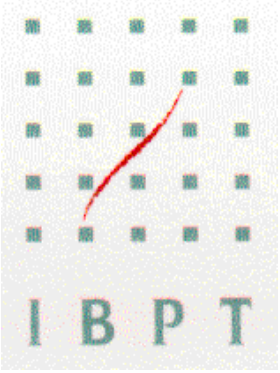

LRIC Bottom-up model for interconnection

Consultation Document 4: Reconciliation

Prepared by BIPT
In collaboration with Bureau van Dijk Management Consultants

September 17th, 2003

Consultation Document 4: Reconciliation

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0. INTRODUCTION

On April 27th and October 3th, 2001, the BIPT issued the first and second consultation document with respect to the creation of a Bottom-Up model, in order to define the general methodology and the logical and physical network to be modelled. The summaries of these two consultation documents were published by the BIPT on June 4th, 2001 and on March 29th of 2002. The decisions were commented in further detail to the market on June 24th, 2001 and April 9th, 2002 by the BIPT's consultant, *Bureau van Dijk Management Consultants.*

Subsequently, a third consultation document for the development of the first version of the Bottom-Up model was issued on April 23th, 2002. During the technical meeting that followed upon the consultation document on May 21th, 2002, the present operators phrased some comments, which were translated in a first addendum to the third consultation document, issued on June 3th, 2002. Finally, a second addendum was issued on July 15th, 2002, treating the modelling of Accommodation Costs, DWDM equipment and the signalling network.

The summary of the comments on the third consultation document and its addenda, and the decisions taken by the BIPT was communicated by the BIPT on September 8th, 2003, which was accompanied by a demonstration of the Bottom-Up model.

The present document constitutes the fourth and last consultation document regarding the development of a LRIC Bottom-Up model for interconnection and is concerned with the reconciliation of the Bottom-Up model with the BIPT's Top-Down model. It drafts a methodology for the reconciliation and indicates the choices that have to be made w.r.t. the results of the reconciliation. On both issues, the sector is invited to provide input and phrase comments.

1. PRELIMINARY REMARKS

1.1 The BIPT's cost models for interconnection: overview

The BIPT's Top-Down model for interconnection services was firstly developed in 1996. Ever since 1998, its yearly update has been the basis for setting tariffs for the incumbent's interconnection services.

In 2001, the BIPT started the development of a LRIC Bottom-Up model. On September 8th, 2003, this model was presented to the sector and a summary of the comments on the third consultation document and the decisions taken by the BIPT (hereafter called 'the summary of the 3rd consultation document') was communicated, including a description of the general structure of the model and the methodology and principles applied.

Figure 1 highlights the general differences between a Top-Down and a Bottom-Up approach. Whereas a Top-Down model starts from the financial accounts in order to allocate costs to interconnection services, a Bottom-Up model starts from the demand volumes, subsequently determines the network required to meet this demand and finally allocates costs related to the network to the interconnection services.

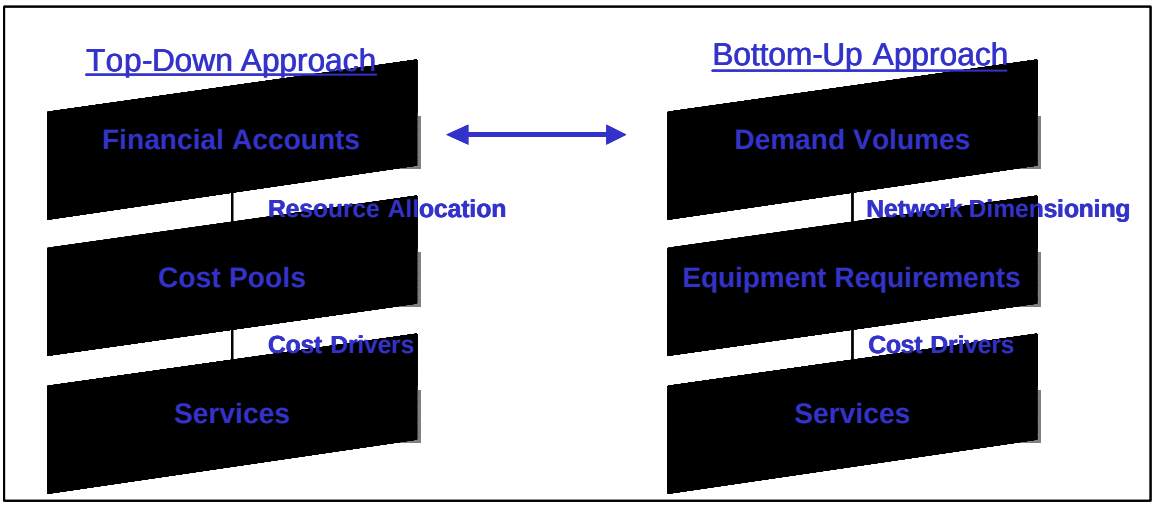

Figure 1: The Top-Down and Bottom-Up approach

A description of the Top-Down model, outlining its general structure, the hypotheses that are taken and the main principles that the model is based on, can be found on the BIPT's website[1]. For a general description of the Bottom-Up model, we refer to the summary of the third consultation document, issued on September 8th, 2003.

1.2 Objectives of the fourth consultation document

The objectives of this consultation document are threefold:

[1] Cfr. http://www.bipt.be, section 'Telecommunications/Interconnection/Communications'.

(1) Outlining a general framework for the reconciliation process, which allows to *identify* and *quantify* the differences between tariffs emerging from both models and hence allows to "close the gap";

(2) Inviting the sector to voice its opinion regarding the choices that have to be made based on the results of the reconciliation;

(3) Describing how the choices made during the reconciliation will be reflected in the final BRIO 2004 tariffs.

General framework Firstly, this document will outline a general framework for the reconciliation process. The framework firstly identifies the main *areas* that will be investigated in the reconciliation; subsequently, one will examine how they are dealt with in the Top-Down and Bottom-Up model. This analysis will result in a *number of differences* between both models. Finally, it will be indicated which of these differences take high priority and therefore should surely be investigated and which differences can be considered as less important. We hereby want to mention that, given the limited time frame, it is the BIPT's clear intention to primarily focus on the major differences that constitute a large share of the "gap" between the tariffs resulting from both models.

The actual application of this framework on the BIPT's Top-Down and Bottom-Up model is expected to result in a list, indicating the various main differences (*i.e. the identification of differences*) and if possible, to quantify their impact on the resulting tariffs (*i.e. the quantification of differences*).

Input regarding choices to be made Once the differences between the tariffs are identified and quantified, the BIPT will have to decide how it intends to deal with these differences when setting tariffs. Clearly, this is an issue of utmost importance. First and foremost, one has to decide which interconnection tariffs will be affected by the results of the reconciliation. Secondly, one has to determine which *options or decisions* will be taken regarding the main differences that emerge from the reconciliation: e.g. whether costs of copper cables can be accepted in the core network or not.

Given their importance, the BIPT considers it desirable to offer the sector the possibility to voice its opinion regarding the proposal for the general framework and the choices to be made, phrase comments or formulate proposals.

1.3 Specific context of the reconciliation

In general, reconciliation exercises may differ widely in scope and issues to explore, depending on e.g. the modeling assumptions that were taken when developing the Bottom-Up model. As an example, we believe that the scope, feasibility and results of the reconciliation will differ dramatically between a reconciliation of a '*scorched node'* Bottom-Up model with a given Top-Down model on the one hand, and the reconciliation of a '*greenfield'* Bottom-Up model with the same Top-Down model on the other hand.

Therefore, the BIPT deems it important to clearly state that the network modeled in the Bottom-Up model intends to approximate the actual incumbent's network, featuring a.o. the same 3-layer network architecture and the same number of switching and transmission nodes.

Moreover, please note that *a priori*, an important difference in investment costs for switching equipment could arise between the Top-Down and Bottom-Up model, due to the number of switching nodes. However, as a *scorched node approach* was taken in the Bottom-Up model

and hence no node consolidation process was executed, the number of switching nodes in the Bottom-Up model equals the corresponding number in the Top-Down model.

Finally, we hereby state that the reconciliation will apply to the update of the Top-Down model BRIO 2004 on the one hand, and to the Bottom-Up model BRIO 2004 on the other hand. The BIPT expects to publish both tariffs on November 1st, 2003. However, as the BIPT at present already possesses the Top-Down model BRIO 2003 and the Bottom-Up model for setting bottom-up tariffs for 2003 and since the Institute does not expect that great methodological or structural changes will occur in the Top-Down model BRIO 2004 and the Bottom-Up model for setting bottom-up tariffs for 2004, the reconciliation of the last two models can already be prepared to a large extent. The results of this preparation are presented in the following chapters.

2. GENERAL FRAMEWORK FOR THE RECONCILIATION PROCESS

Figure 2 presents the general framework for the reconciliation process.

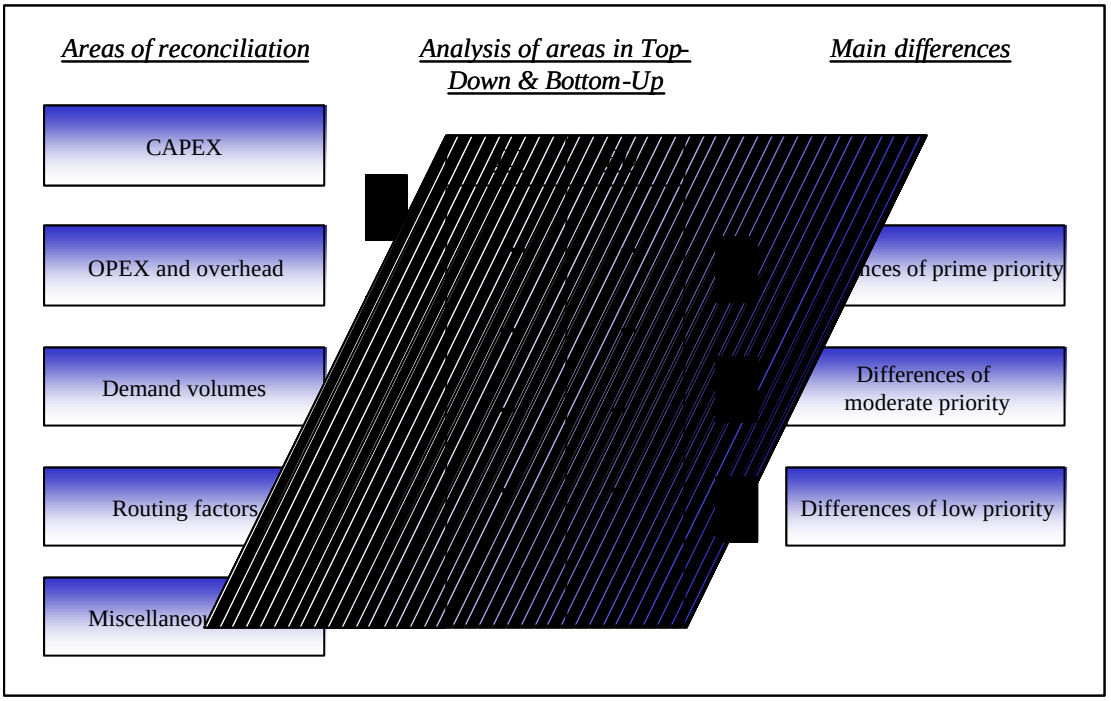

Figure 2: General framework for the reconciliation process

On the left side, the *areas* of reconciliation are indicated. These areas correspond to the areas proposed by the BIPT in the 3rd consultation document and accepted by the sector:

- Capital expenses (CAPEX);
- Operating expenses (OPEX) and company overhead;
- Demand volumes;
- Routing factors;
- Miscellaneous items.

Subsequently, one examines, for each of these areas, how they are dealt with in the Top-Down and the Bottom-Up model. Generally, the treatment of the areas results from high-level methodological choices, such as the choice regarding the network modeled in the Bottom-Up model (e.g. greenfield approach vs. modified scorched node approach), as well as from the choices regarding specific parameters.

Based on this analysis, the BIPT will identify a list of *main differences* between the treatment of the 5 areas in the Top-Down and Bottom-Up model. Hereby, given the limited time frame, it is the BIPT's clear intention to establish priorities and to primarily focus on the major differences that can be expected to have a significant impact on the tariffs resulting from the two models. Therefore, within the list of differences, the BIPT will indicate which differences it considers to take high priority and therefore will surely be investigated, and which differences take moderate or low priority.

In the next paragraphs, for each of the areas of reconciliation, a list of the main differences that emerge from the analysis of the areas in the Top-Down and Bottom-Up model will be presented and priorities indicated. The BIPT defined its priorities based on the results of preliminary analyses that were executed for the differences between the Top-Down model

BRIO 2003 and the Bottom-Up model for setting bottom-up tariffs 2003. As the BIPT expects that no major methodological or structural differences will occur between the models for 2003 and 2004, *a priori* one may assume that differences that have significant impact for the models for 2003 will also have significant impact for the models for 2004 and hence can be considered to take high priority.

2.1 CAPEX

Figure 3 presents the structure that the BIPT proposes to use in order to identify the main differences with respect to CAPEX costs:

Figure 3: Structure for investigating the main differences regarding CAPEX costs

Firstly, a distinction is made between CAPEX costs for *switching equipment*, featuring a subdistinction between local switches (RUs and BUs) on the one hand and transit switches (CAEs) on the other hand, CAPEX costs for *transmission equipment* and CAPEX costs for *transmission infrastructure*. Moreover, within each of these categories, a distinction will be made between *Direct Network CAPEX* and *Indirect Network Support CAPEX*.

Secondly, three main levels of differences with respect to CAPEX costs are distinguished: differences may arise from the determination of the investment cost of the various categories, from the allocation of the investment costs and finally from the way the investment costs are converted to an annual cost (annualisation).

Question 2.1: The BIPT invites the operators to comment upon the proposed structure for investigating the main differences regarding CAPEX costs.

In the remainder of this paragraph, a list of the main differences regarding CAPEX (i.e. for each category at the three levels mentioned in Figure 3) is presented and priorities are indicated.

2.1.1 Switching – Direct Network CAPEX

The following table firstly presents, for each of the three levels (investment cost, cost allocation and annualisation method), how 'Direct Network CAPEX' for Switching Equipment is determined in the Top-Down and Bottom-Up model and secondly, it identifies the differences between the two models and indicates their priority in the reconciliation analysis:

	Top-Down model	Bottom-Up model	Remarks - Level of priority for reconciliation analysis
Investment cost	(1) Volume: ✍ *Number of nodes*: actual number of switching nodes in the incumbent's network ✍ *Number of equivalent lines*[2]: mainly determined based on technical inventory databases (2) Cost: mainly unit price per equivalent line (3) Signaling network: investment cost of incumbent's actually installed network	(1) Volume: ✍ *Number of nodes*: actual number of nodes in the incumbent's network ✍ *Volume of components/equivalent lines*: determined based on demand volumes at node level (2) Cost: price per switching component (3) Signaling network: not treated as Direct Network CAPEX; included via mark-up for Indirect Network Support CAPEX	(1) Volume: important differences in the capacity of components: high priority (2) Costs: price of equivalent line will be determined in Bottom-Up & compared with Top-Down: high priority (3) Signaling cost: comparison of investment costs of actually installed network in Top-Down and Bottom-Up model: low priority
Cost allocation	(1) PSTN/ISDN vs. other services (2) RU/BUs vs. CAEs: based on the number of equivalent lines in the RU/BUs and the CAEs	(1) PSTN/ISDN vs. other services (2) RUs vs. BUs vs. CAEs: based on the demand volume in the individual switching nodes (no real allocation, costs for RUs, BUs and CAEs are determined directly)	(1) Identical: fully allocated to PSTN/ISDN (2) Moderate priority
Annualisation method	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Identical: Tilted Annuity Method (TAM) (2) Asset lives/depreciation period: identical WACC: identical Annual price changes may differ: low priority

[2] For the definition of equivalent lines, we refer to pag. 36 of the summary of the 3rd consultation document.

Finally, the BIPT wants to add that both in the Top-Down and Bottom-Up model, accommodation costs come as *annual costs* and hence, the table above does not apply.

In the Top-Down model, accommodation costs are included in the annual costs of the general support division '*Facilities and Business Services'* (FBS) that are allocated to the incumbent's network division *'Advanced Network Services'* (ANS), whereas in the Bottom-Up model, accommodation costs are determined by multiplying the surface requirements of switching equipment with costing parameters that are consistent with the incumbent's collocation offer. As the accommodation costs can be expected to differ significantly in both models, reconciling these costs will be a matter of high priority for the BIPT.

Question 2.2: The BIPT invites the operators to comment upon the list of differences that is identified and upon the priorities set by the BIPT.

2.1.2 Switching – Indirect Network Support CAPEX

Definition

Firstly, the BIPT wants to recall the definition of Indirect Network Support CAPEX as it was stated in the summary of the 3rd consultation document within the framework of the development of the Bottom-Up model:

> *"One defines the 'Indirect network support CAPEX' as the total of all capital expenditure costs that cannot be directly attributed to specific network components that are dimensioned in the Bottom-Up algorithms, but that are indispensable for providing PSTN/ISDN-services. These include e.g. CAPEX costs for network management systems.*
>
> *As a consequence, this cost category contains all CAPEX costs relevant for PSTN/ISDN-services, excluding 'Direct investment CAPEX' (i.e. all direct investments in switching equipment, transmission equipment, transmission infrastructure and technical buildings) and 'Non-network related overhead CAPEX' (e.g. building costs for the corporate headquarters)."*

Please remark that this definition does *not* include CAPEX costs of 'Assets under construction', as CAPEX costs of spare capacity are already included in the 'Direct Investment CAPEX' by means of the capacity utilisation parameter.

Indirect Network Support CAPEX in the Top-Down and Bottom-Up model

Top-Down model Firstly, the BIPT wishes to remark that in the Top-Down model, Indirect Network Support CAPEX costs are not defined as such, since in this model no formal distinction is made between Direct Investment and Indirect Network Support CAPEX. Therefore, in order to make this distinction, the criterion as outlined in the previously mentioned definition is applied to all CAPEX costs within the Top-Down model model that are relevant for PSTN/ISDN-services: if CAPEX costs are concerned with investments in switching equipment, transmission equipment or transmission infrastructure that are dimensioned in the Bottom-Up model, they are considered to be Direct Investment CAPEX; if CAPEX costs are concerned with investments that cannot directly be attributed to specific network components that are dimensioned in the Bottom-Up algorithms, they are considered to be Indirect Investment CAPEX.

Based on this criterion, two types of Indirect Network Support CAPEX can be identified in the Top-Down model:

- Indirect Network Support CAPEX that is allocated from the Asset Classes[3] to the various ONP-blocks and emerges almost exclusively from the incumbent's division '*Advanced Network Services*'[4];
- Indirect Network Support CAPEX emerging from the incumbent's general support divisions '*Facilities and Business Services*' (FBS) and '*Information Technology Group'* (ITG), excl. costs related to accommodation.

With respect to the first type, once the Asset Classes that contain Indirect Network Support CAPEX and the allocation percentages of these ACs to the ONP-blocks that are relevant for switching are identified, investments cost can be calculated rigorously. Consequently, based on the Tilted Annuity Method (TAM), annual costs can be determined.

With respect to the second type however, the Top-Down model solely provides figures regarding total OPEX and CAPEX of the divisions FBS and ITG and therefore, it is not possible to quantify Indirect Network Support CAPEX emerging from FBS and ITG. Hence annual costs of total Indirect Network Support CAPEX cannot be determined in the Top-Down model.

Bottom-Up model The BIPT wishes to recall that Indirect Network Support CAPEX costs are treated in a fairly different way in the Bottom-Up when compared to the Top-Down model: whereas in the Top-Down model Indirect Network Support CAPEX is included as an *absolute amount*, in the Bottom-Up model Indirect Network Support CAPEX is defined as a *percentage* of the total direct investment costs in switching equipment (i.e. by multiplying a mark-up percentage and the total investment costs). The use of a mark-up clearly implies that differences in Direct Network CAPEX in the Top-Down and Bottom-Up model will directly be reflected in the total amount of Indirect Network Support CAPEX that will be taken into account in the Bottom-Up model.

The mark-up percentage itself is determined based on specific information that the incumbent operator provided within the scope of the Bottom-Up model, i.e. as the ratio of the total investment in Indirect Network Support CAPEX and the total investment in Direct Network CAPEX according to the incumbent's internal cost models[5]. However, this information was adapted in order to comply with the previously mentioned definition of Indirect Network Support CAPEX (e.g. costs for 'Assets under construction' were excluded).

Reconciliation

Based on the way Indirect Network Support CAPEX is included in the Top-Down and Bottom-Up model, in the reconciliation the two following items will be investigated:

- The impact of the differences in Direct Investment CAPEX in the Top-Down and Bottom-Up model on the amount of Indirect Network Support CAPEX taken into account;

[3] For more information regarding the Asset Classes and ONP-blocks, we refer to the description of the Top-Down model at the BIPT's website (http://www.bipt.be).

[4] A small share of the Indirect Network Support CAPEX that is allocated to the ONP-blocks emerges from the division '*Carrier & Wholesale Business*' (2,67%) or other divisions (3,51%).

[5] For more details on the determination of the mark-up, we refer to paragraph 3.4 (title 'Quantification of the indirect network cost mark-ups) of the summary of the 3rd consultation document.

- The impact of adaptations to the information originating from the Top-Down model on the value of the mark-up (e.g. the impact of in- or excluding costs of 'Assets under construction').

Question 2.3: The BIPT invites the operators to comment upon the differences that the BIPT will investigate.

2.1.3 Transmission Equipment – Direct Network CAPEX

The following table firstly presents, for each of the three levels (investment cost, cost allocation and annualisation method), how 'Direct Network CAPEX' for Transmission Equipment is determined in the Top-Down and Bottom-Up model and secondly, it identifies the differences between the two models and indicates their priority in the reconciliation analysis:

	Top-Down model	Bottom-Up model	Remarks - Level of priority for reconciliation analysis
Investment cost	(1) Volume: ✍ *Number of nodes*: actual number of transmission nodes in the incumbent's network ✍ *Capacity of components*: mainly determined based on technical inventory databases (4) Cost: unit price per transmission component, based on technical inventory database	(1) Volume: ✍ *Number of nodes*: actual number of transmission nodes in the incumbent's network ✍ *Capacity of components*: determined based on demand volumes (2) Cost: price per transmission component	(1) Volume: differences in the capacity of components: high priority (2) Costs: price of transmission components in Bottom-Up will be compared with Top-Down: high priority
Cost allocation	(1) PSTN/ISDN vs. other services: based on specific cost allocation system (2) Interconnection vs. non-interconnection PSTN/ISDN services: based on definition of non-interconnection services[6], ONP blocks for transmission equipment and Top-Down theoretical routing factors	(1) PSTN/ISDN vs. other services: dimensioned equipment applies solely to PSTN/ISDN-services, except for the fixed costs of transmission nodes (2) Interconnection vs. non-interconnection PSTN/ISDN services: based on definition of non-interconnection services[7], resource pools for transmission equipment and Bottom-Up theoretical routing factors	(1) High priority (2) Definition of non-interconnection PSTN/ISDN services differs, as well as the definition of the ONP blocks and resource pools; hence also the routing factors for transmission equipment differ: moderate priority as impact is limited

[6] For the definition of the non-interconnection services in the Top-Down model, we refer to the description of the Top-Down model at the BIPT's website.
[7] For the definition of the non-interconnection services in the Bottom-Up model, we refer to paragraph 3 of Annex A of the summary of the 3rd consultation document.

Annualisation method	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Identical: Tilted Annuity Method (2) Asset lives/depreciation period: identical WACC: identical Annual price changes may differ: low priority

As was the case for the accommodation costs of switching equipment, also for transmission equipment accommodation costs are included in the annual costs of the general support division '*Facilities and Business Services*' (FBS) that are allocated to the incumbent's network division *'Advanced Network Services'* (ANS) in the Top-Down model, whereas in the Bottom-Up model, accommodation costs are determined by multiplying the surface requirements of transmission equipment with costing parameters that are consistent with the incumbent's collocation offer. As the accommodation costs can be expected to differ significantly in both models, reconciling these costs will be a matter of high priority for the BIPT.

Question 2.4: The BIPT invites the operators to comment upon the list of differences that is identified and upon the priorities set by the BIPT.

2.1.4 Transmission Equipment – Indirect Network Support CAPEX

For our approach regarding the reconciliation of Indirect Network Support CAPEX of Transmission Equipment, we refer to paragraph 2.1.2, as the approach for Switching Equipment is identical to the one for Transmission Equipment.

Question 2.5: The BIPT invites the operators to comment upon the differences that the BIPT will investigate.

2.1.5 Transmission Infrastructure – Direct Network CAPEX

The following table firstly presents, for each of the three levels (investment cost, cost allocation and annualisation method), how 'Direct Network CAPEX' for Transmission Infrastructure is determined in the Top-Down and Bottom-Up model and secondly, it identifies the differences between the two models and indicates their priority in the reconciliation analysis:

	Top-Down model	Bottom-Up model	Remarks - Level of priority for reconciliation analysis
Investment cost	(1) Technology used: both copper cables (PDH) and optical fiber (SDH/DWDM) (2) Length of cables: actual figures from the incumbent's network (3) Costs: global costs for copper cables, optical fibers and DWDM equipment (4) Number of cables in core transmission network: actual links as in incumbent's network	(1) Technology used: solely optical fiber (SDH) (2) Length of cables: actual figures from the incumbent's network for the regional rings and the core links, an actual average length for the links LDC-host (3) Costs: unit cost per cable type, duct and trench (4) Number of cables in core transmission network: calculated based on capacity requirements	(1) Difference due to copper cables: high priority (2) Total length identical (3) Difference due to copper cables: high priority (4) Low priority
Cost allocation	(1) PSTN/ISDN vs. other services: based on specific cost allocation system (2) Interconnection vs. non-interconnection PSTN/ISDN services: based on definition of non-interconnection services, ONP blocks for transmission infrastructure and Top-Down theoretical routing factors	(1) PSTN/ISDN vs. other services: based on used capacity (2) Interconnection vs. non-interconnection PSTN/ISDN services: based on definition of non-interconnection services, resource pools for transmission infrastructure and Bottom-Up theoretical routing factors	(1) High priority (2) Definition of non-interconnection PSTN/ISDN services differs, as well as the definition of the ONP blocks and resource pools; hence also the routing factors for transmission infrastructure differ: moderate priority
Annualisation method	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Depreciation method (2) Depreciation parameters: ✍ Asset lives/depreciation period ✍ WACC ✍ Annual price changes	(1) Identical: Tilted Annuity Method (2) Asset lives/depreciation period: identical WACC: identical Annual price changes may differ: low priority

Question 2.6: The BIPT invites the operators to comment upon the list of differences that is identified and upon the priorities set by the BIPT.

2.1.6 Transmission Infrastructure – Indirect Network Support CAPEX

For our approach regarding the reconciliation of Indirect Network Support CAPEX of Transmission Infrastructure, we refer to paragraph 2.1.2, as the approach for Switching Equipment is identical to the one for Transmission Infrastructure.

Question 2.7: The BIPT invites the operators to comment upon the differences that the BIPT will investigate.

2.2 OPEX and company overhead

2.2.1 Introduction

In contrast to CAPEX costs, OPEX and overhead costs are determined on an annual basis and can directly be allocated to the PSTN/ISDN-services.

Consequently, the three reconciliation levels presented in Figure 3 do not apply to OPEX or overhead costs; rather the reconciliation will focus on the total amount of OPEX costs taken into account and which costs should be in- or excluded in the determination of the mark-ups for OPEX in the Bottom-Up model.

2.2.2 Network OPEX costs

Definition

Firstly, the BIPT wants to recall the definition of Direct and Indirect Network OPEX as it was stated in the summary of the 3rd consultation document within the framework of the development of the Bottom-Up model:

> *"One defines the '**Direct network OPEX**' as the total of all direct operational expenditure costs that are required to guarantee the continuity of the network components' functioning. These include a.o. maintenance costs of switches. As a consequence, this cost category contains all OPEX costs relevant for PSTN/ISDN-services, excluding 'Non-network related overhead OPEX' and 'Indirect Network OPEX' (defined hereafter)."*
>
> *One defines the '**Indirect network OPEX**' as the total of all direct operational expenditure costs that are required to guarantee the continuity of the indirect network investments' functioning. These include a.o. maintenance costs of the network management systems. As a consequence, this cost category contains all OPEX costs relevant for PSTN/ISDN-services, excluding 'Non-network related overhead OPEX' and 'Direct Network OPEX'.*

Network OPEX in the Top-Down and Bottom-Up model

The BIPT wants to recall that OPEX costs are treated in a fairly different way in the Bottom-Up and Top-Down model:

- Firstly, in the Top-Down model, Direct and Indirect Network OPEX are not defined as such: OPEX costs are split up in categories such as 'Manpower Costs', 'Services', 'Materials' etc. but no distinction is made between OPEX costs that are directly or indirectly related to the functioning of the network, in the Bottom-Up model OPEX costs are divided in two main categories, i.e. Direct Network OPEX and Indirect Network OPEX[8];

- Moreover, please note that Indirect Network OPEX costs also include certain OPEX costs from the divisions FBS and ITG that are allocated to the division ANS. As the Top-Down model solely provides figures regarding *total* OPEX and CAPEX costs of FBS&ITG, it is not possible to quantify Indirect Network OPEX emerging from FBS&ITG in the Top-Down model;

- Finally, whereas in the Top-Down model the absolute amount of OPEX costs taken into account is determined based on *absolute budgeted figures*, in the Bottom-Up model Direct and Indirect Network OPEX costs are defined as percentages of investment costs by means of *mark-ups*: Direct Network OPEX costs are determined as percentages of investments regarding Direct Network CAPEX for switching equipment, transmission equipment and transmission infrastructure, whilst Indirect Network OPEX costs are determined as percentages of investments regarding Indirect Network Support CAPEX. Please remark that since the mark-up percentages for Direct Network OPEX (respectively Indirect Network OPEX) in the Bottom-Up model are defined as the ratio of the absolute amount of Direct Network OPEX (respectively Indirect Network OPEX) and total investment in Direct Network CAPEX (resp. Indirect Network Support CAPEX) in the Top-Down model, differences in Direct Network CAPEX and Indirect Network Support CAPEX will clearly affect the difference in Network OPEX.

<u>*Reconciliation*</u>

Based on the way Direct and Indirect Network OPEX is included in the Top-Down and Bottom-Up model, in the reconciliation the following items will be investigated:

- The impact of the differences in Direct Investment CAPEX (resp. Indirect Network Support CAPEX) in the Top-Down and Bottom-Up model on the amount of Direct Network OPEX (resp. Indirect Network OPEX) taken into account;

- The impact of the *source* of the data for the calculation of OPEX costs on the value of the mark-ups: in the Bottom-Up model for setting bottom-up tariffs 2003, the mark-ups for OPEX are based on *actual 2001* figures emerging from the incumbent's internal cost models, whereas OPEX costs in the Top-Down model BRIO 2003 are based on *budgeted 2002* figures. Whereas for 2004, in the Top-Down model OPEX costs will be based on budgetted 2003 figures, it is not yet known whether OPEX costs in the Bottom-Up model will be based on actual 2002 or budgeted 2003 figures (high priority).

- The impact of the treatment of *restructuring costs and Pension Backservice (PBS) costs* on the value of the mark-ups: in the Bottom-Up model OPEX costs with respect

[8] For a definition of both types of OPEX costs, we refer to we refer to paragraph 3.4 (title 'Methodology for the inclusion of indirect network costs and non-network related overhead costs in the Bottom-Up model') of the summary of the 3rd consultation document.

to restructuring are excluded, whereas in the Top-Down model these costs are included (high priority);

- As far as possible, the relative proportion of total, Direct Network and Indirect Network OPEX over switching equipment (RU/BUs vs. CAEs), transmission equipment and transmission infrastructure, taking a.o. into account that the ratio of Direct Network OPEX costs of switching equipment is based on the number of equivalent lines (low priority).

Question 2.8: The BIPT invites the operators to comment upon the proposed approach for the reconciliation of OPEX costs and the list of items that could be investigated.

2.2.3 Overhead costs

Overhead costs are treated in a similar way in the Top-Down model and the Bottom-Up model, i.e. as an annual absolute, budgeted amount. Hence the BIPT's reconciliation of overhead costs will focus on the following item:

- The treatment of *restructuring and PBS costs*: in the Bottom-Up model overhead costs exclude restructuring costs, whereas in the Top-Down model restructuring costs are included in the amount of overhead costs (high priority).

Question 2.9: The BIPT invites the operators to comment upon the proposed item that could be investigated.

2.3 Demand volumes

Demand volumes may be considered both at node level (expressed as *Busy Hour Erlang*) or at global level (expressed as a number of minutes usage of a certain PSTN/ISDN communication type per period of time).

The former does not appear in the Top-Down model althogether, whilst in the Bottom-Up model, data regarding BHE is solely used for the *dimensioning* of switching equipment, transmission equipment and transmission infrastructure and no distinction is made between communication types. Moreover, BHE data do not appear further in the model.

With respect to the latter, both for the Top-Down model for the BRIO 2004 and the Bottom-Up for setting bottom-up tariffs for 2004, demand volumes will be based on the so-called 'Outlook 2003' volumes, i.e. a forecast of traffic volumes for 2003 which was revised at the end of June 2003. The 'Outlook 2003' will be used as an estimate for the volumes of 2004, since the BIPT believes these figures to be the most realistic available approximation. Please note that this implies that the Institute assumes that traffic volumes will neither grow or decline in 2004 when compared to 2003.

Note however that the 'Outlook 2003' provides demand volumes for the PSTN/ISDN communication types as defined in the Top-Down model and that the definition of these communication types differs to a certain extent from the definition of the communication types in the Bottom-Up model[9]: although the regulated interconnection services evidently are the same, some communication types for e.g. 'Belgacom-to-Belgacom traffic' (i.e. traffic from a Belgacom subscriber to another Belgacom subscriber) differ.

In principle, demand volumes could be reconciled both at node level and global level.

Reconciliation of demand volumes at node level The following steps have to be taken for translating the demand volumes at company level (in billed minutes) to (*average*) demand volumes at the node level, in order to evaluate whether a reconciliation with the BHE-information at the *individual* switching node level (cfr. Figure 4 at page 21) is feasible:

- Firstly, the total number of billed minutes has to be converted to the total demand volume. In order to do so, one is obliged to take some general assumptions on e.g. answering and waiting time, on the percentage of unsuccessful calls etc.;
- Consequently, the application of the routing factors allows to convert the total demand volumes at company level to average demand volumes at the node level;
- Finally, in principle the determination of parameter ? (= the ratio between the volume of traffic during the busy hour and the total annual traffic) allows to convert the demand volumes per network element expressed in number of minutes into demand volumes expressed in BHE.

The first and second step of the conversion of the total demand volume, should no cause to many difficulties. However, the '*ex-post'* determination of the curial parameter ? is estimated to be much more difficult and arbitrary. Moreover, the result of the application of the parameter ? would still only provide *average* BHE per node, whereas the bottom-up model is based on *individual* BHE-information. Furthermore, the fact that there is only BHE-information available for the BUs and the CAEs and not for the RUs, makes a useful comparison even more difficult.

[9] An overview of the communication types, retained in the Bottom-Up model, can be found in Annex A of the summary of the 3rd consultation document.

Consequently, demand volumes at node level derived from the total demand volume and the individual node demand volume will not be explicitly be reconciled.

Finally, one should note that the BHE information used in the Bottom-Up model is determined for 2002, whilst demand volumes at global level will be determined as an '*Outlook 2003*'. However, given the large workload that the update of the BHE information would invoke and the strict deadline for the BRIO 2004, the BIPT does not intend to update the BHE information for the calculations of the 2004 tariffs.

Reconciliation of demand volumes at global level Although the BIPT developed a rigorous methodology for the conversion of the traffic volumes for the communicated communication types to the communication types of the Bottom-Up model, the difference in the definition of communication types can *a priori* cause a difference in the relative proportion of the amount of annual costs that are allocated to non-interconnection PSTN/ISDN communication types and the amount of annual costs that are allocated to interconnection PSTN/ISDN communication types. Although analysis showed that in the Top-Down model BRIO 2003 and the Bottom-Up model for setting bottom-up tariffs 2003, the difference in cost allocation due to this issue is very limited and no major changes are expected for 2004, the BIPT will investigate whether also for the models for 2004, the impact of this difference remains to be very limited (moderate priority).

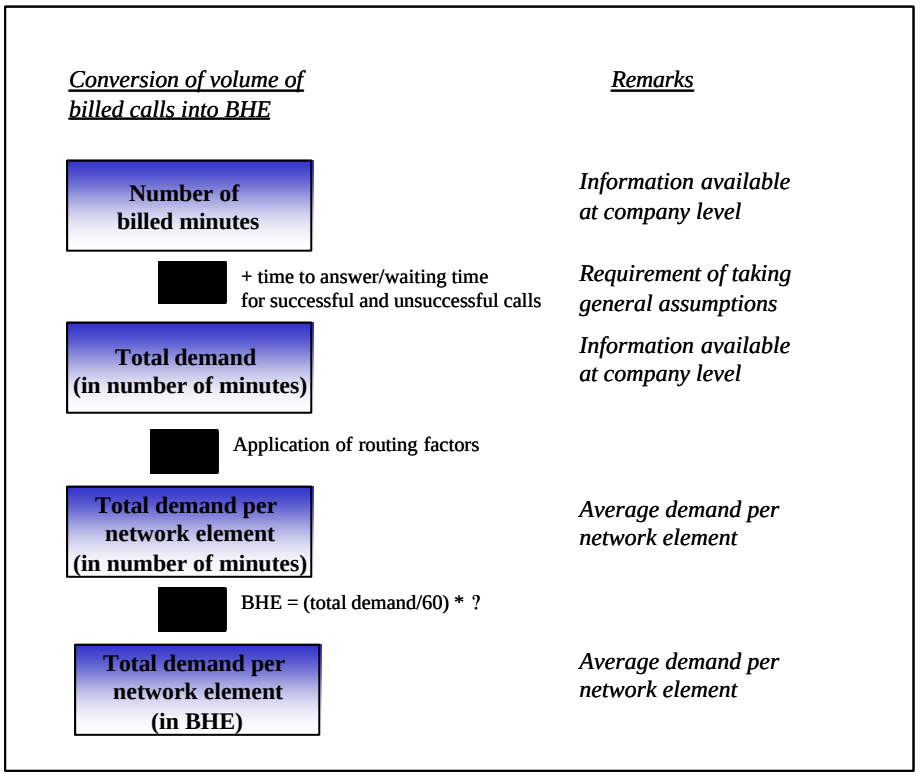

Figure 4: Conversion of total billed calls into BHE per network element

Question 2.10: The BIPT invites the operators to comment upon the proposition for the reconciliation of the demand volumes.

2.4 Routing factors

As the definition of some non-interconnection PSTN/ISDN communication types on the one hand, and the definition of ONP-blocks (in the Top-Down model) and resource pools (in the Bottom-Up model) on the other hand differs in the two models to be reconciled, evidently the structure and the values of the routing factors in both models differ as well.

With respect to the tariffs for interconnection services, differences due to the routing factors can be situated on two levels:

- The relative proportion of the amount of annual costs of the PSTN/ISDN network that are allocated to non-interconnection communication types and the amount of annual costs that are allocated to interconnection communication types;
- Within the costs that are allocated to interconnection communication types, the relative proportion of the amount of annual costs that are allocated to the individual communication types.

The Institute wishes to remark that, due to the significantly different structure of the routing factors in both models, reconciliation is not straightforward and some assumptions (e.g. regarding the distribution of costs of ONP-blocks over resource pools) have to be taken.

Nevertheless, the BIPT performed a first analysis, which showed that in the Top-Down model BRIO 2003 and the Bottom-Up model for setting bottom-up tariffs 2003, the difference in cost allocation due to the routing factors is very limited. However, the BIPT will investigate the impact of this difference again in the Top-Down and Bottom-Up model for 2004 (moderate priority).

Question 2.11: The BIPT invites the operators to comment upon the proposition for the reconciliation of the routing factors.

2.5 Miscellaneous items

The BIPT intends to focus on the following item:

- *Interconnection specific costs*: cfr. paragraph 3.5 of the summary of the consultation document.

The BIPT wishes to remark that the differences due to *restructuring and PBS costs* were already mentioned in paragraph 2.2 as they are reflected in OPEX and overhead costs. Moreover, the difference due to the cost of the signaling network was already treated in paragraph 2.1.1.

Question 2.12: The BIPT invites the operators to comment upon the proposed list of miscellaneous items that could be investigated.

3 CHOICES TO BE MADE REGARDING THE RESULTS OF THE RECONCILIATION

In the previous chapter, for each of the 5 main areas, a proposal for the items that should be investigated when reconciling the Top-Down and Bottom-Up model was presented.

Analysis of these items has lead to the identification of a number of differences. Consequently, the BIPT executed preliminary analyses in order to distinguish priorities. Once the differences taking high priority are examined and their impact quantified, the BIPT will have to decide what options/decisions will be taken with respect to these differences for the actual determination of the BRIO 2004 tariffs. In general, one should decide to choose between the option/decision as retained in the Top-Down model, the option/decision as retained in the Bottom-Up model or an intermediate option/decision.

As this is clearly a matter of utmost importance, in this chapter the input of the sector regarding the various options is asked for. The operators are asked to indicate which options they prefer and to extensively motivate their opinion. Whilst drawing up their opinion, operators should always bear in mind that the BIPT wishes to retain the decisions or options that stimulate the development of the telecommunications sector in the most efficient way.

3.1 Application of the results with respect to tariffs

In general, one may decide to base the tariffs of the PSTN/ISDN interconnection communication types purely on the results of the Top-Down model, purely on the results of the Bottom-Up model or on the results emerging from the reconciliation of the Top-Down model and the Bottom-Up model.

Therefore, first and foremost one has to decide upon which interconnection tariffs will be affected by the results of the reconciliation.

Question 3.1: The BIPT invites the operators to indicate which interconnection tariffs should be based on the results of the reconciliation and to motivate their opinion.

3.2 Choices regarding CAPEX

Volumes Firstly, one has to decide whether to retain the volumes of switching equipment, transmission equipment and transmission infrastructure as determined in the Bottom-Up model, which in principle equal the required volumes of a fully efficient operator, or to retain the volumes as determined in the Top-Down model, which equal the actually installed volumes in the incumbent's network. Please note that in fact, this choice boils down to the *amount of spare capacity* that one wishes to take into account: if one opts to retain the volumes of the Top-Down model, the actually installed spare capacity in the incumbent's network is taken into account; if on the contrary, one opts to retain the volumes of the Bottom-Up model, this choice implies the acceptance of the proposed value for the capacity utilisation (90%). Finally, please also note that the actual spare capacity in the Bottom-Up model is also influenced by the granularity[10] of the equipment dimensioned in the Bottom-Up model.

Question 3.2: The BIPT invites the operators to indicate how the volumes of switching equipment, transmission equipment and transmission infrastructure should be determined: should one retain the actually installed spare capacity (i.e. accepting the

[10] Cfr. paragraph 3.1 of the synthese of the 3rd consultation document.

volumes of the Top-Down model), should one retain the proposed capacity utilisation of 90% (i.e. accepting the volumes of the Bottom-Up model) or should another amount of spare capacity be taken into account. Please motivate your answer.

Technologies used Due to historical reasons, the incumbent's core transmission network sometimes includes technologies that are not widely used anymore and can be considered to be suboptimal in the case when one would build a new network today. Examples include the fact that the incumbent's core transmission network still includes a certain number of copper cables, whereas at present transmission links are generally realised by means of optical fiber and the fact that in certain cases PDH is still used instead of SDH. Therefore, one should examine whether other than the widely used technologies (copper cables, PDH etc.) should be taken into account when setting tariffs. Finally, please note that the use of DWDM technology will be further analysed within the scope of the tariffs for 2004, as DWDM might not to be most cost efficient technology when one would build an entirely new network today[11].

Question 3.3: The BIPT invites the operators to indicate whether other than modern equivalent assets, such as fiber and SDH, should be taken into account when setting tariffs. Please also indicate whether you consider the use of DWDM technology to be appropriate and please motivate your answer.

Indirect Network Support CAPEX As already stated, Indirect Network Support CAPEX costs are treated in a fairly different way in the Bottom-Up and Top-Down model: whereas in the Top-Down model Indirect Network Support CAPEX for switching equipment, transmission equipment and transmission infrastructure are determined as *absolute amounts*, in the Bottom-Up model Indirect Network Support CAPEX are determined by multiplying *mark-up percentages* for switching equipment, transmission equipment and transmission infrastructure with their corresponding investment costs. As the investment costs in the Bottom-Up model clearly differ from the corresponding costs in the Top-Down model, the resulting absolute Indirect Network Support CAPEX costs will differ as well in both models and the resulting figures in the Bottom-Up models should be seen as an approximation of the Indirect Network Support CAPEX costs of a fully efficient operator.

Consequently, one should ask himself whether one should retain the Indirect Network Support CAPEX costs as determined in the Top-Down model, which are believed to closely approximate the actually incurred costs by the incumbent operator, or whether one should retain the Indirect Network Support CAPEX costs as determined in the Bottom-Up model, which reflect costs of an operator featuring fully efficient network exploitation.

Question 3.4: The BIPT invites the operators to indicate whether Indirect Network Support CAPEX costs as determined in the Top-Down model or as determined in the Bottom-Up model should be retained and to motivate their answer.

3.3 Choices regarding OPEX and overhead costs

OPEX Also OPEX costs are treated quite differently in the Bottom-Up and Top-Down model: in the Top-Down model OPEX costs are determined as *absolute, budgeted* amounts that include certain restructuring costs, whilst in the Bottom-Up model OPEX costs are determined by multiplying *mark-up percentages* for OPEX with investments in Direct

[11] Cfr. paragraph 2.3 of the summary of the 3rd consultation document.

Network CAPEX or Indirect Network Support CAPEX. These mark-ups are based on *actual* figures that do not include restructuring costs, nor PBS costs.

Consequently, firstly one should decide whether OPEX costs that are taken into account for the determination of interconnection tariffs should in- or exclude restructuring and PBS costs.

Question 3.5: The BIPT invites the operators to indicate whether OPEX costs that are taken into account for the determination of interconnection tariffs should in- or exclude restructuring and PBS costs and to motivate their answer.

Moreover, one has to decide whether OPEX costs as determined in the Top-Down model (and that are believed to closely approximate the actually incurred costs by the incumbent operator) should be retained, or whether OPEX costs as determined in the Bottom-Up model, which are believed to reflect costs of an operator featuring fully efficient network exploitation, should be retained.

Question 3.6: The BIPT invites the operators to indicate whether OPEX costs as determined in the Top-Down model or as determined in the Bottom-Up model should be retained and to motivate their answer.

Overhead costs Overhead costs are treated in a similar way in the Top-Down model and the Bottom-Up model, i.e. as an annual absolute, budgeted amount. Hence one should solely decide whether the overhead costs that are taken into account for the determination of interconnection tariffs should in- or exclude restructuring and PBS costs.

Question 3.7: The BIPT invites the operators to indicate whether the overhead costs that are taken into account for the determination of interconnection tariffs should in- or exclude restructuring and PBS costs and to motivate their answer.

3.4 Choices regarding demand volumes and routing factors

As already mentioned, the definition of some non-interconnection PSTN/ISDN communication types differs in the Top-Down and Bottom-Up model. Whereas the definition of these communication types in the Top-Down model is inspired by the commercial structure of the retail tariffs, in the Bottom-Up model the corresponding communication types are inspired by the technical structure of the network.

Evidently, the different definition of certain communication types invokes significant differences in routing factors and in the determination of demand volumes, which might cause a difference in the relative proportion of the amount of annual costs that are allocated to non-interconnection PSTN/ISDN communication types and the amount of annual costs that are allocated to interconnection PSTN/ISDN communication types.

Therefore, the BIPT will have to decide whether the communication types as defined in the Top-Down model, or as defined in the Bottom-Up model, should be retained.

3.5 Choices regarding the miscellaneous items

IC specific costs The interconnection specific costs will be subject to a detailed analysis during the reconciliation of the both models. By consequence, at this stage it is not yet clear what choices will have to be made regarding the IC specific costs.

Signaling costs In the current version of the Bottom-Up model (bottom-up tariffs 2003), the annual cost of the actually installed signaling network of the incumbent is retained, whereas in principle one could dimension the signaling network based on the demand at node level and determine its cost. However, considering the limited impact of the cost of the signaling network and the strict timing, one should question himself which of both options is desirable.

Question 3.8: The BIPT invites the operators to indicate whether the cost of the actually installed signaling network should be retained, or whether the cost of the signaling network, dimensioned based on the demand at node level, should be retained. Please motivate your answer.

4 REFLECTING THE CHOICES MADE IN THE FINAL BRIO 2004 TARIFFS

In the two preceding chapters, the BIPT described which items it will investigate and which choices will have to be made. In this last chapter, the BIPT describes how the decisions regarding the choices to be made will be reflected in the BRIO 2004 tariffs.

Possible options In general, the BIPT believes that *a priori* three options exist for reflecting the decisions regarding the choices to be made when setting tariffs:

- One could opt to execute all required adaptations emerging from the decisions taken and to calculate the resulting tariffs in the Top-Down model;
- One could opt to execute all required adaptations emerging from the decisions taken and to calculate the resulting tariffs in the Bottom-Up model;
- One could develop a customised reconciliation tool that uses input from calculations performed in the Top-Down and Bottom-Up model and consequently calculates tariffs.

Option taken by the BIPT Since the BIPT believes that it will be very hard to execute all adaptations in purely the Top-Down model or purely the Bottom-Up model and a customised tool offers a greater versatility and flexibility for performing calculations with respect to the reconciliation, the BIPT decided to retain the last approach.

Figure 5 shows a high-level representation of the reconciliation tool, which consists of a number of Excel-tables, that the BIPT will use for setting the final BRIO 2004 tariffs.

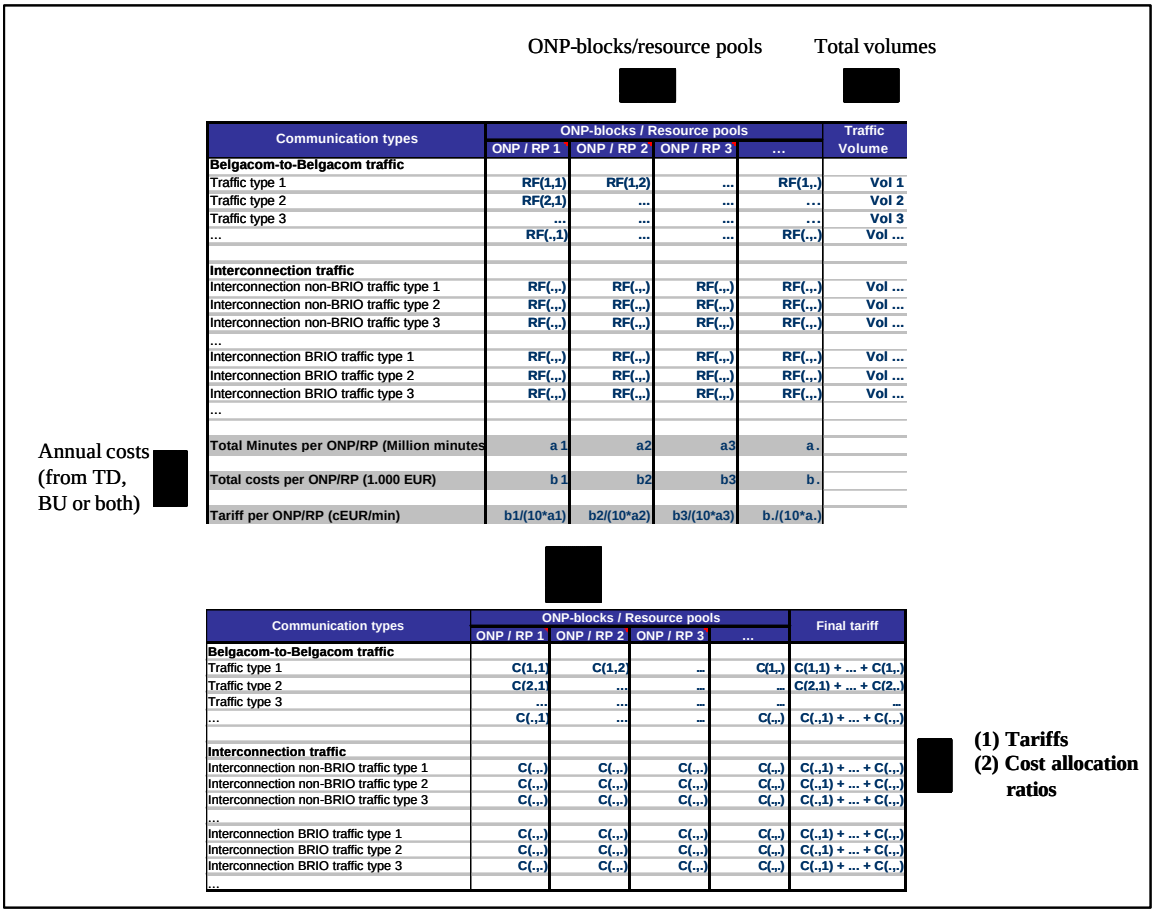

Figure 5: Customised tool for the execution of the reconciliation

The first table takes the total annual costs, total demand volumes, the appropriate routing factors and the resource pools or ONP-blocks to be used as an input. Inputs may come both from the Bottom-Up or Top-Down model, depending on the items that is investigated. In this table, unit prices for the use of a resource pool/ONP-block (hereafter abbreviated as 'RP/ONP') are determined by dividing the total annual cost of a RP/ONP by its so-called 'Total minutes':

$$Unit\ cost_{RP/ONP\ j} = Total\ cost_{RP/ONP\ j} / Totalminutes_{RP/ONPj}$$

The 'Total minutes' of a resource pool or ONP-block equal the weighted sum of its routing factors for the various communication types and the traffic volumes of these communication types:

$$Totalminutes_{RP/ONP\ j} = \sum_{i=1}^{alltraffictypes} RF_{i,RP/ONP\_j} * traffic\ volume_i$$

Finally, after the determination of the unit price of all resource pools or ONP-blocks, the final tariffs can be found by multiplying the routing factors with the unit costs per RP/ONP and adding these figures up for every communication type:

$$Tariff_{communication\ type\ i} = \sum_{j=1}^{All\ RPs/\ ONPs} RF_{communicaton\_type\_i,j} * Unit\ Cost_j$$

Please note that the presented reconciliation tool offers a high degree of versatility and flexibility: it starts from annual costs that may be calculated purely in the Top-Down model, purely in the Bottom-Up model or partially in both models and subsequently, once a given set of annual costs is inserted, one can freely choose to use the routing factors and volumes of the Top-Down model in order to calculate tariffs, or rather to use routing factors and volumes of the Bottom-Up model. Hence the impact of the differences between the two models can readily and transparantly be investigated.

5 PLANNING

Comments to the fourth consultation document should be submitted in writing prior to Tuesday **September 30th**, 2003 to Ms. Hilde Verdickt (BIPT).

Subsequently, the BIPT will analyse the remarks of the sector and take them into account for the execution of the reconciliation. Please note that, although it is expected that the BIPT will publish the Top-Down and Bottom-Up tariffs on November 1st, 2003, the BIPT should not wait until this date in order to start analysing and investigating differences between the Top-Down model BRIO 2003 and the Bottom-Up model for setting bottom-up tariffs 2003. Indeed, once the models for 2004 will be final and tariffs for 2004 are available, the analyses executed for the models for 2003 can readily be updated for the models for 2004.

Therefore, the BIPT will not wait until November 1st either in order to collect the required information for the reconciliation from the incumbent. It is the BIPT's intention to collect the most important data and to perform the lion's share of the analyses regarding the reconciliation prior to November 1st, which will allow the BIPT to update the analyses for the models for 2004 and to take decisions regarding the choices to be made from November 1st until November 15th, 2003.

Finally, once the reconciliation is finalised, in order to promote the transparancy of the determination of the BRIO 2004 tariffs, the BIPT will issue a document regarding the reconciliation, indicating the differences that the BIPT investigated, as well as the decisions taken regarding these differences and their impact on the final tariffs.

For any further information on the contents of this consultation document, please contact Ms. Hilde Verdickt (BIPT) or Ms. Tine Debusschere (Bureau van Dijk).

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