have made; and
- We estimate the volumes of channels switching from PPCs to wholesale ISDN30 using different scenarios.

Proposal

A9.4 We estimate that between 9% and 31% of future and current ISDN30 channels provided using PPCs are likely to switch to Openreach's wholesale ISDN30 services. We estimate that the additional channels our model has estimated as switching to wholesale ISDN30 would only represent 0.7% of the total Openreach volumes by the end of the charge control.

A9.5 We have based our estimates on an assessment of the likely impact of our proposed decrease in wholesale ISDN30 prices on OCPs' choice between PPCs and Openreach's wholesale offering. For this, we have had regard to OCPs' costs of supply using PPCs.

OCPs' choice of wholesale input to supply retail ISDN30

A9.6 As discussed in section 2, there are three main forms of supply for retail ISDN30 services. OCPs' choice will in the first instance depend on their business strategy.

OCPs that have an infrastructure strategy (i.e. they have a strong preference to deploy their own services rather than purchase wholesale services from others such as Openreach) often use all three forms of supply and will normally choose them in the following order of preference:

- End to end own infrastructure – the OCP uses its own exchange concentrator and connects it to the customer with a digital bearer running over its own access network;
- Own infrastructure and 2Mbit/s PPCs – the OCP uses its own exchange concentrator and connects it to the customer using a PPC rented from BT or another infrastructure provider; and
- Wholesale ISDN30 purchased from Openreach – the OCP uses Openreach's wholesale ISDN30 service.

A9.7 The OCP's choice of wholesale input may vary from customer to customer. An OCP will typically assess which is the less costly form of supply for each customer. This will depend on:

- The location of the customer, which will determine the costs of extending the OCP's network as well as the likelihood of additional demand from other customers and, hence, the potential for economies of scale and scope;
- The expected customer revenues which are dependent on:
  - The number of ISDN30 channels purchased and the prospects of future additional demand for ISDN30 and other services from that customer;
  - The customer's expected lifetime, which will depend on the duration of the initial contract and the operator's view on the likelihood of it being extended[279]; and
- The relative prices of wholesale ISDN30 and alternative methods of provision.

A9.8 Where OCPs already have their own infrastructure in place, it is likely to be cost effective to use it rather than purchasing wholesale services from BT. This is because it makes the services simpler to provide and because investing in infrastructure alters the structure of the OCP's costs. When an OCP installs its own access network it typically incurs high sunk and fixed costs (i.e. the costs of installing the infrastructure required), but the variable costs (i.e. the costs of running the services once the infrastructure has been installed) of using it are then relatively low. OCPs tend to locate their access networks in areas with a high number of customers because this way they can spread their high fixed costs over a larger number of services (benefiting from economies of scope) and customers (benefiting from economies of scale). This way, OCPs can recover their initial investment in infrastructure while at the same time reducing their variable costs.

A9.9 Most infrastructure OCPs will typically use PPCs in cases where the cost of extending their access network exceeds the expected customer revenues and is not

[279] The average contract length of an ISDN30 retail customer tends to be around five years. However, many end users tend to extend their initial contract and OCPs' view on the probability of an initial contract being extended may determine their choice of method of provision.

justified in terms of the benefits of any potential economies of scale and scope associated with the access network extension.

A9.10 Typically infrastructure OCPs only opt for wholesale ISDN30 where the costs of serving a customer using PPCs significantly exceed the costs of purchasing wholesale ISDN30. Other things being equal, OCPs tend to prefer PPCs to wholesale ISDN30 because this allows them to make more use of their own infrastructure.

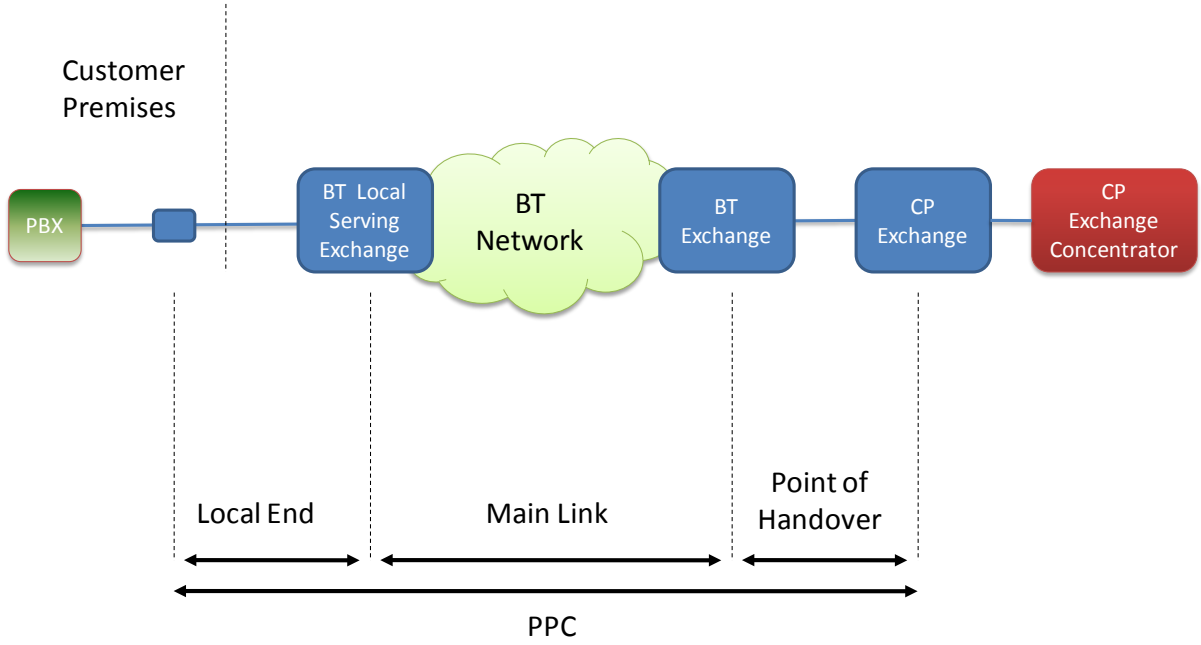
Provision of ISDN30 using PPCs

A9.11 Although most OCPs purchase PPCs from BT Wholesale, in a few instances they make use of other infrastructure providers' wholesale inputs.

A9.12 There were around 96k ISDN30 channels provided using PPCs in June 2010. These represented 12% of the total channels self supplied by infrastructure providers and 3% of the total number of retail channels in the same year.

A9.13 Figure A9.1 below illustrates the provision of ISDN30 using a PPC.

Figure A9.1 Provision of ISDN30 using a PPC



A9.14 A PPC provides a circuit of dedicated transmission capacity between end-users premises and a Point of Handover (PoH). The PoH is a high bandwidth interconnection circuit between the BT and CP networks used for multiple PPCs. In PPC terminology, the end-user is referred to as the third-party.

A9.15 Figure A9.1 above shows that a PPC is comprised of three segments:

- The Local End connecting the customer premises to the BT local serving exchange;
- The Main Link connecting the BT local serving exchange to a remote BT exchange where the PoH is located. Depending on the location of the serving

exchange and the PoH, the main link may cross the core of BT's network between Tier1 nodes (i.e. major nodes); and

- The Point of Handover, a short distance circuit segment between the BT main exchange and a nearby CP exchange.

A9.16 In order to provide ISDN30 using a BT PPC, OCPs have to provide several inputs of their own as well as renting a PPC from BT. Table A9.1below lists the setup costs.

Table A9.1 One-off setup costs for ISDN30 using PPCs.

BT PPC connection charges	There are several elements to BT's PPC connection charges: Circuit connection charge – a charge that applies to each new circuit connected. Third Party Customer Link Infrastructure Charge – a charge for customer specific infrastructure installed in the local end segment of the circuit. If the circuit is provided over copper cables one of the following charge elements will be applicable: • If the circuit is delivered over existing copper cables the '2Mbit/s circuit delivered by HDSL on existing copper' charge will be applicable; • If the circuit is delivered over newly provided copper cables the '2Mbit/s circuit delivered by HDSL on new copper' charge will be applicable; If the circuit is delivered over a new fibre cable, two charges will be applicable: • the 'Additional charge to provide new fibre infrastructure at a new site' charge; and • The 'Provide a 2Mbit/s 4x2 at existing fibre site' charge covering provision of a 4 by 2 multiplexor capable of supporting 4 separate 2Mbit/s circuits. At sites where there is existing fibre and spare capacity on a 4 by 2 multiplexor there is no additional infrastructure charge. Excess Construction Charges – only in the cases where additional construction work is required in connection with provision of the local end segment, (such as installation of new duct to the customer premises or breaking through a wall at the customer premises) additional charges are payable according to the work required. PoH Connection Charges – A charge that applies to each new PoH connection. As noted the PoH circuit segment is generally shared between multiple PPCs so this charge would not be incurred for each 2 Mbit/s PPC.
OCP transmission costs	The capital cost of the OCPs transmission equipment at OCP's end of the PoH circuit and the transmission equipment used to extend the digital bearer from the PoH to CP's exchange concentrator,
OCP exchange concentrator costs	The capital cost of the exchange concentrator line-card and the exchange space it occupies.
OCP provision costs	Costs incurred by the OCP to install and commission an ISDN30 circuit using a PPC, including circuit design, data entry and validation and circuit testing.

A9.17 In addition to the set up costs described above, the OCP would also have to incur recurring costs, both relating to its own infrastructure and the rental costs of PPCs. These are described in Table A9.2 below.

Table A9.2 Recurring costs for ISDN30 using PPCs

BT PPC rental charges	There are several elements to BT's charges: • Local End Fixed Charge – a fixed charge for the local end element of a circuit. • Main Link Fixed Charge – a fixed charge for the main link between the serving exchange and PoH exchange. • Terminating Segment Charge – A charge per km for the terminating segment of the PPC. • Trunk Segment Charge – A charge per km for the trunk segment of the PPC. • Third party PoH Rental Fixed Charge – a fixed charge for the PoH section of each individual PPC circuit. • PoH Circuit rental charges – a share of the rental charge for the high-bandwidth PoH circuit over which the 2Mbit/s circuit is carried based on the proportion of the circuit bandwidth occupied by the ISDN30 circuit. Enhanced maintenance charges – BT charges extra for optional enhanced care maintenance services.
OCPs transmission costs	Maintenance and power costs for the OCP's transmission equipment.
OCPs exchange concentrator operating costs	A share of the exchange concentrator operating costs, including exchange space and power costs.
OCPs service management costs	Operational cost of maintaining the service, including customer service, fault finding and fault resolution functions.
OCPs billing costs	Cost of retail circuit billing and verification of BT wholesale bills for the PPC.

Structure and purpose of the Switching model

A9.18 The main objective of the Switching model is to estimate the extent to which, as a result of our proposed charge control on wholesale ISDN30 services, OCPs may decide to switch current and future provision of ISDN30 from PPCs to Openreach's wholesale offering. We have not assessed how our proposed charge control on ISDN30 will impact OCPs' use of their end to end infrastructure. This is because OCPs are likely to consider these investments as sunk (i.e. not recoverable) and, therefore, OCPs are unlikely to switch customers from their network to Openreach. Furthermore, supply over end to end own infrastructure is the OCPs' preferred form of supply, given that it allows them to spread their high fixed costs over a larger amount of services, therefore, our charge control proposals are unlikely to affect OCPs' choice between this form of supply and wholesale ISDN30.

A9.19 The Switching model should not be confused with the incremental cost differential analysis we discuss in Annex 10. The incremental cost analysis is a cross-check on the differential between the wholesale ISDN30 rental and connection charges which will result from our proposed control, and the rental and connection charges for a 2Mbit/s PPC. This is because both wholesale ISDN30 and a PPC can be used to supply a retail ISDN30 service. If this differential is set at the appropriate level (i.e. it is at least as great as the difference in the incremental costs of these two services) users will be encouraged to make the efficient (cost minimising) choice between them.

A9.20 The Switching model, on the other hand, is intended to identify the least cost option based on OCPs' costs. This model can then be used to estimate the volumes of ISDN30 which are likely to be provided using either PPCs or wholesale ISDN30, when the price of the latter is set at the level implied by our proposed charge control. By comparing our estimates of OCPs' costs of supply using either technology we can estimate the proportion of current and future PPC demand that may switch to wholesale ISDN30.

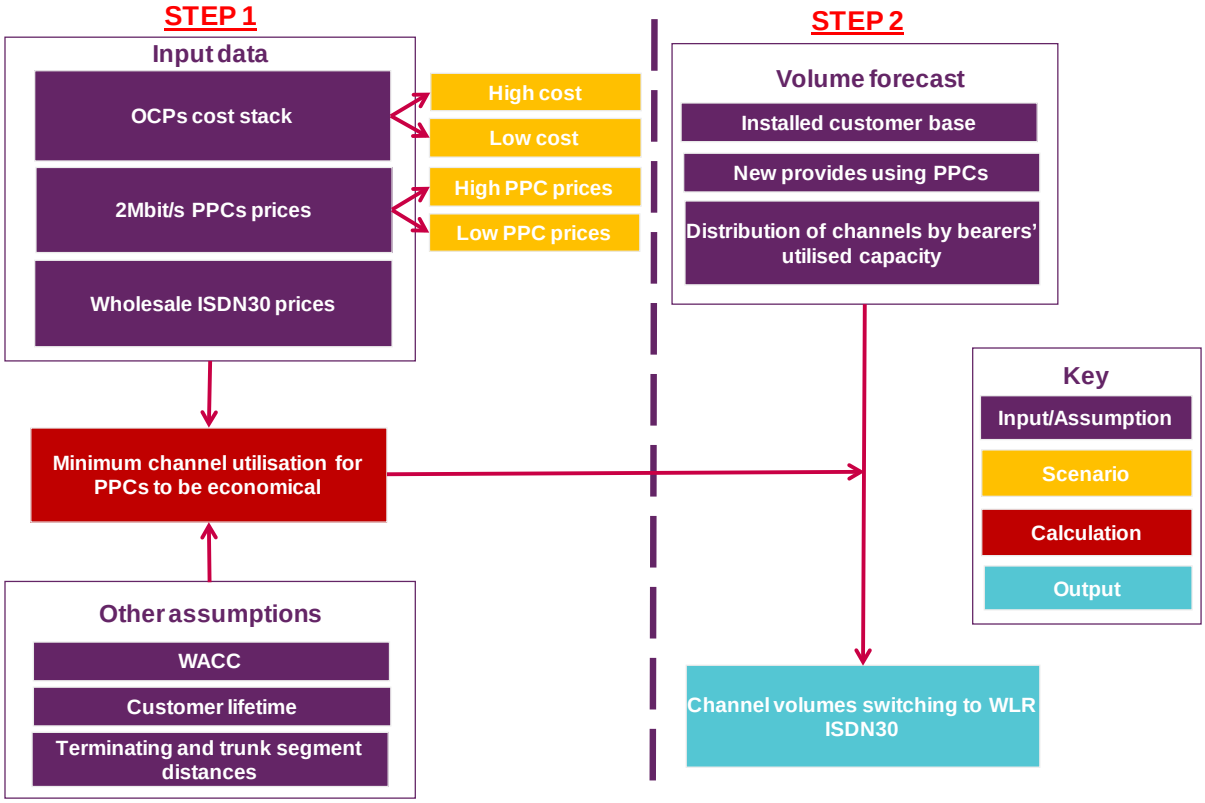
A9.21 As described below, the structure of the PPC wholesale charges is such that PPCs tend to be more economical the higher the number of ISDN30 channels used in a bearer. The maximum number of ISDN30 channels that can be provided over a single 2Mbit/s PPC bearer is 30. The switching model estimates the number of channels that may switch from PPCs to Openreach's wholesale ISDN30 in two steps:

- Step 1: We calculate the minimum number of channels per 2Mbit/s PPC bearer that would make supply of ISDN30 using PPCs more economical than wholesale ISDN30;

- Step 2: We estimate the number of ISDN30 channels that will switch from PPCs to Openreach's wholesale ISDN30 product. The inputs to this step are the outputs from Step 1, the ISDN30 volumes forecast and the distribution of total ISDN30 channels by the bearers' utilised capacity (i.e. how many channels are supplied on bearers with 18 channels, 20 channels, 22 channels, etc.).

A9.22 Figure A9.2 below summarises the model's structure.

Figure A9.2 The Switching model structure



A9.23 In the following sections we describe in detail each of these steps, the assumptions we have used and the different scenarios modelled.

Step 1: The minimum number of channels required for provision of ISDN30 using PPCs to be economical

A9.24 Retail ISDN30 services are generally charged on a per-channel basis. At the wholesale level, the cost of providing ISDN30 services using PPCs is mainly driven by the wholesale charges of a 2Mbit/s PPC which are levied on a per-bearer basis (each of which is capable of supporting up to thirty channels). In contrast, Openreach's wholesale ISDN30 charges are on a per-channel, rather than on a per-bearer basis. For this reason, the costs of using wholesale ISDN30 are driven by the amount of channels purchased, rather than the number of bearers.

A9.25 This means that for an OCP the costs of using wholesale ISDN30 increase linearly with the number of channels required by the end user, whereas in the case of PPCs they increase on a per-bearer basis and therefore do not vary regardless of the number of channels in use on each bearer. Therefore, an increase in the number of channels increases the costs of wholesale ISDN30 while decreasing the costs of the 2Mbit/s PPC on a per channel basis.

A9.26 Given the above, the switching model calculates the number of channels at which PPC provision becomes more economical than wholesale ISDN30 using two inputs:

- A cost model of ISDN30 provision using PPCs which includes OCPs' own infrastructure costs and relevant PPC charges; and

- Estimates of the wholesale ISDN30 prices resulting from our proposed charge control.

A9.27 Below we describe the assumptions used in our model.

Cost scenarios used

A9.28 Based on information we have received from OCPs we have developed two cost scenarios,

- a 'High' cost scenario in which we have used the cost figures provided by OCPs. This represents the OCPs' view of the average cost of providing ISDN30 over PPCs; and

- a 'Low' cost scenario in which we have amended some of the assumptions in the OCPs' cost stack. This represents our view of the lowest cost of providing ISDN30 over PPCs and therefore the most attractive case for the provision of ISDN30 over PPCs. It uses the cheapest Third Party Infrastructure components and assumes that OCPs' equipment capital costs are sunk and so not relevant to the choice between PPCs and wholesale ISDN30.

A9.29 The main features of the two scenarios are summarised in Table A9.3 below and explained in detail in the following sections.

Table A9.3 Assumptions in the high and low cost scenarios

Cost component	High cost scenario	Low cost scenario
Third party infrastructure charge	Provision of Local End over fibre infrastructure with 2Mbit/s 4 by 2 multiplexors. New fibre infrastructure required at ✂% of sites. ✂Mbit/s circuits in use on the 4x2 multiplexors.	Provision of Local End over existing copper infrastructure – cheapest method of provision of Local End.
OCPs' exchange concentrator costs	Includes the capital costs of the OCPs' exchange concentrator and associated exchange space	Assumes these capital costs are sunk and will not affect the decision to switch
OCPs' transmission costs	Includes the capital costs associated with the transmission equipment	Assumes these capital costs are sunk and will not affect the decision to switch to wholesale ISDN30
OCPs' provision and service management costs	Uses the £✂ pay rate for technicians dealing with provision activities provided to us by the OCP.	Uses the £17.26/hour Standard Cost Model pay rate for these activities.
Share of Point of Handover costs	A pro-rata share of the PoH connection and rental costs are included	Does not include a share of the PoH connection and rental costs, as these are sunk costs

A9.30 The rationale behind these assumptions is explained below.

Third party infrastructure charge

A9.31 For the High cost scenario we assume that the PPC is provided over fibre infrastructure and that on average:

- the £2,301 'Additional charge to provide new fibre infrastructure at a new site' charge is applicable at ✂% of sites i.e. a cost of £✂ per site and at other sites existing fibre is available (not chargeable); and
- that ✂ circuits on each 4 by 2 multiplexor are in use. ✂ the £4,341 'Provide a 2Mbit/s 4x2 at existing fibre site' charge is applicable to each circuit.

A9.32 In practice, 2Mbit/s PPCs can be provided more cheaply if the service is provided over existing copper infrastructure. Therefore, for the Low cost scenario we assume:

- That a single 2Mbit/s PPC is provided using HDSL over existing copper infrastructure; and, therefore,
- That the £1,155 '2Mbit/s circuit delivered by HDSL on existing copper' charge is applicable.

OCPs' exchange concentrator costs

A9.33 For the high cost scenario we include £✂ covering the capital cost of the ISDN30 line-card, a share of the exchange concentrator and exchange space based on information supplied by OCPs. For the Low cost scenario we assume that:

- For existing customers these costs are likely to be regarded as sunk (i.e. OCPs are unlikely to avoid them by switching customers to wholesale ISDN30). Therefore, they would not affect OCPs' decision to switch existing customers from PPCs to wholesale ISDN30; and
- For new customers we have also assumed that OCPs regard the incremental cost of these items as zero for these purposes. We note that OCPs first launched an ISDN30 service using PPCs around the year 2000 and one OCP has indicated to us that the Net Book Value (NBV)[280] of its switches and concentrators is currently zero.[281] We believe that the fact that the NBV of these assets is currently zero is likely to mean that CPs are serving new demand through re-use of existing equipment, rather than investing in new equipment. We note that this is consistent with our assumption that Openreach is currently serving new demand out of existing equipment, particularly, in light of the fact that most ISDN30 line-cards are no longer in manufacture.

OCPs' transmission costs

A9.34 For the High cost scenario we include £✂ covering the capital costs associated with the transmission equipment. For the same reasons as in the case of the exchange concentrator costs. In the Low cost scenario we have assumed that the

[280] The net book value of an asset is equal to its initial value minus its accumulated depreciation.
[281] One OCP has explained to us that the asset lives of its switches and concentrators span 5 to 10 years depending on the criteria at the time they were installed. Additionally, it has indicated that, the NBV of its switches and concentrators is currently zero, with most of the equipment having been written down by ✂.

capital and operating costs are sunk and, therefore, their incremental cost is likely to be zero for both existing and new customers.

- For existing customers we have assumed that these costs will have already been incurred and are not recoverable.

- For new customers we believe it is reasonable to assume that future demand can be served using existing transmission kit and, consequently, its (short-run) incremental cost is likely to be close to zero. This is on the basis that information we have received from an OCP indicated that its transmission equipment is utilised up to ✂%, implying that there is still spare capacity to accommodate future demand. In the Low cost scenario, we assume that the OCP does not regard the costs of replacing transmission and other equipment as part of the incremental costs of providing ISDN30 over the relevant time period.

OCPs' provision and service management costs

A9.35 These costs relate to the engineering work undertaken by OCPs' staff to install and commission ISDN30 services. For both scenarios we assume this activity involves ✂ hours work based on information supplied by an OCP.

A9.36 The High cost scenario assumes a £✂/hour pay rate based on information supplied by OCPs.

A9.37 In the Low cost scenario, we have assumed a labour rate of £17.26[282] per hour which is the telecommunications engineers (skilled trade occupations) rate from BIS' *UK Standard Cost Model*[283].

OCPs' point of handover costs

A9.38 The High cost scenario includes a pro-rata share of the PoH connection and rental costs. In the Low cost scenario we have excluded these costs. This is because, as in the case of the exchange concentrator costs and the transmission kit, PoH costs are likely to be sunk and would not be critical in OCPs' decision to switch to wholesale ISDN30. Additionally, the PoH is generally shared with other services such as leased lines and we believe it is reasonable to assume that OCPs are likely to be able to serve new demand from existing spare capacity. On these grounds, the incremental costs of the PoH are likely to be close to zero.

Treatment of excess construction charges

A9.39 Excess construction charges ('ECCs') are payable on a per metre basis for the provision of new cable (copper or fibre) for wholesale ISDN30 services whereas for PPCs there are fixed charges where connections require new cables. As they are charged on a per metre basis in the case of wholesale ISDN30, ECCs will be site specific and could be lower or higher than the fixed charges that apply to PPCs.

[282] We consider this rate is likely to be representative of market rates for telecoms technicians who could undertake these activities. In this context we note that this SCM rate falls within the pay range of the comparable BT technician grade known as grade C2 whose pay rates range from £15.64 to £19.54 per hour including a 30% mark-up for employer's overheads as used in BIS' Standard Cost Model.

[283] See BIS, *Measuring Administrative Costs: UK Standard Cost Model Manual*, telecommunications engineers (cat. 5242), available at page A18 http://www.bis.gov.uk/files/file44505.pdf. We have adjusted the 2005 labour rates for labour rate inflation at 1.5% p.a.

A9.40 In both the High and Low cost scenarios our model excludes ECCs. This is because ECCs are intrinsically difficult to model, given their dependence on the specific characteristics of each end user and its requirements. We recognise that this is likely to underestimate the true costs of supply using both ISDN30 and PPCs. However, we believe that the impact of this on our switching model is likely to be significantly mitigated for the following reasons.

A9.41 Firstly, ECCs will only be incurred in the case of new provides, given that they will represent a sunk cost for existing customers. Therefore, they would only affect switching of future new provides, not existing customers.

A9.42 Secondly, ECCs are generally associated with the provision of a first connection to a site (i.e. a site that has not previously been connected to BT's network). Therefore, we believe that they are more likely to arise when OCPs opt for a new fibre connection than a copper connection, as a much higher proportion of premises are already connected to BT's copper network than its fibre network. This means that, as long as the end user's requirements allow for it, OCPs may be able to avoid incurring ECCs by renting a PPC over existing copper cables, rather than fibre.

Customer lifetime, annualised connection costs and WACC

A9.43 Connection costs are the 'upfront' costs incurred by the OCP when a new customer joins its network. Once incurred, these costs are likely to be sunk because the OCP is unlikely to be able to recover them if the customer subsequently leaves its network. OCPs typically recover connection costs partly through a one-off connection charge and partly through ongoing rental charges. In the switching model we assume that both wholesale ISDN30 and PPC connection costs are recovered over a period of 5 years.[284] The market research that we conducted during our Market Review found that, on average, ISDN30 customers stay with an OCP for between five to six years.[285]

A9.44 For the annualised connection costs we have used the "rest of BT" WACC applicable to leased lines as the discount rate (i.e. 9.3%).

Labour related costs inflation

A9.45 We have assumed the same pay inflation used in our Cost Forecast model, as discussed in Annex 6. In the switching model, pay inflation is applied to labour intensive activities, such as:

- OCPs' internal provision costs; and
- OCPs' service management costs (including costs related to assure and billing services).

[284] Sensitivity analysis using the switching model suggests that increasing the assumed customer lifetime above 5 years is unlikely to have a material impact on switching volumes. Assuming significantly shorter customer lifetimes (e.g. 2 year) could lead to a more significant increase in the use of wholesale ISDN30 in preference to PPCs, with a maximum impact of about 35,738 channels switching over the period of the charge control. However, this would have no material impact on the value of X.

[285] See Ofcom, *Narrowband Multi-channels Market Research*, page 23, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/narrowband.pdf

Terminating and trunk segment distances

A9.46 When renting a PPC from BT, operators incur terminating and trunk segment charges that vary depending on the total distance of the circuit. The switching model assumes the average distances of the 2Mbit/s terminating and trunk segment circuits provided to us by one OCP (equal to 11.1 km for terminating segments and 2.6 km for trunk segments). This OCP was unable to differentiate between the average distances of PPCs that it uses for ISDN30 and for other services; however, it considered that there was no reason to believe they would differ significantly[286].

The wholesale 2Mbit/s PPCs prices

A9.47 BT's PPC charges are currently subject to the charge controls introduced in the LLCC[287], which will last until 30 September 2012. The switching model takes the impact of the charge controls on PPC pricing into account.

A9.48 All the PPC inputs used to provide ISDN30 are subject to a basket price cap and sub caps that apply to certain services within that basket. The main basket price cap limits the average increase in prices for that basket to a maximum of RPI-1.75%. The average increase is naturally always lower than the maximum increase permitted for any individual price within the overall basket, which is given by the safeguard cap of RPI-0% or RPI+5%. To reflect this, we have developed two cost scenarios.

- In the 'Low PPC prices' scenario we have assumed that BT will reduce prices of every PPC input by the basket cap applicable to that PPC input.
- In contrast, in the 'High PPC prices' scenario, we assume that BT will increase prices to the extent allowed by the safeguard cap applicable to each PPC input (which means that charges for other services in the basket must decrease by more than the value of the basket cap).

A9.49 This means that for each of the 'Low' and 'High' cost scenarios described in the previous section, the model estimates the extent of switching for the 'Low PPC prices' and 'High PPC prices' scenarios.

A9.50 Due to the fact that the LLCC will last until 30 September 2012, in our model we have assumed that PPC prices will be affected by the LLCC price caps up to the year 2012/13. We have assumed that in the last year of the proposed ISDN30 charge control (i.e. 2013/14) PPC prices will remain at the level of the year 2012/13, given that the LLCC has been set such that it brings prices in line with the underlying costs over the current period of the charge control.[288]

[286] We have assessed the impact of assuming different terminating and trunk segment distances on the volumes switching by increasing these to 15km and 4km and reducing them to 9km and 2km, under two alternative scenarios, respectively. However, these changes did not have a material impact on the volumes switching and, consequently, we do not report these results here.
[287] See http://stakeholders.ofcom.org.uk/consultations/llcc/statement/.
[288] We acknowledge, nonetheless, that the costs of PPCs could subsequently change, for example, due to declining PPC volumes.

The wholesale ISDN30 charges proposed by our charge control

A9.51 To estimate the minimum number of channels at which PPCs become more economical than wholesale ISDN30, we need to compare the costs of using PPCs with the cost of using wholesale ISDN30 at the prices that we are proposing.

A9.52 As described in more detail in paragraph A8.40, under our charge control proposals, we are proposing to set a price cap on the combined basket for connections and rentals. Therefore, as in the case of our volumes forecast described in Annex 8, for the purpose of calculating the likely price decrease in wholesale ISDN30 connections and rentals resulting from our charge control proposals, we have assumed that Openreach will increase connection prices by the maximum allowed by the safeguard cap, RPI+5%. We then derive rental prices as a residual by calculating the change in the rental required for compliance with the basket cap (RPI-10.0%) given the assumed increase in connection charges, and using prior year revenue weights. To derive the prior year revenue weight, we have used our Stage 1 volumes forecast for connections and rentals (as described in Annex 8). The ISDN30 prices used in the Switching model are the same as those used in our volume forecast, shown in Table A8.4.

Model outputs from Step 1

A9.53 For each of the previous four scenarios considered (i.e. the 'Low/High cost' scenarios and the 'Low/High PPC prices' scenarios) the model calculates the minimum number of channels at which PPCs will become more economical than wholesale ISDN30 as:

$$Minimum\ number\ of\ channels = \frac{[Costs\ of\ PPC\ provision\ (own\ infrastructure + 2Mbit/s\ PPCs)]}{[Wholesale\ ISDN30\ prices\ per\ channel\ (rental\ +\ connection)]}$$

A9.54 In other words, the minimum number of channels represents the required level of utilisation of a bearer (i.e. the number of channels supplied in a 2Mbit/s PPC bearer) that makes the costs of supplying ISDN30 using a PPC equal to the prices of a wholesale ISDN30 circuit with that same amount of channels. Therefore, if the end user requires a circuit with less than the minimum number of channels, the OCP is likely to be better off supplying this customer using wholesale ISDN30 rather than using PPCs[289].

A9.55 In addition to the four scenarios described above, when estimating the minimum number of channels required for PPCs to be economical, we have differentiated between existing customers and future new provides. This is because OCPs' choices will be different in each case.

A9.56 For existing customers, OCPs have to choose between continuing supply using PPCs or switching these customers to wholesale ISDN30. Because one-off connection costs will have already been incurred and are sunk (i.e. cannot be recovered), an OCP will only decide to switch an end user if the connection and

[289]For example, suppose the total costs per circuit are £3,000 using a PPC and that the sum of the connection and rental prices of wholesale ISDN30 are equal to £150 per channel. Then, only for customers requiring 20 or more channels will the OCP be better off using PPCs rather than wholesale ISDN30. This is because at 20 channels the costs of supplying a customer using a PPC are equal to the costs of wholesale ISDN30 (i.e., £150 per channel).

rental prices of wholesale ISDN30 are below the recurring costs of PPCs. The OCPs' choice to switch from PPCs to wholesale ISDN30 may also be affected by other considerations such as the potential disruption that switching may cause to the end user. For this reason, we believe that our model is likely to overestimate the extent of switching that is likely to occur for existing customers.

A9.57 In the case of new provides, OCPs' decision on the form of supply will be determined by their recurring costs as well as their one-off set up costs. Therefore, the comparison will be made between their total costs of provision using PPCs (set up and recurring) and wholesale ISDN30 connection and rental prices.

A9.58 In light of the above, the model calculates the minimum number of channels separately for existing customers and new provides. Table A9.4 below summarises the results.

Table A9.4 Minimum number of channels required for provision of ISDN30 over PPCs to be economical by the end of the charge control

	High cost scenario		Low cost scenario	
	High PPC price	**Low PPC price**	**High PPC price**	**Low PPC price**
New provide	Uneconomical	Uneconomical	28	25
Existing customer	23	21	20	18

A9.59 As shown in Table A9.4 above, the switching model forecasts significantly different results for new provides and existing customers. In the case of new provides, the proposed reduction in wholesale ISDN30 prices is likely to make provision using PPCs uneconomical only under the High cost scenario.

A9.60 For existing customers (i.e. customers that are already being supplied using a PPC), the number of channels required for PPCs to be economical when compared to wholesale ISDN30 is much lower. This follows from the fact that for existing customers OCPs will only switch provision to wholesale ISDN30 if the sum of the connection and rental price is lower than the rental costs of using PPCs. Instead, for new provides OCPs will compare the connection and rental prices of both wholesale ISDN30 and PPCs, therefore, the number of channels at which it is economical to provide ISDN30 using PPCs will be higher in this case.

Step 2: The number of channels switching to wholesale ISDN30

A9.61 In Step 1 the switching model estimates the number of channels required for PPCs to be more economical than wholesale ISDN30 at the prices proposed by our charge control. This means that at the new wholesale ISDN30 prices, OCPs' customers that are being served using bearers with a lower channel utilisation than the one calculated by the model would be better off being supplied using wholesale ISDN30.

A9.62 In order to estimate the number of channels that are likely to switch from PPCs to wholesale ISDN30 we need to know how the total number of channels provided

using PPCs are distributed over bearers with different channel utilisation. For this purpose, OCPs have provided to us the average number of ISDN30 channels provided in their 2Mbit/s PPC bearers and, in some cases, they have been able to provide the exact distribution of their total customer base over the PPCs used to supply them (e.g. how many channels are provided using bearers of, say, ten channels, fourteen channels, fifteen, etc.). Using this information and the minimum number of channels calculated in Step 1 we can estimate the number of channels that could switch to wholesale ISDN30 at the proposed charges by the end of the charge control.

A9.63 For example, if in Step 1 our model has calculated that the minimum number of channels for PPCs to be economical is, say, 24 and the information submitted by our stakeholders shows that there are, say, 30k channels being supplied using bearers with less than 24 channels, then in Step 2 our model will estimate that 30k channels are likely to switch to wholesale ISDN30.

A9.64 To arrive at the final estimate of the number of channels switching from PPCs to wholesale ISDN30 we have made further assumptions relating to:

- Forecast of channels provided using PPCs; and
- Distribution of channels over bearers with different channel utilisation.

A9.65 Each of these assumptions is explained below.

Forecast of ISDN30 channels provided using PPCs

A9.66 We have assumed two different volumes forecast for the period of the charge control, one relating to the existing customers and another relating to the future new provides that are likely to be supplied using 2Mbit/s PPCs.

Volume forecast for existing customers

A9.67 In our model we have assumed for simplicity that the number of existing customers will remain constant over the period of the charge control. In practice, some of the customers currently being supplied using PPCs are likely to switch to IP based alternatives or will be supplied by OCPs using their own access networks but the difference is unlikely to be material.

Volume forecast for new provides

A9.68 We have forecast the volumes of new provides that are likely to be supplied using PPCs during the period of the charge control using two sources of information. First, we have obtained OCPs' latest volumes of PPC new provides.

A9.69 Secondly, we have assumed this same volume of new provides for each year of the charge control but we have reduced it every year by the rate of decline in wholesale ISDN30 connections obtained from our Stage 1 volume forecasts described in Annex 8 (i.e. an annual reduction in the new provide volumes of around 16%). This gives us the total pool of new ISDN30 PPC provides that could switch to wholesale ISDN30 during the charge control period (2009/10 to 2013/14). The model estimates that the likely volumes of new ISDN30 channels supplied using PPCs for this period will be around 29,987 channels.

A9.70 We note that under our charge control proposals, Openreach is only likely to be able to introduce price reductions starting in the charge control year 2011/12. This means that, for the purposes of estimating the switching volumes, the volumes of new provides in the year 2010/11 could be included within the pool of the current installed base (rather than the new provides), given that it could be assumed that OCPs serving new customers in 2010/11 will have already incurred the connection costs by 2011/12 and should, therefore, be treated as existing customers. However, we have included these volumes of new provides within the pool of new customers in the calculations in Step 1. The reason is that we expect that our charge control proposals are likely to affect OCPs' decision on the form of supply from the date at which our proposals are known (i.e. in early 2011), even if Openreach introduces them at a later stage. For this reason, our estimate of new provides for the year 2010/11 have been included within the pool of 'new provides', rather than 'existing customers' for the purpose of our estimation of volumes switching.

Distribution of ISDN30 channels over bearers by the bearers' utilised capacity

A9.71 As discussed above, the distribution of channels by the bearers' utilised capacity is used to determine the extent of switching once the model has calculated the minimum number of channels required for PPCs to be more economical than wholesale ISDN30. The information provided by OCPs is presented in Figure A9.3, which shows the share of total ISDN30 channels by the bearers' utilised capacity (e.g. it shows that around ✂% of the total channels provided using PPCs are supplied using bearers of less than ✂ channels).

Figure A9.3 Distribution of current ISDN30 channels by the bearers' utilised capacity

✂

A9.72 As can be seen in Figure A9.3 above, the vast majority of channels are currently being provided using bearers at close to full capacity (i.e. 30 channels). In fact, the average number of channels per 2Mbit/s PPC bearer on average across all OCPs using PPCs to supply ISDN30 is 28.6. The switching model assumes that new provides will have the same distribution shown in Figure A9.3 as the existing customers.

A9.73 Figure A9.3 above also shows that there is a significant share of channels that are currently provided using bearers with a relatively low channel utilisation (for example, the ✂% of total channels that are currently provided using circuits with less than ✂ channels). Even at current prices, our model predicts that under the assumptions used, supplying these channels using PPCs may not be economical and that OCPs would be better off supplying them using wholesale ISDN30. This shows that some additional factors (outside those explicitly included in the model) matter for the actual choices. For instance:

- The customer premises could be located closer to the OCPs' network than the average trunk and terminating segment distances assumed by our model;
- OCPs' may choose to connect their network to an end user even if they may incur losses in the short term if these could be recouped in the future due to the expectation of additional demand from that particular customer;
- The ISDN30 service may be provided in conjunction with other services at the same site, which could make provision using PPCs economical;

- The end user may have requested a high number of circuits to be connected and the bearers with lower channel utilisation simply reflect the residual of the channels requested (e.g., if an end user requests 305 channels, it will have to purchase 10 bearers with 30 channels and the residual 5 channels in a single bearer); or

- It may result from a reduction in the number of channels initially purchased by the end user and the fact that OCPs may be unwilling to involve the end user in the disruption that is likely to be required to switch that customer to wholesale ISDN30.

A9.74 It should be noted that the Switching model does not distinguish between bearers that are uneconomical under the current wholesale ISDN30 prices and those that will only become uneconomical as a result of our proposed charge control. This is because we have been unable to determine the precise reasons for which OCPs continue to supply bearers that are uneconomical under current wholesale ISDN30 prices. Therefore, our model estimates that, with the proposed price changes, the channels that are currently being supplied in uneconomical conditions will switch to wholesale ISDN30. However, we believe this will overestimate the true extent of switching to wholesale ISDN30. We return to this point below when we discuss the incorporation of the results of the switching model in our volume forecast.

Estimation of volumes switching to wholesale ISDN30

A9.75 The switching model estimates that the volume of channels switching from PPCs to wholesale ISDN30 will be in the range of 10,758 to 39,421channels or, equivalently, 9% to 31% of the volume of channels that would have been provided over PPCs throughout the period of the charge control, including existing customers and new provides. As shown in Table A9.5 below, the lower end of the range results from assuming the Low cost and Low PPC price scenarios, whereas the high end of the range is based on the High cost and High PPC price scenario.

Table A9.5 Number of ISDN30 channels switching to wholesale ISDN30 under each scenario

	High cost scenario		Low cost scenario	
	High PPC price	**Low PPC price**	**High PPC price**	**Low PPC price**
New provides	✂	✂	✂	✂
Existing customers	✂	✂	✂	✂
Aggregate	✂	✂	✂	✂

A9.76 As discussed in Annex 8, the output from the switching model is included in our Stage 2 volumes forecast. For the purposes of our base case scenario (i.e. the scenario used to derive the values of X in our Cost Forecast model), we have used the Low cost scenario and have estimated an average of the High and Low PPC

price scenarios, that is a total of 11,494 channels switching to wholesale ISDN30 (around 9% of total PPC volumes for the period).

A9.77 We have adopted the Low cost scenario because we believe it is the more plausible representation of the costs that OCPs will have regard to when deciding whether to switch supply to wholesale ISDN30. We believe this is likely to be the case for existing customers (where OCPs are likely to view their PPC costs as sunk, as discussed earlier) and, to a significant extent, for new provides (where OCPs are likely to accommodate additional demand out of their spare capacity and without incurring substantial additional costs). Additionally, we believe that, by adopting this scenario, we take account of the fact that more use seems to be made of PPCs in practice than would be predicted by the model. It is also consistent with our conservative approach to charge controls, given that the Low cost scenario will result in the lower number of channels switching to wholesale ISDN30 and, consequently, in lower values of X.

A9.78 We have also estimated an average of the High and Low PPC price scenarios because we believe that this is likely to be the most plausible scenario for future PPC prices. We recognise that BT may well increase PPC terminating segment prices (with reductions in trunk segment prices). However, we believe that it may not raise them to the maximum allowed by the safeguard caps imposed by the LLCC (as currently modelled in the High PPC price scenario). Therefore, we believe that an average of the two price scenarios (High and Low) is a good representation of the likely future PPC prices for the purposes of our switching analysis.

A9.79 When compared to Openreach's total wholesale volumes in our Stage 1 volumes forecast in the last year of the charge control (i.e. 1.6m channels) described in Annex 8, the additional 11,494 channels that our model has estimated will switch to Openreach would only represent 0.7% of the total Openreach wholesale ISDN30 volumes. Therefore, we believe that the proposed charge control will have a relatively modest impact on the volumes of channels that will switch from PPCs to wholesale ISDN30.

Annex 10

Incremental cost analysis

Introduction

A10.1 In section 4 we have proposed to set the wholesale ISDN30 charge control using costs measured on a current cost accounting (CCA) fully allocated cost (FAC) basis. We described the analysis which we have carried out to assure ourselves that, in doing so, we would maintain the difference between the prices for wholesale ISDN30 and the prices of more upstream inputs which could also be used to supply a retail ISDN30 service, principally 2Mbit/s PPCs, at an appropriate level. By this we mean that the difference in prices should not be less than the difference between the incremental costs of wholesale ISDN30 and of 2Mbit/s PPCs. We refer to our analysis as the "incremental cost analysis".

A10.2 The purpose of this annex is to set out in more detail the rationale for conducting the incremental cost analysis and to describe the key assumptions that support it.

A10.3 The annex is structured as follows:

- We first provide a brief overview of the rationale for conducting the incremental cost analysis; and
- We then describe the incremental cost analysis.

Proposal

A10.4 We have carried out a cross-check on the differentials between wholesale ISDN30 and 2Mbit/s PPCs and a less detailed analysis of the differentials between the former and MPF. We are satisfied that the difference between the prices of these wholesale inputs is at least as large as the difference between their incremental costs.

A10.5 In light of the above, we continue to regard CCA FAC as being an appropriate measure of costs for the purpose of setting the wholesale ISDN30 charge control.

The purpose of the incremental cost analysis

A10.6 We propose to use CCA FAC as the basis for setting the ISDN30 charge control for the reasons highlighted in section 4. In addition, we propose to cross check our cost estimates to ensure that differences between the prices of, on the one hand, MPF and 2Mbit/s PPCs (hereafter, PPCs) and, on the other hand, wholesale ISDN30 are broadly consistent with differences in their incremental costs. We believe this will ensure that the choice between wholesale inputs (MPF, PPCs and wholesale ISDN30) that are used or can potentially be used to provide the same retail output (ISDN30 services) will not be distorted. This way we make sure that OCPs choose to supply end users using the wholesale inputs that result in the minimum cost of provision. This is the approach used in the current WLR and LLU proposed

controls[290], and has been supported by the Competition Commission (CC) in its recent determination in the WLR/LLU price control appeals[291].

A10.7 We recognize that from a technical perspective retail ISDN30 services could be provided using MPF and an OCP's network infrastructure. However, there are currently no OCPs using MPF to provide ISDN30 services ✂. Therefore, for the reasons highlighted below, we have undertaken only a high level cross-check of the LRIC differentials between MPF and wholesale ISDN30. On the other hand, we have carried out a more detailed analysis of the LRIC differentials between PPCs and wholesale ISDN30, given that PPCs are currently used to provide retail ISDN30 services.

Allocative and dynamic efficiency considerations

A10.8 In line with the CC determination in the WLR/LLU Appeal, our preliminary view is that there are no strong efficiency reasons for moving away from CCA FAC[292]. The CC did not consider that in setting prices, we had erred by adopting an approach that took greater account of productive efficiency considerations than allocative or dynamic efficiency considerations[293].We have proposed to use this same approach to set the next control on WLR and LLU charges. Similar considerations arise in the setting of the ISDN30 charge control since PPCs and wholesale ISDN30 are alternative wholesale inputs that are currently used to provide retail ISDN30 services. The choice between them would be distorted if the difference in their charges was less than the difference in their incremental costs. Such distortion could lead to inefficient outcomes, such as, for example, inefficient investments that could ultimately result in end users paying higher retail prices.

A10.9 However, there is an important difference between the ISDN30 charge control and the WLR and LLU controls. We are not currently reviewing the PPC charge control, whereas both WLR and LLU charges are being reviewed together. Therefore, we can only influence the difference between the wholesale ISDN30 and PPC charges by varying the former rather than by jointly setting both charges. In addition, we take as given the contribution to the recovery of BT's common costs made by PPCs. The PPC charge control was set using costs measured on a CCA FAC basis too, so using CCA FAC for the wholesale ISDN30 charge control is consistent with this, from the point of view of overall cost recovery.

A10.10 We have also considered whether we should give additional weight to dynamic efficiency when setting the charge control for wholesale ISDN30. In particular, we have assessed whether it could be justifiable to actively promote upstream competition by setting prices specifically to assist entry using PPCs to compete with wholesale ISDN30 at the retail level. For this purpose, we could have intentionally set prices for wholesale ISDN30 so that the price differential was greater than the

[290] http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

[291] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Determination, Case 1149/3/3/09, paragraph 3.9, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

[292] The CC was not persuaded by the argument that a price differential based on the LRIC+EPMU methodology would have been a good approximation to an economically efficient price differential. See Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Determination, Case 1149/3/3/09, para. 3.176, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

[293] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Determination, Case 1149/3/3/09, para. 3.176, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

LRIC difference between the two wholesale inputs. We recognize that one of the reasons for not imposing a charge control on wholesale ISDN30 in the past was the view that upstream competition using PPCs would act as a competitive constraint on its prices. However, as discussed in section 5, we have come to the conclusion that PPCs have been unable to constrain the prices of wholesale ISDN30 and that a charge control on wholesale ISDN30 prices is needed. In these circumstances, we have also concluded that the difference between the charges for ISDN30 and PPCs should move towards reflecting the underlying difference in costs rather than, for example, being set to give an additional incentive to use PPCs. However, we believe that we should not set prices which would favour the more downstream input (wholesale ISDN30), so we want the price difference to be *at least* as great as the difference in incremental costs.

A10.11 We believe that using CCA FAC to set wholesale ISDN30 charges is consistent with earlier decisions, which should help to provide investors confidence in the stability and predictability of the regulatory framework.

A10.12 For the reasons set out above, we propose to use CCA FAC as the basis for setting the ISDN30 charge control and to cross check our cost estimates to ensure that differences in the prices of PPCs and wholesale ISDN30 are broadly consistent with, and not less than, the differences in their incremental costs. The incremental cost differential analysis is described in the following sections.

We have not estimated the differential between wholesale ISDN30 and MPF

A10.13 As discussed above, we have only carried out a high level cross-check of the LRIC differentials between wholesale ISDN30 and MPF. The main reason for this is that there are currently no OCPs using MPF to provide ISDN30 services and, as far as we are aware ✂. We believe that the fact that there are currently no OCPs using MPF to supply ISDN30 may be explained by the significant fixed costs associated with establishing a point of presence at a BT exchange (e.g. ordering the space, installation and commissioning of equipment and backhaul circuits), which is likely to make provision of ISDN30 services using MPF relatively less attractive.

A10.14 We consider that MPF is only likely to be regarded as an option to supply ISDN30 where unbundling has already occurred for broadband and/or telephony. In contrast, provision of ISDN30 alone is very unlikely to drive investment in MPF, given that there are a relatively low number of ISDN30 circuits, even in city exchanges where demand for these services is mostly concentrated.

A10.15 In addition to the fixed costs involved in MPF, the distance between the local exchange and the customer premises also determines the costs of supply using MPF and, therefore, may limit the extent to which OCPs can make use of MPF to provide ISDN30. Where this distance is significant, up to three copper lines may be required to provide ISDN30 using MPF, increasing the total costs of provision.

A10.16 In Table A10.1 below we present the 2009/10 CCA FAC and LRIC costs of wholesale ISDN30 rental (for a circuit including eight channels) and the costs of an MPF rental (including three copper lines). We then calculate the cost and price differentials between these two forms of supply under the above conditions. We make the comparison assuming a circuit with eight channels, which is the minimum number of channels that customers can purchase from Openreach, as our analysis suggests that MPF is more likely to be a viable alternative for low capacity

installations. For higher capacities, PPCs are a more likely alternative to wholesale ISDN30.

Table A10.1 Wholesale ISDN30 and MPF cost and price differentials in 2009/10

	wholesale ISDN30 (8 channels)	MPF (3 lines)	Differential (wholesale ISDN30 – MPF)
CCA FAC cost	£798.61[294]	£256.47[295]	£542.14
LRIC cost	£✂[296]	£156.27[297]	£✂
Current prices	£1128.00[298]	£259.20[299]	£868.80
FAC vs. 2009/10 MPF price	£798.61[300]	£259.20[300]	£539.41

A10.17 As shown above, if we brought wholesale ISDN30 prices down to their CCA FAC level in 2009/10, the differences in the prices of ISDN30 and MPF rental (i.e. £539.41) would be significantly greater than the differences in their LRICs (i.e. £✂). The Table also shows that the costs involved in MPF rental are significantly lower than those of wholesale ISDN30 rental. In the case shown in Table A10.1, the LRIC costs of MPF rental are around ✂% of the ISDN30 LRIC costs. We believe that the fact that OCPs are currently not using MPF to supply ISDN30, when charges are much lower, shows that there are other cost elements, in addition to Openreach's rental prices, which determine OCPs' choice between these two wholesale inputs (as discussed above). It also suggests that the fact that price differentials have been above the difference in incremental costs has not in practice distorted investment decisions.

A10.18 In light of the above, we believe that the differences in the prices of wholesale ISDN30 and MPF rentals are likely to be at least as large as the differences in their LRICs when supplying ISDN30 services. As discussed above, we are also confident that our charge control proposals are unlikely to affect OCPs' choice between these

[294] In our base year 2009/10 the ISDN30 CCA FAC per channel per year, after all the relevant adjustments (as discussed below), is £99.834.
[295] In 2009/10 the CCA FAC for MPF rental was £85.49 per line per year, see BT's Regulatory Financial Statements, page 55, available at: http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2010/CurrentCostFinancialStatements2010.pdf.
[296] In our base year 2009/10 the ISDN30 LRIC per channel per year, after all relevant adjustments (discussed below), is ✂.
[297] In 2009/10 the LRIC for MPF rental was £52.09 per line per year, see BT's Regulatory Financial Statements, page 55, available at: http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2010/CurrentCostFinancialStatements2010.pdf.
[298] Current wholesale ISDN30 rental charge is £141.0 per channel.
[299] For most of the 2009/10 year the price of an MPF rental was £86.40 per line per year, see Openreach's price list, available at: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=totid5BwFmkf9vLcBITRyZF9loRxWIbIKK6V7YWmlYAlMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D.
[300] This is the price for eight wholesale ISDN30 channels if prices were set at the 2009/10 CCA FAC costs.

two wholesale inputs to a significant extent. Therefore, we do not think there is a need to conduct any further analysis of the differentials between wholesale ISDN30 and MPF.

Estimating the LRIC differentials between 2Mbit/s PPCs and wholesale ISDN30

Our approach to estimating the LRIC differentials

A10.19 Throughout our analysis we have concentrated on the *differences* in the LRICs of the two wholesale products and, therefore, we have ignored all the cost elements that are common to PPCs and wholesale ISDN30. Our approach has been:

- first, to identify and categorise the physical differences between the two products (for example, wholesale ISDN30 involves a 'line-card' and PPCs do not); and
- second, to consider the likely LRIC difference for each of the categories identified, drawing on the CCA FAC numbers and other sources where possible.

A10.20 In doing this, we have:

- relied on our Cost Forecast model CCA FAC estimates and BT's (unaudited) LRIC estimates to derive the LRIC differentials;
- assumed a thirty channel wholesale ISDN30 circuit as a benchmark for calculating the costs of wholesale ISDN30;
- assumed that both wholesale inputs are used to supply the same end user; and,
- assessed two scenarios in our calculation of the differentials, the first including what we believe are the most plausible assumptions (our 'base case scenario') and, the second, including the assumptions that result in the largest differentials (the 'conservative scenario').

A10.21 We deal with each of these issues in turn below.

We have used Openreach submissions for the Incremental Cost model to estimate the LRIC differentials

A10.22 In estimating the incremental cost differences between PPCs and wholesale ISDN30 we have not used the Cost Forecast model. The Cost Forecast model does not include all the relevant costs of PPCs because PPCs are sold by BT Wholesale rather than Openreach. The Cost Forecast model only includes the costs of "e-PPC" local ends, which are local end segments of PPCs that Openreach supplies to BT Wholesale as an input to PPCs. They comprise the digital bearer from the end-user premises to the local serving exchange, including the transmission equipment at either end of the circuit (i.e. the NTE at the customer premises and the LTE at the serving exchange).

A10.23 Therefore, Openreach has supplied cost data to enable us to compare wholesale ISDN30 and PPCs on a like with like basis. These data have been collated specially for this purpose and include PPC costs that are incurred by BT Wholesale together with equivalent costs incurred by Openreach in the case of wholesale ISDN30.

A10.24 Because e-PPC local ends are only one input to PPCs, there are several cost elements of a 2Mbit/s PPC that are not included in the e-PPC local end cost stack. These costs relate to activities that are provided by BT Wholesale and include:

- PPC product management and service management costs;
- PPC main link costs; and
- Point of handover (PoH) costs.

A10.25 We asked Openreach to provide estimates of those 2Mbit/s PPC costs that relate to activities carried out by BT Wholesale.

We have used a thirty channel circuit as the benchmark for calculating the costs of wholesale ISDN30

A10.26 In our incremental cost model the costs of e-PPCs are provided on a per bearer basis, whereas the model allocates costs of wholesale ISDN30 on a per channel basis. We assume that this reflects the underlying cost of the service in each case as well as the charging structure for each service. A 2Mbit/s PPC provides exactly thirty channels capacity. If a smaller number of channels are used, there is no saving in cost (or charges). Wholesale ISDN30 also provides up to thirty channels but in contrast, costs and charges rise and fall with the number of channels taken.

A10.27 We therefore calculate the difference in incremental costs assuming that thirty channels are used. This means that the comparison will be on a like-for-like basis. The cost differences we identify will then reflect the costs of the additional equipment or service levels associated with the more downstream service, wholesale ISDN30. If we assumed a lower number of channels, ISDN30 would inevitably tend to be the lower cost option and some of the cost differences would reflect the fact that, in effect, a smaller number of channels are supplied, as a 2Mbit/s PPC always provides capacity equal to thirty channels. We therefore compare prices and costs assuming thirty channels in each case.

We have assumed that both wholesale inputs are used to supply the same end user

A10.28 Some of the differences in the costs allocated to PPCs and wholesale ISDN30 simply reflect the fact that PPCs are mostly used to provide retail services other than ISDN30; PPCs are primarily intended to be used to provide retail leased lines. In fact, in 2009/10 BT provided 179,185 2Mbit/s local end PPCs and of these ✂. Different retail uses may be reflected, for example, in differences in the location of typical customers or average circuit lengths which can affect average costs.

A10.29 We want price differentials to reflect the LRIC differentials, so that, where OCPs' have a choice between two wholesale inputs that could be used to provide the same retail service (i.e. ISDN30), OCPs have an incentive to choose the one which minimises overall costs. Therefore, in order to compare the costs of both products on a like with like basis, we have not simply taken the cost data from BT's financial statements but have estimated what the costs would be if both wholesale inputs were used to supply the same customer. We have therefore excluded differences driven by the fact that PPCs are used by customers with different requirements or for services other than ISDN30.

A10.30 For example, PPCs and wholesale ISDN30 services can be supplied over copper or fibre. When providing a PPC or a wholesale ISDN30 circuit, OCPs' choice between

fibre and copper generally depends on the end user's requirements (rather than being a function of the wholesale input chosen in each case). As a result of the different requirements of the typical customers for PPCs (which are primarily used to supply retail leased lines) and wholesale ISDN30, both have on average a different copper to fibre ratio. In our model, some access network costs are allocated to both services on the basis of their average copper to fibre ratio (e.g. an ISDN30 cost component may be attributed a higher cost because on average a higher proportion of ISDN30 bearers use copper than is the case for PPCs).

A10.31 However, we consider that the choice of fibre or copper should be independent of the choice of wholesale input (i.e. ISDN30 or PPC) if, as we assume, the circuit is in either case used to supply ISDN30 services to a given retail customer. In other words, if copper is used when the service is supplied using wholesale ISDN30, then copper will also be used if the service is supplied using a 2Mbit/s PPC. Therefore, even if our model shows differences between the average costs of wholesale ISDN30 and 2Mbit/s PPCs resulting from differences in the average copper:fibre ratio, we exclude them because we consider that such differences would disappear if both products were used to supply the same end user and do not result from differences in their underlying incremental costs. This greatly simplifies our analysis.

A10.32 Additionally, in order to compare like with like, in the PPC cost stack we have only considered those cost elements that have an equivalent in wholesale ISDN30. For example, as discussed below, to provide ISDN30 services using PPCs, operators require a PoH and, for PPC users, PoH costs are recovered in separate PoH charges. However, wholesale ISDN30 prices do not recover costs relating to the PoH. Therefore, we have excluded the PoH costs from the LRIC differential analysis.

We have used BT's unaudited estimates to derive LRICs from our CCA FAC costs

A10.33 In relation to the LRIC difference, our estimates are taken from the (unaudited) LRIC figures in BT's 2009/10 regulatory accounts[301]. Our proposals are consistent with moving the differentials towards those implied by these LRIC estimates. In line with our previous WLR/LLU charge controls, we have not reviewed these LRIC figures and do not necessarily regard them as robust. However, we used the same approach in the WLR/LLU price control, which has since been reviewed by the CC under appeal.

A10.34 In one respect we depart from the methodology used in the WLR/LLU charge control. We are proposing to calculate the incremental cost differential using the costs of PPCs and wholesale ISDN30 in the base year (i.e. 2009/10). The approach followed in the WLR/LLU charge control is to compare the costs of both products at the end of the charge control (i.e. 2013/14). This is preferable, but is not practicable for the ISDN30 control because this price control review only deals with one of the wholesale inputs (ISDN30), while the existing charge control on PPCs will be in place until 2012. This means that, to compare charges at the end of the charge control we would have had to develop a forecast of PPC costs and volumes, which is beyond the scope of this review and would have introduced additional uncertainty into the analysis. This means that we necessarily base our analysis on the base year costs of both services. However we also carry out an analysis of the sensitivity of our results to changes in assumptions and the results of this give us some

[301] According to Openreach the cost estimates submitted to us are pure LRICs, with the only exception of some cost components relating to e-PPCs, which are DLRICs.

additional assurance that the charge differential resulting from our proposals will be at an appropriate level.

We have conducted a 'base case scenario' to derive the LRIC differentials and a 'conservative scenario' as a cross-check on our estimates

A10.35 When assessing the likely cost differentials between the two products, we have constructed two cost scenarios. In the first scenario, our 'base case scenario', we derive the LRIC differentials using what we believe are the more plausible assumptions on the likely direction and magnitude of the differentials. For example, we may consider that the differences in the costs shown by our model result from different allocation methods which do not reflect true differences in the underlying incremental costs of the two services and, therefore, assume that the differential is zero.

A10.36 Alternatively, we recognize that there are some uncertainties surrounding our estimates of the incremental cost differentials. These are mainly due to the fact that some of the PPC activities sit within BT Wholesale (whereas they all sit within Openreach in the case of wholesale ISDN30), as well as to the fact that both wholesale inputs are primarily used for different retail services and the differences in costs may reflect this, rather than differences in their underlying incremental costs (as discussed above). For this reason we have also developed a 'conservative scenario' in which we adopt the assumptions that result in the largest differentials between the two services. The objective of this is to understand if under this approach the differences in the prices between the two services are still at least as large as the differences in their incremental costs.

A10.37 After carrying out these two cost scenarios we have found that even in the case of the conservative scenario the differences in the prices of the two wholesale inputs are larger than the differences in their incremental costs[302]. For this reason we only report the results of our base case scenario here.

We have considered it proportionate to conduct only a high level cross-check on the LRIC differentials

A10.38 We note that PPCs represent only 12% of the total self-supplied channels and 3% of the total ISDN30 retail market. In this regard, our analysis has been guided by the principle of proportionality and, therefore, we have carried out only a *high level* assessment of the differences in LRICs between PPCs and wholesale ISDN30. We believe that the detail of the analysis conducted is sufficient for us to be relatively confident that the differences between the prices of both wholesale inputs are not less than the difference in their incremental costs.

The differences between the costs of wholesale ISDN30 and 2Mbit/s PPCs rentals

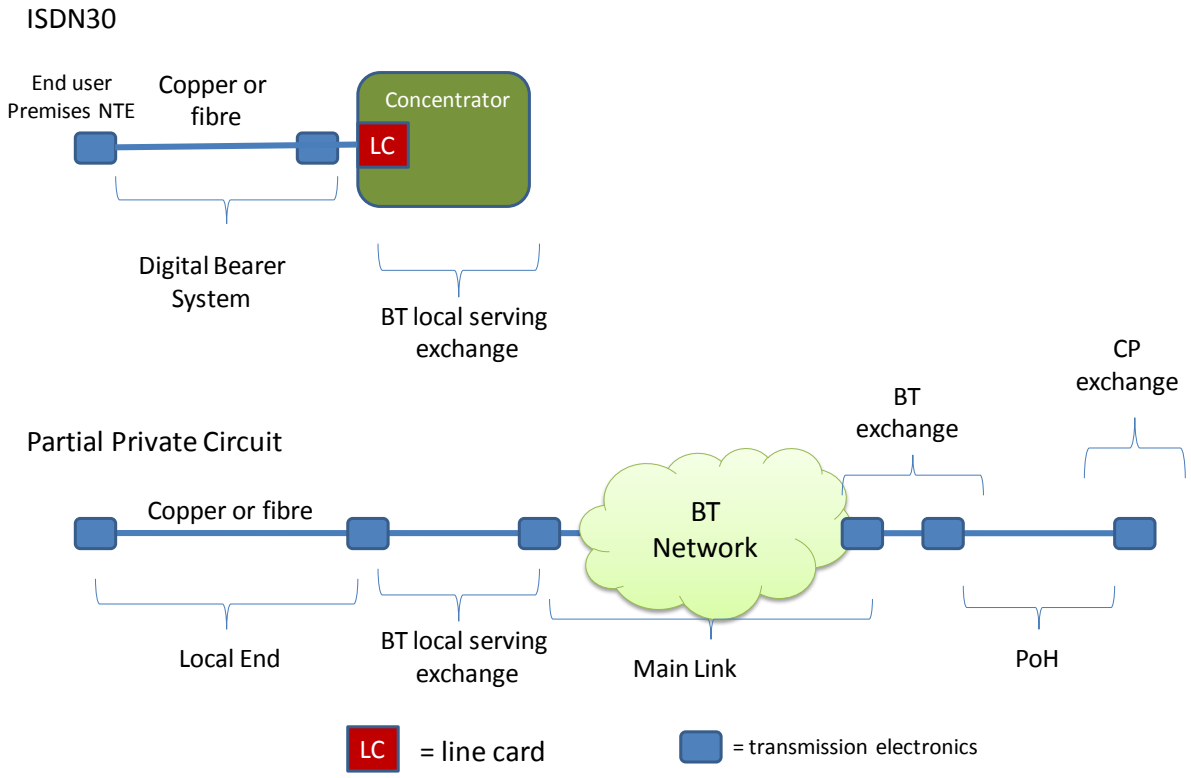
A10.39 In the rest of this section, we set out how we have estimated the LRIC differentials between 2Mbit/s PPCs and wholesale ISDN30. Our approach is to first identify and categorise the physical differences between the two products under the assumption

[302] In fact, in the case of the conservative scenario the ISDN30's 2009/10 FAC for connections and rentals were above the LRIC differentials by ✂% [more than 10%]. We note that we do not view the 'conservative scenario' as superior to our 'base case scenario'. To the contrary, we adopt the latter because we believe it is the most plausible scenario and conduct a second, most conservative scenario, just as a cross-check on our base case scenario.

that they are used to supply the same customer (for example, wholesale ISDN30 involves a 'line-card' and PPCs do not); and, second, to consider the likely LRIC difference for each of the cost categories identified, drawing on the CCA FAC numbers and the (unaudited) LRIC figures in BT's 2009/10 regulatory accounts.

A10.40 From the technical perspective, we understand that Openreach builds the ISDN30 digital bearer systems from the same components that it uses for e-PPC Local Ends. Therefore, wholesale ISDN30 and e-PPC Local Ends share a number of cost elements. The diagram below illustrates the components used to provide ISDN30 and 2Mbit/s PPCs.

Figure A10.1 ISDN30 and Partial Private Circuits



A10.41 The main network differences between the two are:

- ISDN30 uses a line-card and exchange concentrator, whereas PPCs do not;
- PPCs connect end-user premises to a remote OCP exchange. They therefore generally have a main link and a PoH in addition to the local end. ISDN30 circuits normally connect end-user premises to an exchange concentrator in the local serving exchange. They therefore have a digital bearer system that is equivalent to a PPC local end but generally do not include a main link or PoH.
- Backhaul circuits used to connect end-users to exchange concentrators located in adjacent exchanges. As explained in Annex 5, these are used in a small proportion of cases, typically where the serving exchange does not support ISDN30.
- The use of different ratios of copper and fibre access network cable, with around ✂% of ISDN30 circuits being provided over copper and only around ✂% in the case of PPCs; and

- the different access digital bearer systems they use, whilst ISDN30 and PPCs can be provided on the same digital line systems, ISDN30 tends to use smaller digital line systems (e.g. 2x1 or 4x2), whereas PPCs tend to use larger line systems (e.g. 4x2 and 16x2).

A10.42 BT has explained that the choice of transmission system used for digital bearer systems depends on a range of factors including customer preferences, whether other services are provided at the same location, the availability of fibre cable at or near customer premises and the availability of transmission systems at the serving exchange. Thus, in practice the differences in the cost stacks for cable and transmission components for ISDN30 and PPCs are likely to be driven by the fact that they are used to supply different sets of customers. For this reason, as discussed above, throughout our analysis we have considered that the cable and transmission system component costs for local end segments do not contribute to the LRIC differentials.

A10.43 Additionally, we have excluded the PoH segment of PPCs that is, the link between BT and an OCP's network, from the scope of our comparison. Wholesale ISDN30 charges do not recover any costs associated with a link between BT and the OCP's network, such as a PoH in the case of PPCs, the cost of which are also recovered in separate charges. For this reason we have excluded the PoH, thereby restricting our analysis of the differentials to the PPC local end and main link.

A10.44 In Table A10.2 we show the rental costs of providing a 2Mbit/s PPC and a 30 channels wholesale ISDN30 bearer on a LRIC basis.

Table A10.2 Estimate of LRIC differential between ISDN30 and 2Mbit/s PPC rentals

	2009/10 £	2009/10 £	Differential £
	ISDN30	**2Mbit/s PPC**	**ISDN30 – 2Mbit/s PPC**
Backhaul costs	✂	✂	✂
Local access network costs	✂	✂	✂
Line Test Equipment	✂	✂	✂
ISDN30 line-card	✂	✂	✂
Access network repair	✂	✂	✂
Product management	✂	✂	✂
Service centre costs	✂	✂	✂
Total LRIC	✂	✂	✂

A10.45 As shown in Table A10.2 above, we have excluded some of the differences in the LRIC costs of the two services on the basis that differences in these costs can be attributed to differences in network components and activities resulting from the fact that each wholesale input is typically used to supply retail customers with different service requirements (as discussed above in paragraphs A10.28 to A10.30). Table A10.2 above shows differences in the costs of wholesale ISDN30 and PPCs that we believe are only driven by differences in their incremental costs. Below we discuss our approach to assessing the likely cost differential between the two wholesale inputs and for each of the cost groups shown in Table A10.2 above.

Backhaul costs

A10.46 As discussed above a minority of ISDN30 circuits are connected to exchange concentrators located in remote exchanges over a backhaul link[303]. In the case of wholesale ISDN30, the backhaul costs in our model include the transmission costs attributed to ISDN30 for this linking circuit, including the transmission electronics equipment involved. Openreach has indicated that 14% of the exchanges used for ISDN30 incur these backhaul costs and that the average distance of these backhaul circuits is 4.3km (i.e. the average distance between local exchanges to which the end-user is connected and the exchange housing the exchange concentrator).

[303] These costs should not be confused with the links between the exchange concentrators and exchange processors where these are not co-located in the same building, rather than backhaul segments for ISDN30 lines which are not served from the local serving exchange.

A10.47 In contrast, no backhaul costs are included in the e-PPC cost stack in our model. The reason for this is that even if these ISDN30 backhaul costs have their equivalent in the distribution element of PPCs (i.e. the main link)[304], they relate to activities that sit with BT Wholesale. Under these circumstances, we have requested Openreach to provide the PPC costs that would be equivalent to the ISDN30 backhaul costs, including both backhaul electronics and backhaul fibre and duct costs. These costs are shown in Table A10.3 below.

Table A10.3 PPC main link costs equivalent to wholesale ISDN30 backhaul costs

	2Mbit/s PPC main link (£/link)	2Mbit/s PPC per km distribution (£/km)
Unit cost from Openreach cost stack	✂	✂
Adjustment for average Km distance[305]	✂	✂
Adjustment for exchanges incurring backhaul costs in ISDN30[306]	✂	✂
Adjustment to LRIC basis[307]	✂	✂

Note: The backhaul costs included in the table above exclude 21CN costs.

A10.48 The PPC main link costs from the Openreach cost stack have been adjusted to obtain figures on an equivalent basis to wholesale ISDN30 backhaul costs. In the case of ISDN30 only 14% of total bearers incur backhaul costs and the average length of backhaul circuits used is then 4.3km. Therefore we calculate the average cost of a PPC main link, given that in 14% of cases a main link 4.3km in length will be needed, and in the remaining 86% of cases no main link will be needed. We finally adjust the CCA FAC estimates to obtain these on a LRIC basis. As shown above, this results in a total LRIC cost of £✂[308] in the case of PPC backhaul costs, whereas the figure is equal to £✂ in the case of wholesale ISDN30.

A10.49 We believe that if the two wholesale inputs were used to supply the same end user, it could be assumed that the ISDN30 costs should be the same as the backhaul costs incurred when supplying using PPCs, given that they would effectively involve the same equipment inputs. However, the above data shows significant differences in the costs allocated to each service. We believe that this is likely to be due to differences in the routing of the backhaul circuits again reflecting differences in end use and customer location. Circuit routing depends on the availability of capacity between the two nodes that are being linked by the backhaul circuit in any particular case, and this is likely to be reflected in our cost stacks.

[304] The main link is a circuit segment that connects the BT local serving exchange to a BT main exchange where the PoH is located.
[305] We multiply the PPC backhaul distribution costs, which are on a Km basis, by the average distance of wholesale ISDN30 backhaul circuits (i.e. 4.3Km). This adjustment does not apply to the PPC main link costs (left column) because these costs are expressed on a circuit, rather than distance, basis.
[306] We adjust both costs to account for the fact that backhaul costs are only incurred in 14% of Openreach exchanges in the case of wholesale ISDN30. This adjustment applies to both costs (i.e. to the two columns).
[307] The PPC backhaul costs have a LRIC:FAC ratio of ✂ . We derive the LRIC costs by multiplying the CCA FAC costs by these LRIC:FAC ratio.
[308] This is the sum of £✂and £✂, as shown in the last row of Table A10.3.

A10.50 In light of this, we believe that backhaul costs should be the same for both services if we assumed that they connect the same two points in the network (i.e. if they are used to supply the same end user). Therefore, we have considered that the LRIC differentials for these costs should be £✂.

Local access network costs

A10.51 Local access network costs include costs relating to the access electronics equipment, access network ducts, access network cables (copper and fibre) and costs relating to the main distribution frame. Currently, the model allocates different costs to each service. On a LRIC basis these are equal to £✂ for wholesale ISDN30 and £✂ for PPCs. However, the majority of these differences are driven by the allocation method used by our model, in particular, the fact that the products use different proportions of copper and fibre. As discussed above, we believe that these differences are mainly driven by the end user requirements and, therefore, they would disappear if both wholesale inputs were used to supply the same end user. In light of this, we exclude these costs from the estimation of the LRIC differentials.

Line test equipment costs

A10.52 Line test equipment costs relate to the electronics equipment that supports line testing of both the PSTN and ISDN circuits. This equipment is only used for telephony services, hence, no costs are allocated to PPCs. We have therefore considered that these costs should contribute in full to the LRIC differentials (a differential of £✂).

Line-card costs

A10.53 Each ISDN30 circuit is connected to an ISDN30 line-card in the exchange concentrator. Line-card costs recover the costs associated with the line-card, the concentrator and other common assets in the local exchange. They represent an important input for wholesale ISDN30 but are not required for the provision of PPCs. The costs are therefore directly attributable to wholesale ISDN30 services.

A10.54 Following our approach in the WLR/LLU price controls, we have used the LRIC:FAC ratio for line-cards in BT's 2009/10 regulatory accounts and we have applied this to the CCA FAC figure for line-card costs in 2009/10 in our model. The LRIC:FAC ratio estimate for 20CN ISDN30 line-cards prepared by BT in its 2009/10 regulatory accounts is around ✂ of the CCA FAC figure. An important difference with WLR/LLU is that Openreach is currently not using any 21CN line-cards in the case of ISDN30 and has no plans to migrate ISDN30 to 21CN. Therefore, we have used the costs currently allocated to line-cards, which reflect the costs of the 20CN line-cards currently being used by Openreach.

A10.55 Openreach currently uses several types of line-cards for various versions of its System X and AXE10 exchange concentrators. All types of line-cards are no longer in manufacture and Openreach manages demand by re-using its existing stock. The age of BT's ISDN30 line-cards means that we need to be careful when using the figures in BT's current regulatory accounts for line-card costs, because BT may be using some fully depreciated equipment. This could mean that the accounting costs understate the true economic cost of providing voice services. As the CC has noted, there are two effects of Openreach continuing to use fully depreciated line-cards. First, if many of the line-cards being used are *fully depreciated*, the more recent CCA FAC figures for line-cards would tend to underestimate the LRIC as these

would make no allowance for the cost of capital or depreciation of these assets. Second, for those line-cards that have *not been fully depreciated*, because the economic life of the line-cards has been proved to exceed the length of time over which they were depreciated (which was ten years), historic CCA FAC figures may overstate the LRIC by depreciating the assets over too few years[309].

A10.56 However, we believe that in the case of ISDN30, because depreciation was last at a steady state level in ✂ and most line-cards are likely to have been fully depreciated[310], the first effect is likely to dominate the second effect. Consequently, we believe that the LRIC is likely to underestimate the true economic cost of the line-cards in a hypothetical ongoing network.[311] For this reason we have adjusted the LRIC costs of line-cards using the same uplift that we have applied in our Cost Forecast model. As described in Annex 6, we have adjusted the NRC/GRC ratio of ISDN30 line-cards to 47% to approximate their steady state level. This adjustment results in an increase of around ✂% in the ISDN30 line-card costs (relative to the initial value shown by our model). In this case, the LRIC differential for line-cards is equal to £✂.

Access network repair

A10.57 In terms of fault repair costs, the comparison of the LRIC estimates shows £✂ for wholesale ISDN30 and £✂ for PPCs. We believe that the differences in LRIC costs are not likely to be driven by differences in the repair costs of PPCs and wholesale ISDN30. Both services use the same equipment and, therefore, we would expect them to have similar repair costs. In the case of the equipment that they do not share, such as line-cards, the concentrator and common assets in exchanges, the repair costs for these assets are recovered through the line-card cost component and would already be accounted for in the cost differential for line-cards.

A10.58 In contrast, we believe that the differences in repair costs are mainly driven by the allocation of costs according to the different ratios of copper/fibre used by the two services and the different mixes of digital line systems. These differences are likely to be driven by the end users' requirements and, as discussed above, we believe that when the two wholesale inputs are used to supply the same end user these differences are likely to disappear. In light of the above, we assume no difference in the incremental costs of network repair.

Enhanced care and maintenance costs

A10.59 In terms of maintenance service levels, wholesale ISDN30 has recently been subject to Openreach's service harmonisation initiative[312]. Under the current arrangements, the Service Maintenance Level 2 is provided as a standard for wholesale ISDN30 and is included in the rental charge[313]. Customers can opt for

[309] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Determination, Case 1149/3/3/09, paragraph 3.138, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf

[310] As discussed in section 3, the NRC/GRC of ISDN30 line-cards is 8%.

[311] This might not be the case if the network was being rapidly run down, stocks of line-cards were sufficient to meet all future demand and they had no alternative use.

[312] See 'Maintenance Options Overview' at: http://www.openreach.co.uk/orpg/home/products/serviceproducts/serviceharmonisation/serviceharmonisation.do

[313] See 'Rental Product Options' at: http://www.openreach.co.uk/orpg/home/products/pricing/notificationDetails.do?data=ThQLPOgdo8c%2FpcQlNXj7BVoAzMfOCIw%2B7d4ELMHNgDf%2BdE2ASH3YBwU5Ud37NnywlmbMkfEWV9Hg%0A

two additional levels of enhanced care services, Level 3 and 4. As discussed in section 5, most ISDN30 customers use Level 2 and the costs of this basic level of care are recovered through the ISDN30 rental charges.

A10.60 The case of PPCs is similar to wholesale ISDN30. There are effectively three different maintenance levels: 'Regular Care', 'Enhanced Care' and 'Enhanced Care +'[314]. The 'Regular Care' option is provided as standard and is included in the PPC rental charge. It includes very similar levels of response and repair times to the ones included in wholesale ISDN30's maintenance Level 2, as shown in Table A10.4 below:

Table A10.4 Standard care service options for PPCs and wholesale ISDN30

	Operational hours	Response time	Target Repair Time
PPC – Regular Care	08:00 – 17:00 (except Sunday and bank holidays)	< 1 working day	< 2 working days
Wholesale ISDN30 – Service Maintenance Level 2	08:00 – 17:00 (except Sunday and bank holidays)	N/a	< 1 – 2 working days depending on time of fault report[315]

Source: BT Wholesale, PPC Product Handbook, available at http://www.btwholesale.com/pages/downloads/service_and_support/contractual_information/docs/ppcoffer/briefings/ppc_product_handbook_Issue_4_sept2010.pdf and Openreach, Maintenance Options Overview, available at http://www.openreach.co.uk/orpg/home/products/serviceproducts/serviceharmonisation/serviceharmonisation.do

A10.61 In light of the similarities between the characteristics of the standard levels of maintenance service between PPCs and wholesale ISDN30 (i.e. 'Regular Care' and 'Service Maintenance Level 2', respectively), we believe that the majority of OCPs purchasing PPCs to provide ISDN30 services are likely to opt for 'Regular Care' in the same way as they primarily use Service Maintenance Level 2 in the case of wholesale ISDN30 (as discussed in section 5). In light of this, and the fact that in both the PPC and wholesale ISDN30 case the costs associated with the standard care are recovered through rental charges, we are proposing to exclude enhanced care from the analysis of the LRIC differentials.

A10.62 Therefore, we consider that repair costs and maintenance services are unlikely to contribute significantly to the differences in incremental costs (given that PPCs and wholesale ISDN30 have similar repair costs and similar levels of maintenance services). Thus, we have not included any difference in our estimate of the LRIC for fault repair and maintenance costs.

S5od5xPk5mMrG2JXeytL6pFJZpTLM42nMTEF%2BKjWmexJt5mYlgMVVCBTHUk%2FAkGGPXhiPyurwQ%3D%3D

[314] See PPC's Product Handbook http://www.btwholesale.com/pages/downloads/service_and_support/contractual_information/docs/ppcoffer/briefings/ppc_product_handbook_Issue_4_sept2010.pdf and PPC Circuit Rental Charges price list B8.03 at: http://www.btwholesale.com/pages/cmsjsps/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/cpl_browsable_sections/cpl_browsable_sectionb_8.jsp

[315] Under the service description, Openreach states that faults are repaired by the end of the next working day (i.e. 23:59 pm of the next working day), which may result in one to two working days depending on the time at which the fault is reported.

Product management costs

A10.63 In relation to the product management functions, these costs relate to activities such as pricing, regulatory affairs, account management and portfolio strategy. We would not expect the differences between the two services to be very significant and, in fact, the LRIC is equal to £✂ in the case of wholesale ISDN30 and £✂ in the case of PPCs. Differences in the average incremental costs of each service could be driven by the fact that BT supplies a much larger portfolio of PPC services than of wholesale ISDN30 services (e.g. they include PPCs of different bandwidth). However, if we compared 2Mbit/s PPCs to wholesale ISDN30 for a given hypothetical user, we believe most of these differences would disappear. Therefore, we have decided to exclude these costs from the incremental cost differences.

Assurance service centre costs

A10.64 Under this cost component we include differences in LRICs that are due to differences between service centre costs. These service centre costs relate mostly to activities associated with fault handling[316]. We have first adjusted the PPC assurance costs to account for the fact that these costs relate to fault handling over the entire PPC circuit (i.e. they also include fault handling over the backhaul and core of the circuit, which are not included in full in the case of the ISDN30 assurance costs).To do this, Openreach has provided to us spot rate data on the number of faults occurring at different segments of its network. As shown in Table A10.5 below, around 72% of PPC faults occur in segments of the network that are also used for ISDN30 (i.e. customer, access network, a reasonable share of backhaul/core and other).[317] Therefore, we are proposing to account for only 72% of the total PPC assurance costs in our model.

[316] Examples of the type of activities that drive these costs are: fault reception and fault diagnosis – answering customer calls, creating a fault record and an initial diagnosis; dispatch of field and exchange based technicians; Monitoring fault repair process and providing progress updates to the customer; escalation of problems when repair is exceeding expected time; final testing to prove that fault is cleared and closing of the fault record.

[317] We have first adjusted the share of faults occurring in the backhaul and core segments of BT's network to account for the fact that only 14% of ISDN30 circuits incur backhaul costs, Second, a ✂ faults that are reported but are subsequently 'not found or right when tested'. We have assumed that these should be broadly similar between PPCs and ISDN30 (given that they use similar equipment). We have allocated this type of faults to the network segments by assuming that they would be shared across the different network segments in proportion to the faults reported in these segments (e.g. if 30% of the total faults are reported in the customer segment, then we assume that a 30% of the faults 'not found or right when tested' would relate to the customer segment).

Table A10.5 Spot rate data on the distribution of PPC faults over BT's network (%)

	Total	After adjustment
Customer	✂	✂
Backhaul and core	✂	✂
Access network	✂	✂
Other	✂	✂
Total	100.00%	71.91%

A10.65 Even after the above adjustments, we obtain a LRIC cost that is higher for PPCs (£✂) than for wholesale ISDN30 (£✂). We do not consider it is clear directionally which of wholesale ISDN30 and PPCs should have higher service centre costs on a LRIC basis. The analysis is further complicated by the fact that these costs sit in BT Wholesale for PPCs and in Openreach for wholesale ISDN30.

A10.66 In principle, we believe that ISDN30 should have higher assurance costs than PPCs because they would typically involve a higher number of faults, relating to their additional equipment when compared to PPCs (e.g. the exchange concentrator, the line-card or the NTE1a). We have requested BT to provide information on the number of faults on 2Mbit/s PPCs to compare them to wholesale ISDN30. Unfortunately, BT does no longer supply this information and we have not been able to assess whether the difference in the LRICs may be driven by this.

A10.67 In light of the above, we have adopted a cautious approach and we have not decreased the differential by the amount shown by the differentials in our model (i.e. we have assumed a zero differential for these activities).

The differences between the costs of wholesale ISDN30 and 2Mbit/s PPCs connections

A10.68 We have followed a similar approach to estimate the likely LRIC differentials between the connection costs of PPCs and wholesale ISDN30. In this case, the differences in costs are mainly driven by the different service management costs and the provision costs of the two wholesale inputs. Table A10.6 below shows the LRIC differentials between the connection of a 2Mbit/s PPC and a 30 channels wholesale ISDN30 bearer under the assumptions considered.

Table A10.6 Estimate of LRIC differential between ISDN30 and 2Mbit/s PPC connections

	2009/10 £	2009/10 £	Differential £
	ISDN30	**2Mbit/s PPC**	**ISDN30 – 2Mbit/s PPC**
Routing and records	✂	✂	✂
Connection	✂	✂	✂
Product management	✂	✂	✂
Service centre costs	✂	✂	✂
Computing	✂	✂	✂
Total LRIC	✂	✂	✂

A10.69 As in the case of rentals, some of the LRIC differences have been excluded on the basis that differences in these costs only reflect the fact that the two products are used to supply different types of customers. We discuss our approach for each cost component shown in Table A10.6 in turn below.

Routing and records

A10.70 Routing and records includes costs related to the allocation and recording of circuit routings in BT's access network. The LRIC costs for wholesale ISDN30 are £✂ and £✂ for PPCs. These differences are mostly driven by the differences in the mix of copper/fibre as well as in the digital bearer systems used by the two services. Therefore, we assume that the differential is likely to be zero.

Connection costs

A10.71 Connection costs include costs associated with the provision, cessation and rearrangement of ISDN30 and PPC circuits. These costs reflect works such as testing, line up of circuits, updating records, labelling equipment for onward connection and connecting transmission equipment at the specified bit rate.

A10.72 In the case of PPCs, connection costs relate to activities undertaken in both the local end and the main link, whereas they only relate to the local end network in the case of ISDN30. In order to adjust the PPC costs to a comparable basis with the wholesale ISDN30 connection costs, we have requested to Openreach a distribution of the PPC connection costs over the different network segments of the PPC. However, Openreach has been unable to provide this disaggregation of the PPC connection costs. Instead, Openreach has been able to provide us a distribution of the service management costs ('SMC') by the network segment that generates them. We use this information to adjust the PPC SMC costs to a comparable basis to ISDN30 (as described below). We use this information as a proxy for the distribution of the PPC connection costs by network segment.

A10.73 The allocation of the PPC SMC costs by network segment is shown in Table A10.7.

Table A10.7 Allocation of SMC costs by network segment (%)

	Total	Adjusted
Local end	✂	✂
Main link equipment	✂	✂
Main link distribution	✂	✂
Main link trunk	✂	✂
Point of handover	✂	✂
Total	100%	✂

A10.74 To adjust the LRIC estimates of the PPCs' connection costs in our model we have taken into account only the share of SMC costs relating to local ends and a ✂% of the share of costs relating to the main link equipment and distribution (for the same reasons as in the case of backhaul costs discussed above). We have not included trunk or PoH costs, as these have no equivalent in the wholesale ISDN30 cost stack. In other words, we have considered ✂ [around 50%] of the total PPC connection costs given by our model.

A10.75 After these adjustments, the LRIC costs allocated to these services are £✂ for wholesale ISDN30 and £✂ for PPCs. We believe that connection costs should be higher in the case of ISDN30 than PPCs, given that the former includes additional costs relating mostly to the connection to the concentrator. We have therefore included the £✂ LRIC differential.

Product management

A10.76 As in the case of rentals, we would not expect sales and product management costs to be significantly different between the two wholesale products if we compared only 2Mbit/s PPCs (rather than the entire portfolio of leased lines) and wholesale ISDN30. The LRIC costs for this component are £✂ for wholesale ISDN30 and £✂ for PPCs. Due to the negative differential we have assumed that the LRIC differentials between the two products are zero.

Service management centre costs and computing

A10.77 The differences in the service management centre (SMC) costs and computing are two of the main drivers of the differences in the LRICs of wholesale ISDN30 and PPCs connection. These costs relate to the SMC costs dealing with the provision of wholesale ISDN30 and PPC circuits and, in the case of the computing cost component, to the systems and development costs used by these service centres in the provision of both wholesale inputs[318].

[318] In the case of connections, these services include: giving progress reports to customers; arranging site access for technicians at customer premises; monitoring progress of work; allocating field

A10.78 As in the case of rentals, these costs relate to the provision of the entire PPC circuit, including the local end and the main link. Instead, the service centre costs relate mainly to the access network in the case of ISDN30 (with only 14% of circuits incurring backhaul costs). To adjust the PPC SMC costs we have followed the same approach described in the case of PPC connection costs (paragraphs A10.71to A10.73 above).

A10.79 After these adjustments, the LRIC costs allocated to wholesale ISDN30 for these activities are £✂ and £✂ for SMC and computing costs, respectively. In the case of PPCs the LRIC costs are £✂ and £✂ for SMC costs and computing, respectively. Because ISDN30 involves the provision of the ISDN30 service in addition to the 2Mbit/s bearer included in the PPC, we consider that the overall provision costs should be higher for ISDN30, as shown by the LRIC differentials in both cases. Therefore, we have included the difference in the LRICs shown by our model, equalling £✂ for SMC costs and £✂ for computing.

Tests on the LRIC differentials

A10.80 As discussed above, the main objective of the incremental cost analysis is to ensure that the differences in the prices of PPCs and wholesale ISDN30 are at least as large as the differences in their incremental costs. For this purpose, we have used the differentials estimated above and the current prices of a 2Mbit/s PPC to derive the price for wholesale ISDN30 that would be reflective of the LRIC differentials.

A10.81 In the case of the 2Mbit/s PPC prices, we have used the charges shown in Table A10.8 below and have adjusted to a basis that is comparable to ISDN30.

resources; coordinating activities with other departments; escalating problems and service testing once installation work is complete.

Table A10.8 PPC prices used in the comparison of the differentials with wholesale ISDN30

	Prices	Adjustments		
	2009/10	Rentals	Connections	Rentals + Connections
Local end (£/circuit)[319]	627.25	627.25	N/a	627.25
Main link (£/circuit)[320]	458.47	64.05	N/a	64.05
Terminating segment (£/km)[321]	51.57	30.88	N/a	30.88
PPC connection (£/circuit)[322]	1864.54	N/a	✂	✂
Total PPC price[323]	N/a	722.18	✂	✂

A10.82 As discussed above, we are proposing to compare the price and cost differentials in our base year 2009/10. Therefore, we have compared the current PPC prices in Table A10.8 to the wholesale ISDN30 connection and rental FACs in 2009/10. We show this in Table A10.9 below.

[319] The local end fixed circuit charge is considered in full.
[320] The main link fixed circuit charge is multiplied by 14% to account for the fact that only 14% of ISDN30 circuits incur backhaul costs.
[321] The terminating per Km charge is first multiplied by 14%, for the same reasons as above, and then by 4.3Km, the average distance of wholesale ISDN30 backhaul circuits.
[322] The PPC connection charge is multiplied by the share of SMC costs that relate to network segments that have an equivalent in wholesale ISDN30, as shown in Table A10.7 above.
[323] This is the sum of the above rows in each case.

Table A10.9 Price differentials between wholesale ISDN30 and PPCs in 2009/10 (£/circuit)

		Rentals	Connections	Rentals + Connections
1	Wholesale ISDN30 FAC	2,994.80	1,268.51	4,263.30
2	Total PPC price	✂	✂	✂
3	LRIC differential	✂	✂	✂
4	PPC price + differential (2+3)[324]	✂	✂	✂
5	Difference (1 – 4)[325]	✂	✂	✂
6	**Percentage difference (5/1)[326]**	**✂%**	**✂%**	**✂%**

A10.83 The table above shows in row five, the difference between the wholesale ISDN30 price that would exactly reflect the estimated LRIC differentials (row 4, above) and the wholesale ISDN30 FACs (row 1, above). It then expresses this difference as a share of the wholesale ISDN30 FACs. A positive (negative) sign implies that at current ISDN30 FACs the differences in the prices of the two inputs are larger (smaller) than the LRIC differentials.

A10.84 As shown above, when taken together, the difference in the proposed charges for connections and rentals are broadly in line with the differences in the LRICs of both wholesale inputs (with differences between the two of ✂ [more than 20%]). If taken on an individual service basis, the disparity between the differences in prices and LRICs is more significant and is negative in the case of connections.

A10.85 However, we believe that in the case of the incremental cost differential analysis, the relevant benchmark should be the aggregate rental and connection charges, rather than the prices and costs of each service individually. This is because we think some flexibility to vary relative connection and rental prices is desirable[327], whereas setting the differentials of both services separately equal to the LRIC would effectively tie the pricing structure of one product to that of the other, and that would not be appropriate. It is also likely to be unnecessary, since the choice between the two wholesale inputs will not depend on either connection or rentals alone, but on the aggregate charges. This is of course without prejudice to the possibility that an excessive charge for connections or rentals could be harmful in itself and hence contrary to cost orientation.

A10.86 In addition to the assessment of the price differentials in the base year of the charge control (2009/10), we have conducted a high level cross-check on the differentials

[324] The sum of the PPC price and the LRIC differential between wholesale ISDN30 and PPCs. This is the wholesale ISDN30 that would exactly reflect our estimated LRIC differentials between the two services.
[325] The difference between the wholesale ISDN30 FACs in 2009/10 and the wholesale ISDN30 charges that would exactly reflect our estimated LRIC differentials between the two services.
[326] Percentage difference between the wholesale ISDN30 FACs in 2009/10 and the estimated LRIC-reflecting prices.
[327] We note that this is one of the reasons why we are proposing to set a combined basket for connections and rentals.

in the last year of the charge control (2013/14). Only a high-level check is possible because we cannot be certain how prices, in particular, will change up to 2013/14, given the flexibility BT has over the prices of individual services within the PPC basket. For this purpose we have estimated, on the one hand, the likely prices of ISDN30 and PPCs in 2013/14 and, on the other hand, any change in the difference in the incremental costs of both services by 2013/14 on the basis of reasonable assumptions.

A10.87 In relation to ISDN30 prices, we have used the same approach as we have used in our volumes forecast, described in paragraph A8.40. However, the volumes used to derive the prior year revenue weight are those obtained from the Stage 2 volumes forecast (rather than the Stage 1 volumes forecast used to derive the impact of our charge control proposals on volumes). For the 2013/14 PPC prices we have estimated an average of the two scenarios used in the Switching model (the 'High' and 'Low' PPC price scenarios described in paragraphs A9.47 to A9.48).[328]

A10.88 To estimate the incremental cost differentials for the rental service, we have adopted an approach that is consistent with our calculation of the differentials in the base year. We first identify the additional items of equipment supplied with wholesale ISDN30, that is, the line-card and line test equipment (which are the only two cost elements specific to ISDN30). We then consider the change in the cost of these items projected by the ISDN30 Cost Forecast model over the period to 2013/14.

A10.89 In the case of connections, we consider that the differences in the incremental costs of the two services are not driven by equipment that is specific to ISDN30 and, instead, result from differences in the costs of activities that are common to both services. In this case, due to the fact that we lack an appropriate projection of the costs of PPCs to 2013/14 (as discussed in paragraph A10.34) we have assumed that the differential would change in line with the variation of the ISDN30 relevant costs in the Cost Forecast model. In other words, we have assumed that the 2013/14 incremental cost differential between ISDN30 and PPCs would be equal to their differential in 2009/10, increased by the percentage variation in the relevant costs of ISDN30 from 2009/10 to 2013/14. This seems reasonable, given the underlying similarity between the activities involved in ISDN30 and PPC connections.

A10.90 Table A10.10 shows the incremental cost differentials between the two services in 2013/14 estimated using the approach described above.

[328] The 'Low PPC price' scenario assumes that individual prices will increase annually by the maximum permitted by the price cap on the average charge of the basket in the LLCC. The 'High PPC price' scenario assumes annual price increases equal to the safeguard caps on each individual charge.

Table A10.10 Price differentials between wholesale ISDN30 and PPCs in 2013/14 (£/circuit)

		Rentals	Connections	Rentals + Connections
1	Wholesale ISDN30 price	2,971.18	1,413.81	4,384.98
2	Total PPC price	✂	✂	✂
3	LRIC differential[329]	✂	✂	✂
4	PPC price + differential (2+3)[330]	✂	✂	✂
5	Difference (1 – 4)[331]	✂	✂	✂
6	**Percentage difference (5/1)[332]**	✂%	✂%	✂%

A10.91 As shown above, we estimate that the difference in the charges for connections and rentals are likely to be larger than the differences in the LRICs of both wholesale inputs by ✂% [more than 30%].

A10.92 Additionally, we note that we have not annualised the PPC and wholesale ISDN30 connection charges and costs. If we had done this over a reasonable average customer lifetime this would have given less weight to connections and more to the rental differential, resulting in a larger difference between the price differential and the incremental cost differential. In other words, we have adopted a conservative approach in estimating the differentials and it is likely that the difference between the prices and the differentials would be larger than the ones shown in Table A10.9 and Table A10.10 above.

A10.93 In light of the above, we believe we can be confident that under our current charge control proposals the differences in the prices of wholesale ISDN30 are likely to be broadly in line with the differences in their incremental costs. Importantly, we believe the above shows with a significant degree of confidence that the differences in the prices of the wholesale inputs is likely to be at least as large as the differences in LRICs. In light of this, we continue to regard CCA FAC as being a reasonable basis for informing the setting of charges.

[329] The LRIC differentials discussed above.
[330] The sum of the PPC price and the LRIC differential between wholesale ISDN30 and PPCs. This is the wholesale ISDN30 that would exactly reflect our estimated LRIC differentials between the two services.
[331] The difference between the wholesale ISDN30 FACs in 2009/10 and the wholesale ISDN30 charges that would exactly reflect our estimated LRIC differentials between the two services.
[332] Percentage difference between the wholesale ISDN30 FACs in 2009/10 and the estimated LRIC-reflecting prices.

Annex 11

Ancillary Services

Introduction

A11.1 In the table below we have listed all ancillary services relating to the provision of wholesale ISDN30 services. As discussed in section 5, we propose each DDI charge is subject to a safe-guard cap of RPI-0%, while the remainder of ancillary charges are subject to the fair and reasonable pricing provision.

Table A11.1 Ancillary services for wholesale ISDN30 services

	Ancillary service
1	Conversion from wholesale ISDN30 DASS to ISDN30e for transfer from any CP where a conversion is ordered at the same time as the transfer: per channel (up to and including 60 channels); 61 or more channels
2	DDI connection charges: planning Charge per DDI Installation or Change to Numbers at a DDI Installation
3	DDI connection charges: per DDI Number at a DDI Installation (New orders can only be ordered in blocks of 10 or as a single DDI number).
4	Rental Charge per number at a DDI installation (DDI rental charges apply to all numbers within the ranges provided.)
5	Reconfiguration – 0 to 15 channels; 16 to 30 channels; 31 to 60 channels; 61 and over
6	Standby power – option 1(a) 4x2 and 1x2 integral batteries; option 1(b) 16x2 battery pack and 1x2 SDH access; option 2 standalone battery
7	Business continuity services (for WLR3 only) - Wholesale ISDN30 Out Of Area per 2M Bit/s Bearer
8	Business continuity services (for WLR3 only) - ISDN30 site assurance (Option 1). For each Wholesale ISDN30 channel at the assured site associated with the telephone number whose calls are to be diverted; ISDN30 site assurance (Ooption 2). For each Wholesale ISDN30 2 Mbit/s transmission bearer at both the main and the assured site(s) associated with the telephone number whose calls are to be diverted; DDI Dual Parenting per DDI number range (minimum entry level 1000 DDI's and in blocks of 1000) Charged per Main Billing Number
9	Cancellation charges for orders cancelled before the customer confirmed date
10	ISDN30 DASS Customer Controlled Call Barring
11	ISDN30 DASS Customer Controlled Channel Busying
12	ISDN30 DASS Customer Controlled Diversion
13	ISDN30 DASS Selective Outgoing Call Barring - All calls (permits 999 & 112 access)
14	ISDN30 DASS Selective Outgoing Call Barring - International & Premium Rate Services (permits 999 & 112 access)

15	ISDN30 DASS Selective Outgoing Call Barring - National, International & Premium Rate Services (permits 999 & 112 access)
16	ISDN30 DASS Selective Outgoing Call Barring - Operator Controlled calls (permits 999 & 112 access)
17	ISDN30 DASS Selective Outgoing Call Barring - International, Premium Rate Services & Operator calls (permits 999 & 112 access)
18	ISDN30 DASS Selective Outgoing Call Barring - Supplementary Services
19	ISDN30 DASS Administration Provided Basic Diversion
20	ISDN30 DASS Administration Provided Diversion on Engaged/Failure of BT bearer
21	ISDN30 DASS Administration Provided Diversion on No Reply
22	ISDN30 DASS Calling Line Identity Presentation
23	ISDN30 DASS Calling Line Identity Restriction
24	ISDN30 DASS Connected Line Identity Restriction
25	ISDN30 DASS Permanent Outgoing Calls Barred
26	ISDN30 DASS Permanent Incoming Calls Barred
27	ISDN30 DASS Sub Addressing - 6 Octet
28	ISDN30 DASS Presentation Number
29	ISDN30e Selective Outgoing Call Barring - All calls (permits 999 & 112 access)
30	ISDN30e Selective Outgoing Call Barring - International & Premium Rate Services (permits 999 & 112 access)
31	ISDN30e Selective Outgoing Call Barring - National, International & Premium Rate Services (permits 999 & 112 access)
32	ISDN30e Selective Outgoing Call Barring - Operator Controlled calls (permits 999 & 112 access)
33	ISDN30e Selective Outgoing Call Barring - International, Premium Rate Services & Operator calls (permits 999 & 112 access)
34	ISDN30e Administration Provided Call Forward of Voice & Data Calls on Busy
35	ISDN30e Administration Provided Call Forward of Voice & Data Calls on No Reply
36	ISDN30e Administration Provided Call Forward of Voice & Data Calls on Unconditional
37	ISDN30e Calling Line Identity Presentation
38	ISDN30e Connected Line Identity Presentation
39	ISDN30e Connected Line Identity Restriction

40	ISDN30e Permanent Outgoing Calls Barred
41	ISDN30e Permanent Incoming Calls Barred
42	ISDN30e 20 Octet Sub Addressing
43	ISDN30e Customer Controlled Call Forwarding
44	ISDN30e Call Deflection
45	ISDN30e Presentation Number
46	Caller Redirect (CNI) - One Months Service Per number
47	Caller Redirect (CNI) - Quarterly (or part thereof) Per Number
48	DDI Caller Redirect - Connection charge per installation, Rental is per consecutive 10 number DDI block (or part thereof)
49	Pre-validation of Transfer Order for Wholesale ISDN30 installation types

Annex 12

Legal Instruments

PART 1 – PROPOSED SETTING OF AND REVOCATION OF SMP CONDITIONS

NOTIFICATION OF PROPOSALS UNDER SECTION 48(2) OF THE COMMUNICATIONS ACT 2003

Proposals for the setting of and revocation of SMP services conditions to be imposed upon BT as a result of the proposed market power determinations made by Ofcom in its Review of retail and wholesale ISDN30 services as published on 20 August 2010.

Background

1. On 28 November 2003, the Director General of Telecommunications ("The Director") published a document entitled *Review of the fixed narrowband line, call origination, conveyance and transit markets*[333] ('the 2003 Wholesale Statement').

2. In the 2003 Wholesale Statement the Director set out his decisions on market definitions, market analyses and the setting, where appropriate, of Significant Market Power ('SMP') conditions for the markets under review including the markets for wholesale ISDN30 exchange line services.

3. On 29 December 2003, Ofcom took over the functions and responsibilities under the Communications Act 2003 relating to the EC Communications directives from The Director.

4. On 19 March 2009, Ofcom published its consultation entitled a *Review of the fixed narrowband services wholesale markets : Consultation on the proposed markets, market power determinations and remedies* [334] ('the 2009 Wholesale Consultation') on proposals reviewing market definitions, market analyses, and where appropriate, the setting of SMP conditions. The 2009 Wholesale Consultation proposed, inter alia, a market for wholesale ISDN30 exchange line services for the UK excluding the Hull Area, that BT had SMP in that market, and that appropriate SMP conditions, including cost orientation, should be imposed on BT as person having SMP.

5. On 15 September 2009, Ofcom published a statement and further consultation entitled *Review of the fixed narrowband services wholesale markets: Statement on the markets, market power determinations and remedies including further consultation*[335] ('the 2009 Wholesale Statement').

6. Having given careful consideration to every representation about the proposals made in relation to the wholesale ISDN30 market, Ofcom considered it appropriate to review

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[333] *Review of the fixed narrowband wholesale exchange line, call origination, conveyance and transit markets,* 28 Nov 2003
http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/fix_narrow_retail0803.pdf

[334] *Review of the fixed narrowband services wholesale markets,* 19 March 2009
http://www.ofcom.org.uk/consult/condocs/review_wholesale/

[335] *Review of the fixed narrowband services wholesale markets,* 15 September 2009
http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf

its proposals in relation to that market and confirmed in the 2009 Wholesale Statement that no decisions had been taken in relation to wholesale ISDN30 and a further review would be conducted.

7. On 4 May 2010, Ofcom published a consultation entitled *Review of the retail and wholesale ISDN30 markets*[336] ('the Market Review consultation'), consulting on proposals made in relation to the ISDN30 markets identified at the wholesale and retail levels. The Market Review consultation proposed, inter alia, that a charge control would be an appropriate SMP condition to impose at the wholesale level, but the setting of such a condition should be subject to separate consultation.

8. On 20 August 2010, Ofcom published a statement entitled *Review of the retail and wholesale ISDN30 markets*[337] ('the Market Review'), setting out its decisions made in relation to the ISDN30 markets.

9. The Market Review set out our conclusions that BT held SMP in the market for wholesale ISDN30 exchange line services for the UK excluding the Hull Area and it was appropriate to impose a number of SMP remedies on BT. It also concluded that, on the evidence then available, a price control would be an appropriate remedy to impose, but that the imposition of such a remedy should be considered under a separate review which would fully review the costs associated with the provision of wholesale ISDN30 services.

10. This consultation now makes proposals for the implementation of a charge control under the authority of the market analysis undertaken and notified under the Market Review.

Proposals

Proposals to set SMP Conditions

11. Ofcom hereby proposes, in accordance with section 48(2) of the Communications Act 2003, to set SMP service condition AAA(IS)4A, in relation to the market "wholesale ISDN30 exchange line services" as identified in the Market Review.

12. The proposed SMP condition AAA(IS)4A is set out in Schedule 1 to this Notification, and shall have effect from 28 days after the publication of any Notification under section 48(1) of the Act adopting the proposal set out in paragraph 11 above.

13. The effect of, and Ofcom's reasons for making, the proposals to set the SMP conditions set out in Schedule 1 to this Notification are contained in Sections 5 and 6 of the consultation document accompanying this Notification.

Proposals to revoke SMP Conditions

14. Ofcom hereby also proposes, to revoke SMP Service Condition AAA(IS)4 as set in the Notification to the Market Review statement.

15. The proposed revocation set out at paragraph 14 above, would only take effect on the coming into force of proposed condition AAA(IS)4A following publication of any

[336] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/summary/isbn30.pdf

[337] http://stakeholders.ofcom.org.uk/binaries/consultations/isdn30/statement/statement.pdf

Notification under section 48(1) of the Act adopting that proposal as set out in paragraph 11 above.

16. The effect of, and Ofcom's reasons for making, the proposals to revoke SMP condition AAA(IS)4 are contained in Section 6 of the consultation document accompanying this Notification.

Ofcom's duties and legal tests

17. In considering whether to make the proposals set out in this Notification, Ofcom are proposing SMP conditions by reference to the proposed market power determinations made in relation to the relevant services market made in the Notification to the Market Review statement. Further Ofcom consider that the proposed new SMP condition referred to in paragraph 11 of this Notification and the proposed revocation of the SMP condition referred to in paragraph 14 of the Notification comply with the requirements of sections 45 to 47, 87 and 88 of the Act as appropriate and relevant to each of those SMP service conditions.

18. In making all of the proposals referred to in paragraphs 11 to 14 of this Notification, Ofcom has considered and acted in accordance with its general duties set out in section 3 of the Act and the six Community requirements in section 4 of the Act.

Making representations

19. Representations may be made to Ofcom about any of the proposals set out in this Notification and the accompanying explanatory statement by no later than **10 June 2011.**

20. Copies of this Notification and the accompanying explanatory statement have been sent to the Secretary of State for Business, Enterprise and Regulatory Reform in accordance with section 50(1)(a) of the Act, as well as the European Commission and to the regulatory authorities of every other member State in accordance with section 50(3) of the Act.

Interpretation

21. Save for references made to the identified wholesale ISDN30 exchange line services market in the Notification as set out in the Market Review statement and except as otherwise defined in paragraph 22 of this Notification, words or expressions used shall have the same meaning as they have been ascribed in the Act.

22. In this Notification:

(a) **"BT"** means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006;

(b) **"The Act"** means the Communications Act 2003 c21

(c) **"the Market Review"** means the statement entitled **"**entitled *Review of the retail and wholesale ISDN30 markets"* and its accompanying Notification published by Ofcom on 20 August 2010.

23. For the purpose of interpreting this Notification—

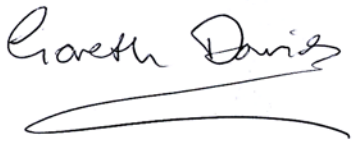
(a) headings and titles shall be disregarded; and

(b) the Interpretation Act 1978 (c. 30) shall apply as if this Notification were an Act of Parliament.

24. Schedule 1 to this Notification shall form part of this Notification.

Gareth Davies

Competition Policy Director



A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

1 April 2011

SCHEDULE 1

[DRAFT] Setting of SMP services conditions AAA(IS)4A as a result of the market power determination made by Ofcom in the statement entitled Review of the retail and wholesale ISDN30 markets dated 20 August 2010 in respect of the services market for wholesale ISDN30 exchange line services in the United Kingdom but excluding the Hull Area in which it was decided that BT is a person having significant market power.

1. In Schedule 1 to Annex 2 of the final statement entitled Review of the retail and wholesale ISDN30 markets dated 20 August 2010, there shall be set the following SMP services condition AAA(IS)4A, inserting it after Condition AAA(IS)3.

"Condition AAA(IS)4A

Charge control – ISDN30 Services

AAA(IS)4A.1 Subject to paragraphs AAA(IS)4A.4, AAA(IS)4A.6 and AAA(IS)4A.7, the Dominant Provider shall take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change (determined in accordance with paragraphs AAA(IS)4A.3 and AAA(IS)4A.4) in each of the five categories of services specified in paragraphs AAA(IS)4A.1(a) to (e) below:

a. the aggregate charges for:
   i. ISDN30 Rental Services;
   ii. ISDN30 Connection Services; and
   iii. ISDN30 Enhanced Care Services;
b. the charge for ISDN30 Transfer Service;
c. the charge for the ISDN30 Direct Dial In Planning Service;
d. the charge for the ISDN30 Direct Dial In Connection Service; and
e. the charge for the ISDN30 Direct Dial In Rental Service;

is not more than the Controlling Percentage (determined in accordance with paragraph AAA(IS)4A.7).

AAA(IS)4A.2 For the purpose of complying with paragraph AAA(IS)4A.1, the Dominant Provider shall take all reasonable steps to secure that the revenue it accrues as a result of all individual Charge Changes during any Relevant Year shall be no more than that which it would have accrued had all of those Charge Changes been made

a) for the First Relevant Year, on [Date][338] of that year; and

b) for each of the Second Relevant Year and the Third Relevant Year, on 1 April of that year.

The Dominant Provider shall be deemed to have satisfied this obligation where, by example in the case of a single Charge Change in the Relevant Year in question, the following formula is satisfied:

$RC(1-D) \leq TRC$

where:

[338] The date of coming into effect of the condition, as set out at paragraph 12 above.

RC is the revenue change associated with the single Charge Change made in the Relevant Year in question, calculated by the relevant Percentage Change immediately following the Charge Change multiplied by the revenue accrued during the Relevant Financial Year;

TRC is the target revenue change required in the Relevant Year in question to achieve compliance with paragraph AAA(IS)4A.1, calculated by the Percentage Change required in the Relevant Year in question to achieve compliance with paragraph AAA(IS)4A.1 multiplied by the revenue accrued during the Relevant Financial Year; and

D is the elapsed proportion of the Relevant Year in question, calculated as:

a. for the First Relevant Year, the date on which the Charge Change takes effect, expressed as a numeric entity on a scale ranging from [x][339] = 0 to 31 March = [x][340], divided by [x][341]; and

b. for each of the Second Relevant Year and the Third Relevant Year, the date on which the Charge Change takes effect, expressed as a numeric entity on a scale ranging from 1 April = 0 to 31 March = 364, divided by 365;

AAA(IS)4A.3 The Percentage Change for the purposes of the service specified in paragraphs AAA(IS)4A.1(b), (c), (d) and (e) (which are referred to in this paragraph as a "single charge category") shall be calculated for the purposes of complying with paragraph AAA(IS)4A.1 by employing the following formula:

$$C_{t,i} = \frac{(p_{t,i} - p_{0.i})}{p_{0,i}}$$

where:

C_t is the Percentage Change in charges for the specific service i in the single charge category in question at a particular time *t* during the Relevant Year;

$P_{0.i}$ is the published charge made by the Dominant Provider for the specific service i in the single charge category in question immediately preceding the Relevant Year; and

$p_{t,i}$ is the published charge made by the Dominant Provider for the specific service in the single charge category in question at the time *t* during the Relevant Year.

AAA(IS)4A.4 The Percentage Change for the purposes of each of the products and/or services specified in paragraphs AAA(IS)4A.1(a), (which is known as a "basket") shall be calculated for the purposes of complying with paragraph AAA(IS)4A.1 by employing the following formula:

$$C_t = \frac{\sum_{i=1}^{n}\left[(R_i)\frac{\{p_{t,i} - p_{0,i}\}}{p_{0,i}}\right]}{\sum_{i=1}^{n}[R_i]}$$

[339] The date of coming into effect of the condition, as set out at paragraph 12 above.
[340] The number of days between start date of the charge control and 31 March 2012, minus 1.
[341] The number of days between start date of the charge control and 31 March 2012.

Where:

C_t is the Percentage Change in the aggregate of charges for the services in the basket at a particular time t during the Relevant Year;

n is the number of individual services in the basket;

i is a number from 1 to n for each of the n individual services in the basket;

R_i is the revenue accrued during the Prior Financial Year in respect of the individual service i that forms part of the basket;

$p_{0,i}$ is the published charge made by the Dominant Provider for the individual service i that forms part of the basket immediately preceding the Relevant Year;

$p_{t,i}$ is the published charge made by the Dominant Provider for the individual service i that forms part of the basket at the time t during the Relevant Year.

AAA(IS)4A.5 Where the Percentage Change in the Relevant Year in question is less than the Controlling Percentage (the "Excess") then the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph AAA(IS)4A.7, but increased by the absolute value of the Excess.

AAA(IS)4A.6 Where the Percentage Change in the Relevant Year in the Relevant Year in question is more than the Controlling Percentage (the "Deficiency") then the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph AAA(IS)4A.7, but decreased by the absolute value of the Deficiency.

AAA(IS)4A.7 Subject to paragraphs AAA(IS)4A.5 and AAA(IS)4A.6, the Controlling Percentage in relation to any Relevant Year in question means:

a. for ISDN30 Rental,ISDN30 Connection Services and ISDN30 Enhanced Care Services;
    a. for the First Relevant Year, [RPI decreased by X_1[342] percentage points]; and
    b. for each subsequent Relevant Year, [RPI decreased by X percentage points].

b. for the ISDN30 Transfer Services;
    a. for each Relevant Year, [RPI decreased by 0 (zero) percentage points].

c. for the ISDN30 Direct Dial Inward Planning Service, [RPI decreased by 0 (zero) percentage points].

[342] Value of X_1 = (1+ change in RPI) – [Sum{wi * Pm,i} / Sum{wi * P0,i)}]* (1+ change in RPI – X), where wi is the weight of the service in the basket as calculated in paragraph AAA(IS)4A.6; Po,i is the published charge made by the Dominant Provider for the individual service i that forms part of the basket immediately preceding the Relevant Year, excluding any Discounts offered by the Dominant Provider; Pm,i is the published charge made by the Dominant Provider for the individual service i that forms part of the basket on 1 April 2011, excluding any Discounts offered by the Dominant Provider; change in RPI is the change in the Retail Prices Index in the period of 12 months ending on 31 December 2010 expressed as a percentage (rounded to two decimal places) of that Index as at the beginning of that period; and X is value set out in paragraph AAA(IS)4A.7(a)(ii).

d. for the ISDN30 Direct Dial In Connection Service [RPI decreased by 0 (zero) percentage points].

e. for the ISDN30 Direct Dial In Rental Service [RPI decreased by 0 (zero) percentage points].

AAA(IS)4A.8 In the case of the ISDN30 Connection services, the Dominant Provider shall also and, in any event, take all reasonable steps to ensure that, at the end of each Relevant Year, the Percentage Change for those services is no more than [RPI increased by 5 percentage points]. For the purpose of this paragraph AAA(IS)4A.8, the Percentage Change shall be calculated by employing the following:.

$$C_t = \frac{(p_t - p_0)}{p_0}$$

where:

C_t is the Percentage Change in charges for ISDN30 Connection services at a particular time *t* during the Relevant Year;

p_0 is the average charge made by the Dominant Provider for ISDN30 Connection services immediately preceding the Relevant Year;

p_t is the average charge made by the Dominant Provider for ISDN30 Connection services at the time *t* during the Relevant Year; and

the average charge is calculated as total revenues from ISDN30 Connection services divided by the number of channels connected in that year.

AAA(IS)4A.9 In the case of the ISDN30 Enhanced Care Services, the Dominant Provider shall also and, in any event, take all reasonable steps to ensure that, at the end of each Relevant Year, the Percentage Change for each of those services is no more than [RPI decreased by 0 (zero) percentage points]. For the purpose of this paragraph AAA(IS)4A.9, the Percentage Change shall be calculated by employing the formula set out in paragraph AAA(IS)4A.3 and its references to each service comprising ISDN30 Enhanced Care Services.

AAA(IS)4A.10 Where:

a. the Dominant Provider makes a material change (other than to a Charge) to any Charge Controlled Service for which a Charge is charged;

b. The Dominant Provider makes a change to the date on which its financial year ends; or

c. there is a material change in the basis of the Retail Prices Index,

paragraphs AAA(IS)4A.1 to AAA(IS)4A.9 shall have effect subject to such reasonable adjustment to take account of the change as Ofcom may direct to be appropriate in the circumstances. For the purposes of this paragraph AAA(IS)4A.10, a material change to the Charge Controlled Service includes (but is not limited to) the introduction of a new product and/or service wholly or substantially in substitution for an existing Charge Controlled Service.

AAA(IS)4A.11 The Dominant Provider shall, no later than three months after the end of each Relevant Year, supply to Ofcom, in writing, the data necessary to perform the calculation of the Percentage Change. The data shall include:

a. pursuant to Condition AAA(IS)4A.3, AAA(IS)4A.4 and AAA(IS)4A.8 the calculated percentage change relating to ISDN30 services;
b. pursuant to Condition AAA(IS)4A.2, calculation of the revenue accrued as a result of all relevant individual charge changes during any Relevant Year compared to the target revenue change;
c. All relevant data the Dominant Provider used in the calculation of the percentage change C_t pursuant to Conditions AAA(IS)4A.3, AAA(IS)4A.4 and AAA(IS)4A.8;
d. All relevant revenues accrued during the Relevant Financial Year in respect of ISDN30 services;
e. Published charges made by the Dominant Provider at time *t* during the Relevant Year;
f. The relevant published charge at the start of the Relevant Year;
g. Other data necessary for monitoring compliance with the charge control.

AAA(IS)4A.12 If it appears to Ofcom that the Dominant Provider is likely to fail to secure that the Percentage Change does not exceed the Controlling Percentage for the Third Relevant Year beginning on 1 April 2013 and ending on 31 March 2014, the Dominant Provider shall make such adjustment to any of its charges for the provision of ISDN30 Services and by such day in the Third Relevant Year (or if appropriate in Ofcom's opinion, by such day that falls after the end of the Third Relevant Year) as Ofcom may direct for the purpose of avoiding such a failure.

AAA(IS)4A.13 Paragraphs AAA(IS)4A.1 to AAA(IS)4A.12 shall not apply to such extent as Ofcom may direct.

AAA(IS)4A.14 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

AAA(IS)4A.15 In this Condition:

a. "**Charge**" means for the purposes of paragraph AAA(IS)4A.10, the charge (being in all cases the amounts offered or charged by the Dominant Provider) to a Communications Provider for the Charge Controlled Service;
b. "**Charge Change**" means a change to any of the charges for the provision of ISDN30 Services;
c. "**Charge Controlled Service**" means a product or service which forms part of (or is comprised in) the provision of ISDN30 services;
d. "**Controlling Percentage**" is to be determined in accordance with paragraph AAA(IS)4A.6;
e. "**DDI**" means Direct Dial Inward;
f. "**ISDN30 Services**" means the following services provided by BT in the within the market for wholesale ISDN30 exchange line services, as defined in the Notification to the Market Review statement:
    i. ISDN30 Rental;
    ii. ISDN30 Transfer Services
    iii. ISDN 30 Enhanced Care Services;
    iv. ISDN30 Connection Services; and
    v. ISDN30 Direct Dial Inward Services,

g. "**ISDN30 Rental Services**" means the rental of an ISDN30 access channel for control and billing purposes;
h. "**ISDN30 Transfer Services**" means the charges for the transfer of control of an ISDN30 line levied per 30 channel access bearer;
i. "**ISDN 30 Enhanced Care Services**" means the products described as Service Maintenance Level 3 and Service Maintenance Level 4 in Openreach's price list[343] correct at the date of this statement, or any such product that, from time to time, replaces or supplements those products;
j. "**ISDN30 Connection Services**" means the charges for the connection of a new ISDN30 line to a premises comprised of;
    (a) The new installation charge charged per end user on a single installation basis; and
    (b) The installation per channel charge;
k. "**ISDN30 Direct Dial Inward Services**" means the ISDN30 Direct Dial Inward Planning Service, Direct Dial Inward Connection Service and the Direct Dial Inward Rental Service;
l. "**ISDN30 Direct Dial Inward Planning Service**" means the charge per DDI installation or change to numbers at a DDI installation
m. "**ISDN30 Direct Dial Inward Connection Service**" means the connection charge per DDI number at a DDI installation;
n. "**ISDN30 Direct Dial Rental Charge**" means the rental charge per number at a DDI installation;
o. "**Ofcom**" means the Office of Communications;
p. "**Percentage Change**" has the meanings given to it in paragraphs AAA(IS)4A.3, AAA(IS)4A.4 and AAA(IS)4A.8;
q. "**Relevant Financial Year**" means the period of 12 months ending on 31 March immediately preceding the Relevant Year in question;
r. "**Relevant Year**" means a defined period covered by any of the First Relevant Year, Second Relevant Year or Third Relevant Year.
s. "**First Relevant Year**" means the period beginning on [DATE][344] and ending on 31 March 2012;
t. "**Second Relevant Year**" means the period of 12 months beginning on 1 April 2012 and ending on 31 March 2013;
u. "**Third Relevant Year**" means the period of 12 months beginning on 1 April 2013 and ending on 31 March 2014;
v. "**Retail Prices Index**" means the index of retail prices compiled by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office of National Statistics at the time of publication of this Notification) from time to time in respect of all items;
w. "**RPI**" means the amount of the change in the Retail Prices Index in the period of twelve months ending on 31 December immediately before the beginning of a relevant year, expressed as a percentage (rounded to two decimal places) of that Retail Prices Index at the beginning of that first mentioned period; and
x. "**the Market Review**" means the statement entitled **"**entitled *Review of the retail and wholesale ISDN30 markets"* and its accompanying Notification published by Ofcom on 20 August 2010.

343 http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

344 The date of coming into effect of the condition, as set out at paragraph 12 above.

Annex 13

Glossary

Asset volume elasticity (AVE): Measures the percentage change in gross replacement costs for a 1% change in volumes.

Backhaul: Connection from the first access node (for example the local exchange or street cabinet) to the core network.

Bandwidth: In digital telecommunications systems the rate at which information can be transferred. In digital systems, it is measured in bits per second (bit/s).

Calling line identification presentation (CLIP): A telephone service, available in analogue and digital phone systems and most Voice over Internet Protocol (VoIP) applications, that transmits a caller's number to the called party's telephone equipment during the ringing signal, or when the call is being set up but before the call is answered.

Capital expenditure: Spending on assets that have physical substance and are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes on a continuing basis in an entity's activities.

Core network: The backbone of the network which carries multiple services over high capacity routes around the country.

CP (Communications provider): A person who provides an Electronic Communications Network or provides an Electronic Communications Service.

Current cost accounting (CCA): An accounting convention, where assets are valued and depreciated according to their current replacement cost whilst maintaining the operating or financial capital of the business entity.

Current generation access (CGA): The copper cable access network that BT uses to provide telephony and broadband services and some ISDN30 services. .

Digital line system: A transmission system used to transport digital signals across the access network. In addition to the access network cables (copper or fibre) this comprises Line Terminating Equipment (LTE) and Network Terminating Equipment (NTE).

Direct dial-in (DDI): Gives businesses the capability to allow incoming calls to be routed directly to employees rather than routing via a central switchboard number.

Digital distribution frame (DDF): An internal wiring frame used to interconnect digital equipment in an exchange. For ISDN30 it is used to connect the LTE to the exchange concentrator line-card.

Distributed long run incremental cost (DLRIC): The LRIC of the individual service with a share of costs which are common to other services over BT's "core" network.

Distributed stand alone cost (DSAC): An accounting approach estimated by adding to the DLRIC a proportionate share of the inter-increment common costs. Rather than all common costs shared by a service being allocated to the service under consideration, the common costs are instead allocated amongst all the services that share the network increment.

Early termination charge (ETC): The total fee that will be charged for early termination of a contract or agreement.

Earnings before interest and tax (EBIT): An approximate measure of a company's operating cash flow based on data from the company's income statement. It is calculated by looking at earnings before the deduction of interest expenses and taxes.

Exchange concentrator: The element of the local exchange to which customer lines are connected. The concentrator provides the telephone line interface, traffic concentration and multiplexing of traffic for transmission to the exchange processor which is the local switching unit.

Exchange flexibility frames: These wiring frames are used within the exchanges to connect access network cables to electronic equipment inside the exchange and to interconnect electronic equipment within the exchange.

Fully allocated cost (FAC): An accounting approach under which all the costs of the company are distributed between its various products and services. The fully allocated cost of a product or service may therefore include some common costs that are not directly attributable to the service.

Gross replacement cost (GRC): The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity.

HCA (historic cost accounting) depreciation: The measure of the cost in terms of its original purchase price of the economic benefits of tangible fixed assets that have been consumed during a period. Consumption includes the wearing out, using up or other reduction in the useful economic life of a tangible fixed asset whether arising from use, effluxion of time or obsolescence through either changes in technology or demand for the goods and services produced by the asset.

Hosted VoIP: A term used to describe IP Centrex services. It is generally used to describe services provided to small sites that are accessed via an ordinary broadband internet connection.

Internal rate of return (IRR): A common measure of profitability used by businesses when deciding where to make their investments. It is calculated using information on the cash outflows (investments and operating expenditure) and inflows (revenues) generated by an activity over its lifespan. The IRR is the discount rate that would yield an NPV equal to zero.

Incremental costs: Those costs which are directly caused by the provision of that service in addition to the other services which the firm also produces. Another way of expressing this is that the incremental costs of a service are the difference between the total costs in a situation where the service is provided and the costs in another situation where the service is not provided.

IP Centrex: An exchange line service that includes the functionality of a PBX within a CP's network. This enables businesses to have the call management features of a PBX such as extension numbering and inter-extension calling without the need to purchase and operate a PBX.

IP (Internet Protocol): The packet data protocol used for routing and carriage of messages across the Internet and modern telecommunications networks.

ISDN2: A type digital telephone line service that supports telephony and switched data services. ISDN2 allows a business to handle two phone calls simultaneously. It is primarily used by smaller businesses.

ISDN30: A type of digital telephone line service that provides up to 30 lines over a common digital bearer circuit. These lines provide digital voice telephony, data services and a wide range of ancillary services. It is primarily used by larger businesses.

Line-card: The line specific functions of the concentrator are provided on electronic circuit boards known as line-cards which are housed in the exchange concentrator. There is one line-card per ISDN30 circuit. The digital bearer circuits terminate on the line-cards.

Line terminating equipment (LTE): Transmission equipment that transforms the signals into a form that can be transmitted over the bearer (either electrical or optical signals). In some cases the equipment may also perform a multiplexing function, combining several circuits onto a higher capacity bearer.

Local loop: The access network connection between the customer's premises and the local serving exchange, usually comprised of two copper wires twisted together.

Local loop unbundling (LLU): A process by which a dominant provider's local loops are physically disconnected from its network and connected to competing provider's networks.

This enables operators other than the incumbent to use the local loop to provide services directly to customers.

Long run incremental cost (LRIC): The cost caused by the provision of a defined increment of output given that costs can, if necessary, be varied and that some level of output is already produced.

LRIC + Equi-Proportional Mark-Up (EPMU): An approach that takes estimates of the LRIC of providing relevant services and then marks up these amounts to take account of an organisation's common costs. Using an EPMU rule, any common costs can be allocated across the different services in proportion to the LRICs of individual services.

Main distribution frame (MDF): An internal wiring frame where copper access network cables are terminated and cross connected to exchange equipment by flexible wire jumpers.

Mean capital employed (MCE): The mean value of the assets that contribute to a company's ability to generate revenues.

Metallic path facilities (MPF): The provision of access to the copper wires from the customer premises to a BT MDF that covers the full available frequency range, including both narrowband and broadband channels, allowing a competing provider to provide the customer with both voice and/or data services over such copper wires.

Minimum contract period (MCP): The amount of time a customer must remain in a contract for before being able to cancel it.

Modern equivalent asset (MEA): The most cost efficient method, using modern technology, of providing the same services, to the same level of quality and to the same customer base as is provided by the existing copper access network.

Multiplexor: A device that combines multiple circuits for transmission over a higher capacity bearer circuit.

Net present value (NPV): A common measure of profitability used by businesses when deciding where to make their investments. It is calculated using information on the cash outflows (investments and operating expenditure) and inflows (revenues) generated by an activity over its lifespan. The NPV calculates the expected return of an activity over its life for a given discount rate.

Net replacement cost (NRC): Gross replacement cost less accumulated depreciation based on gross replacement cost. An alternative is *Depreciated replacement cost (of tangible fixed assets other than property:-*The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity, from which appropriate deductions are made to reflect the value

attributable to the remaining portion of the total useful economic life of the asset and the residual value at the end of the asset's useful economic life.

Network terminating equipment (NTE): Transmission equipment located at the customer premises. Performs a similar function to LTE and also provides the customer interface.

Next generation network (NGN): A network that uses IP technology in the core and backhaul to provide all services over a single platform.

Openreach: The access division of BT established by Undertakings in 2005.

Optical flexibility frame (OFF): The equivalent to the MDF for fibre access network cables.

Partial private circuit (PPC): A generic term used to describe a category of private circuits that terminate at a point of connection between two communications providers' networks. It is therefore the provision of transparent transmission capacity between a customer's premises and a point of connection between the two communications providers' networks. It may also be termed a part leased line.

Points of handover (POH): A point where one communications provider interconnects with another communications provider for the purposes of connecting their networks to third party customers in order to provide services to those end customers.

Private branch exchanges (PBX): Telephone switching systems used by businesses to provide onsite telephony facilities such as extension numbering, inter-extension calling and outbound and inbound external calling.

Return on capital employed (ROCE): The ratio of accounting profit to capital employed. The measure of capital employed can be either Historic Cost Accounting (HCA) or Current Cost Accounting (CCA).

Return on sales (ROS): The ratio of operating profit divided by net sales, usually presented in percent.

Retail price index (RPI): A measure of inflation published monthly by the Office for National Statistics. It measures the change in the cost of a basket of retail goods and services.

Shared metallic path facility (SMPF): The provision of access to the copper wires from the customer's premises to a BT MDF that allows a competing provider to provide the customer with broadband services, while the dominant provider continues to provide the customer with conventional narrowband communications.

SIP Trunking: An exchange line service that uses IP for voice and data transmission and Session Initiation Protocol (SIP) for the telephony control signalling. SIP Trunking services are generally multi-line services that are used to provide exchange line services to modern IP PBXs that support this type of interface.

Synchronous digital hierarchy (SDH): A high capacity digital transmission technology used by operators in their backhaul and core networks and to a lesser extent in access networks. SDH supports a range of circuit bandwidths starting at 155 Mbit/s. SDH also allows multiple SDH circuits to be multiplexed for transmission over higher capacity SDH circuits.

Truncated IRR: A methodology used to assess the profitability of an activity in the past. 'Truncated IRR' can be estimated using data over a reasonable period of time (as opposed to the entire lifetime of the activity) and it only requires estimates of the value of the relevant assets at the start ('opening') and end ('terminal') dates of the period.

Annex 14

List of evidence

Introduction

A14.1 We have referenced the evidence we have relied upon in relation to our findings throughout this consultation; and we have also explained how we have relied upon that evidence.

A14.2 Whilst this annex lists the main evidence we have relied upon, the list is for convenience only and is not intended to be exhaustive.

Ofcom documents : regulatory statements / consultations

A14.3 Review of retail and wholesale ISDN30 services, including: http://stakeholders.ofcom.org.uk/consultations/isdn30/

- Consultation : 4 May 2010
- Responses
- Market Research
- Statement : 20 August 2010

A14.4 A new pricing framework for Openreach, Statement, 22 May 2009: http://stakeholders.ofcom.org.uk/consultations/openreachframework/statement/

A14.5 Wholesale Broadband Access (WBA) charge control review consultation, 20 January 2011: http://stakeholders.ofcom.org.uk/consultations/wba-charge-control/

A14.6 Wholesale mobile voice termination consultation (MCT), 1 April 2010: http://stakeholders.ofcom.org.uk/binaries/consultations/wmctr/summary/wmvct_consultation.pdf

A14.7 Leased Lines Charge Control Consultation, 8 December 2008: http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/summary/leasedlines.pdf

A14.8 Leased Lines charge control statement, 2 July 2009: http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/statement/llccstatement.pdf

A14.9 Wholesale Fixed Narrowband Market Review, 2003: http://stakeholders.ofcom.org.uk/binaries/consultations/750148/fixednarrowbandstatement.pdf

A14.10 Wholesale Fixed Narrowband Market Review, 15 September 2009: http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf

A14.11 Review of BT Network Charge Control Consultation, 19 March 2009: http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/summary/reviewbtncc.pdf

A14.12 Review of BT Network charge Controls statement, 15 September 2009: http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/ncstatement.pdf

A14.13 Mobile Call Termination Statement, 27 March 2007: http://stakeholders.ofcom.org.uk/binaries/consultations/mobile_call_term/statement/statement.pdf.

A14.14 NTS Retail Uplift further consultation, 10 February 2011: http://stakeholders.ofcom.org.uk/binaries/consultations/nts-retail-uplift/summary/nts-retail-uplift.pdf

A14.15 Price Control Review Statement (Oftel), 1996: http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/chap6.htm

A14.16 Pay TV phase three document – Proposed remedies, 26 June 2009: http://stakeholders.ofcom.org.uk/binaries/consultations/third_paytv/summary/paytv_condoc.pdf

A14.17 Review of the wholesale local access market, December 2004: http://stakeholders.ofcom.org.uk/binaries/consultations/rwlam/statement/rwlam161204.pdf

Ofcom documents: other statements / guidance

A14.18 Framework for Disclosure of Charge Control Models, October 2010: http://stakeholders.ofcom.org.uk/binaries/consultations/784024/Charge_control.pdf

A14.19 Better policy-making: Ofcom's approach to impact assessment: http://www.ofcom.org.uk/about/policies-and-guidelines/better-policy-making-ofcoms-approach-to-impact-assessment/

A14.20 Future broadband – Policy approach to next generation access, Consultation, 26 September 2007: http://stakeholders.ofcom.org.uk/binaries/consultations/nga/summary/future_broadband_nga.pdf

A14.21 Consumer Switching Consultation: http://stakeholders.ofcom.org.uk/binaries/consultations/consumer-switching/summary/switching.pdf

A14.22 Pricing Of Telecommunications Services From 1997: Oftel's Proposals for Price Control and Fair Trading: http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/chap6.htm

A14.23 Ofcom, The Business Consumer Experience, December 2009: http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/bce.pdf

A14.24 Cost of Capital Statement, 2005: http://stakeholders.ofcom.org.uk/binaries/consultations/cost_capital2/statement/final.pdf

A14.25 Oftel, *Guidelines on the Operation of the Network Charge Controls,* 2001: http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/pcr1201.htm

A14.26 Clarification of the cost orientation obligation in the WLA market, 7 December 2010 http://stakeholders.ofcom.org.uk/consultations/wla/?a=0

A14.27 Access to Bandwidth: Delivering Competition for the Information Age, November 1999: http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/llu0799.htm

A14.28 Valuing copper access, second consultation, 16 March 2005: http://stakeholders.ofcom.org.uk/binaries/consultations/copper/summary/copper2.pdf

Information requests - S135 requests

A14.29 Ofcom issued a series of notices under section 135 of the Communications Act 2003 ('the Act') requiring various CPs to provide specified information as set out in the Notice for the purposes of an analysis of identified markets as contemplated by Section 79 under the Act. These are commonly known as S135 requests. In this review we have relied upon information provided under such notices that were served in connection with the Market Review; the WLR/LLU Review (where the information related to cost data for modelling)[345] and notices served specifically in relation to this review. We summarise those notices below.

A14.30 S135 request of 16 July (1ST Openreach135) covering accurate and detailed information to assist our understanding, including to populate our own cost forecast and allocation models used for the purposes of each of these reviews. Information was received from Openreach.

A14.31 S135 request of 16 July (OCP 135s) requesting information to assist our understanding of how infrastructure competitors provide ISDN30 services, the costs of provision and the volumes involved. The information was received from key competitors to Openreach in the supply of wholesale ISDN30 products and services.

A14.32 S135 request of 16 July ('2nd Openreach135') covering accurate and detailed information assisting us to understand the differences between the incremental costs of WLR ISDN30 and 2Mbit/s PPCs' rental and connection services; to further understand the profitability of ISDN30 services. Information was received from Openreach.

A14.33 S135 request of 16 July ('3rd Openreach135') covering accurate and detailed information to assist us understanding the demand for WLR ISDN30 compared with other wholesale services provided by Openreach/ BT. Information was received from Openreach.

[345] See Annex 15 at: http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/

EC documents

A14.34 Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0037:0069:EN:PDF

A14.35 Directive 2009/140/EC of 20 November 2009 amending Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services.

A14.36 Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services.

Appeals

A14.37 Competition Commission, *The Carphone Warehouse Group plc v Office of Communications*, Case 1149/3/3/09, available at: http://www.competition-commission.org.uk/appeals/communications_act/wlr_determination.pdf.

A14.38 Competition Appeal Tribunal, LLCC Appeal: http://www.catribunal.org.uk/files/1112_Cable_Wireless_Determination_300610.pdf

A14.39 Competition Commission, *Cable & Wireless UK v Office of Communications*, Determination, Case 1112/3/3/09, June 2010, (LLCC Appeal): http://www.competition-commission.org.uk/appeals/communications_act/final_determination_excised_version_for_publication.pdf

Academic literature / Government Publications

A14.40 Analysys Consulting "*to undertake a comparison between the valuation of the existing [copper access] network and a hypothetical Modern Equivalent Asset (MEA)*" http://stakeholders.ofcom.org.uk/binaries/consultations/copper/annexes/loop.pdf

A14.41 IDC, *Western Europe SIP Trunking Market Update*, July 2010

A14.42 *Economics Bulletin*, Vol. 12, No. 5 pp. 1 – 19, available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.98.1939&rep=rep1&type=pdf

A14.43 The General Building Cost Index is published by the Building Cost Information Service (BCIS) http://www.bcis.co.uk/

A14.44 *Measuring Administrative Costs: UK Standard Cost Model Manual*, telecommunications engineers (cat. 5242), available at p. A18 http://www.bis.gov.uk/files/file44505.pdf

A14.45 Brattle group, "Estimate of BT's Equity Beta", commissioned by Ofcom, October 2010

A14.46 Oxera, *Assessing profitability in competition policy analysis*, OFT Economic Discussion Paper 6, July 2003 http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft657.pdf

A14.47 Efficiency review of BT Openreach, March 2010: http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/annexes/Efficiency_Review_Report.PDF

Other BT information

A14.48 BT Regulatory Financial Statements (RFS) 05/06; 06/07; 07/08; 08/09; 09/10

A14.49 Openreach Carrier Price List: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=CRdZCG1nNAFk46d2aTKmailhWjbv3ISjzoi4SeIn498lMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D

A14.50 Openreach, Maintenance Options Overview, http://www.openreach.co.uk/orpg/home/products/serviceproducts/serviceharmonisation/serviceharmonisation.do

A14.51 Repair service levels offered to Openreach WLR, LLU, ISDN2 and ISDN30 customers: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

A14.52 Openreach pricing list for repair services: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=o1GUUZA4oSGmoXU5lc%2BgZQD265It6W32TNnfEUU7w1FZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

A14.53 DDI Pricing: http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=dLs8GxYbnYP2uRcs8CSohLVXg9qIg6ZASNDEpcqizEglMnGHsqdC0vzO163bJmh34D91D7M0q8u%2F%0AIlSgtIFAKw%3D%3D

A14.54 BT Retail's price offering, available at: http://www.bt.com/pricing/current/Exch_Lines_boo/0011_d0e2917.htm#0011-d0e2917

A14.55 BT Wholesale, PPC Product Handbook, available at: http://www.btwholesale.com/pages/downloads/service_and_support/contractual_information/docs/ppcoffer/briefings/ppc_product_handbook_Issue_4_sept2010.pdf

A14.56 PPC Circuit Rental Charges price list: http://www.btwholesale.com/pages/cmsjsps/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/cpl_browsable_sections/cpl_browsable_sectionb_8.jsp

A14.57 Openreach KPIs from January 2010 to October 2010 (available to Openreach customers at http://www.openreach.co.uk/orpg/customerzone/products/wlr3/wlr3kpi/wlr_kpi.do)