NETWORK STRATEGIES
• Telecommunications Strategy •

Benchmarking issues in the Unbundled Bitstream Access Draft Determination

Final report for Vodafone, 30 January 2013

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Contents

1 Introduction

The Commerce Commission is required under the Telecommunications Amendment Act 2011 to determine a benchmarked forward-looking cost-based price for Unbundled Bitstream Access (UBA) services to apply from 1 December 2014. This replaces the retail-minus approach applied previously as the initial pricing principle (IPP) for UBA services. Accordingly the Commission has issued a draft determination[1] with its preliminary views on appropriate pricing for the UBA services.

Vodafone Fixed Limited has commissioned Network Strategies to review the Commission's proposed benchmarking methodology, and this review encompasses:

- benchmark country selection (Section 2)
- methodological issues (Section 3)
- alternative methodological approaches (Section 4)
- currency conversion (Section 5
- asymmetric costs (Section 6)
- comments on speed / traffic distinction (Section 7).

Although Vodafone Fixed Limited commissioned this report, the views expressed here are entirely those of Network Strategies.

2 Benchmark country selection

2.1 Benchmark sample

The Commission finds that only Denmark and Sweden fully meet its criteria for inclusion in the benchmark sample.

[1] Commerce Commission (2012), *Unbundled Bitstream Access Service Price Review*, 3 December 2012.

Denmark

The Commission sourced the Danish UBA price points from a document dated 7 December 2011[2] containing the regulatory decision for fixed access prices for 2012. In December 2012, however, it appears that the Danish regulator retrospectively changed 2012 fixed access prices[3] due to errors in data reporting and modelling calculations. We recommend that the Commission use the revised prices[4].

In the spreadsheet that accompanied the draft determination, the Commission noted that the Danish price quoted was that of the shared loop and the 256kbps service. Our understanding is that the monthly rental should be derived as shown in Exhibit 1.

	Original prices for 2012 (DKK)	*Revised prices for 2012 (DKK)*
Annual rental		
BSA – adgang ved Lag 2 switch (256kbps)	570	557
Tillæg drift pr. år for BSA uden samproduktion	410	398
Total	980	955
Monthly rental	81.67	79.58

***Exhibit 1**: Monthly rental for bitstream, Denmark [Source: Ervervsstyrelsen]*

As noted by the Danish regulator, the costs of the BSA service are independent of speed (that is, the first component in Exhibit 1 above. The model calculates an average cost over all bandwidths for BSA. External to the cost model, a logarithmic model is applied to this average cost to obtain a price by bandwidth. We have not been able to find any information on this calculation.

2 http://www.erhvervsstyrelsen.dk/file/261882/bilag_5_afgorelse_fastsaettelse_maksimale_netadgangspriser_lraic_2012_fastnet.pdf

3 https://circabc.europa.eu/sd/d/a9c9d853-7550-4827-88c8-6f49f18e40c8/DK-2012-1385_1391%20Adopted_EN.pdf

4 http://www.erhvervsstyrelsen.dk/file/308200/tillaegsafgoerelselraicmetode.pdf.

Sweden

The Commission sourced the Swedish UBA price points from a document dated 26 May 2011[5] containing the cost model results for the fixed network for 2011. Since that time, the Swedish regulator (PTS) has published updated cost model results:

- cost model version 9.0 (corrected version, 3 August 2012[6] – note this version has been adjusted for some errors in an earlier version) – for calendar year 2012
- cost model version 9.1 (14 December 2012[7]) – for calendar year 2013.

The table for the 2012 results exclude the Bitstream DSL Consumer service, only reporting the Bitstream DSL Business service, however the costs for the two services are identical in both 2011 and 2013, so we assume this would also be the case in 2012 (Exhibit 2)

Monthly rental (SEK)	*Bitstream DSL Consumer 250kbps (hel ledning)*	*Bitstream DSL Business 250kbps (hel ledning)*
2011	128.00	128.00
2012	n.a.	134.00
2013	137.00	137.00

Exhibit 2: *Cost model results for selected services [Source: PTS]*

We recommend that all price points in the benchmark sample refer to the same time period. Hence either 2011 or 2012 prices should be used for both Denmark and Sweden.

2.2 Inclusion of additional countries

The Commission has consulted regulators to confirm whether a TSLRIC approach is used for setting UBA services, and, if so, whether the Commission's other criteria for inclusion

5 http://www.pts.se/upload/Ovrigt/Tele/Bransch/Kalkylarbete%20fasta%20nätet/revidering%202011/10-420-kostnadsresultat-slutlig-hybridmodell-v%208_1.pdf

6 http://www.pts.se/upload/Remisser/2012/Telefoni/Kostnadsresultat%20HY-modell%20v%209%200_final%20(korrigerat).pdf.

7 http://www.pts.se/upload/Ovrigt/Tele/Prisreglering/2013/12-6520-kostnadsresultat-hybridmodell-9_1.pdf.

in the benchmark sample have been met. As the following countries narrowly missed inclusion in the sample we reviewed the circumstances of UBA pricing in these countries.

Belgium

Belgium met all of the Commission's criteria but was excluded on the basis that the network configuration of the service was different to that in New Zealand. Specifically the handover point for the Belgian service is technically at the First Data Switch (FDS), but the DSLAMs and FDS are co-located in the main distribution frame (MDF). In New Zealand, however, the MDF and first data switch are typically physically separate.

Despite the fact that Belgacom offers cost-based ATM and Ethernet services it is clear that the network configuration and definitions of service are sufficiently different from New Zealand that adjustments would be necessary to use pricing data from Belgium. We therefore conclude that Belgium cannot be included within the benchmark sample, without such an adjustment.

Greece

In 2009 the Greek regulator changed the method of price control for bitstream services from retail-minus to cost-orientation based on LRAIC / current costs[8]. In December 2011 the regulator approved the incumbent operator's reference offer[9], presumably on the basis that it had met these costing requirements. Prior to this the regulator and the European Commission corresponded about the need (or otherwise) to have economic space between wholesale broadband access service prices and wholesale line access prices[10], with the European Commission concluding that:

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8 European Commission (2009), *Case EL/2009/0935: Wholesale broadband access in Greece*, SG-Greffe (2009) D/4332, 17 July 2009.

9 European Commission (2012), *Greece 2011 Telecommunication market and regulatory developments*, 18 June 2012.

10 European Commission (2010), *Commission decision concerning Case EL/2010/1130: wholesale broadband access - further details of price control remedy*, 14 October 2010.

> a consistently applied costing methodology for both LLU and WBA usually guaranties an economic space that provides efficient investment incentives. The economic space between LLU and WBA should therefore be analysed together with the costing methodologies applied to establish the price of these access products.

No subsequent notifications to the European Commission concerning wholesale broadband access in Greece appear to have been lodged, although the regulator has approved changes to the reference offer in 2012. Thus we have not found substantive evidence that the underlying costing model has been fully verified by the regulator or approved by the European Commission. On this basis Greece cannot be included in the benchmark sample.

Slovakia

The Commission notes that no final results are as yet available from the Slovakian cost model. As of July 2012 the Slovakian regulator had notified the European Commission that it would develop a cost model using a bottom-up-LRAIC methodology and current costs for wholesale broadband access services[11]. The timing of this communication indicates that final results will indeed not be available for inclusion in the Commission's benchmarking sample.

Switzerland

The Commission did not include Switzerland in its benchmark sample, noting in Table 3 and Attachment 3[12] of the Draft Determination that the cost model had not been verified by the regulator. However in the Commission's spreadsheet[13] as at 18 July 2012 Switzerland is stated as meeting the verified cost model criterion in addition to the cost-based price control, TSLRIC cost model and current costs criteria.

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11 European Commission (2012), *Commission Decision concerning Case SK/2012/1345: Wholesale broadband access in Slovakia, C(2012) 5360*, 23 July 2012.

12 See paragraph 178.

13 See Worksheet Cost-based countries.

Clearly it is not acceptable to include cost model results in a benchmark where no regulatory scrutiny has occurred. As we have noted previously[14], in Switzerland the normal regulatory process for wholesale costing is based on an operator model which may then be subsequently reviewed by the regulator, with the possibility of retrospective price adjustment. The regulator prescribes the principles for the modelling which in general appear to meet the Commission's criteria.

In the case of bitstream Swisscom has published prices to apply as from 1 January 2013[15] but the Swiss regulator notes that an agreement was reached in 2011 for pricing for fast bitstream access services between the parties and so these prices are not regulated[16]. On this basis Switzerland cannot be included in the Commission's sample.

2.3 Impact on results due to revised data

We have recalculated the benchmarks based on the Commission's spreadsheet, but using the revised data for Denmark and the 2012 prices for Sweden (Exhibit 3). We note that updating the PPP rates from 2011 to 2012 has no effect (to two decimal places).

	Monthly rental (NZD)
Draft Determination	8.93
Updated data	
– with 2011 PPP rates	8.56
– with 2012 PPP rates	8.56

Exhibit 3: *Comparison of results [Source: Commerce Commission, Network Strategies]*

14 Network Strategies (2011), *Review of Commission's 2011 UCLL Benchmarking*, Network Strategies Report No. 31021, 30 September 2011.

15 See http://www.swisscom.ch/dam/swisscom/de/ws/documents/D_FMG-Dokumente/BSA/BSA_Handbuch-Preise_V1-5.pdf

16 See http://www.bakom.admin.ch/org/jahresberichte/03962/03966/03977/index.html?lang=en

3 Methodological issues

3.1 Small sample

Bitstream costs are strongly influenced by various characteristics of the local environment, which may encompass geographic, demographic, network design and product factors. In a large benchmark sample, any effect due to these differences is smoothed out, as individual datapoints become less influential.

In a small sample, the influence of individual datapoints becomes greater, which can be a problem if those datapoints reflect very different circumstances to those in New Zealand, or if those particular datapoints represent extreme values (or outliers). It is impossible to determine whether or not a datapoint within a small sample may be an outlier. Tests for detecting outliers – such as Peirce's criterion or Grubb's test – rely on having a sufficiently large sample to assume the data has (or approximates) a normal probability distribution. With small samples (less than 20 datapoints) there is generally not enough information to determine whether this assumption is valid.

Consequently the resultant estimates from a small sample may not be representative of bitstream costs.

However benchmarking based on small samples can still be an appropriate tool, in particular under the following circumstances:

- to achieve explicit policy objectives
- if the small benchmark sample provides a closer match to New Zealand than that obtained with a larger randomly selected sample.

The first case is probably best illustrated by an example. Mobile termination rates (MTRs) in Poland had been amongst the highest in Europe, however in 2007 the regulator (UKE) announced that the rates would be reduced via a glide path to the average of the three European Member States with the lowest MTRs (namely Sweden, Finland and Cyprus).[17]

[17] UKE (2007) *Lower termination rates*, media release, 27 April 2007. Available at http://www.en.uke.gov.pl/lower-termination-rates-168.

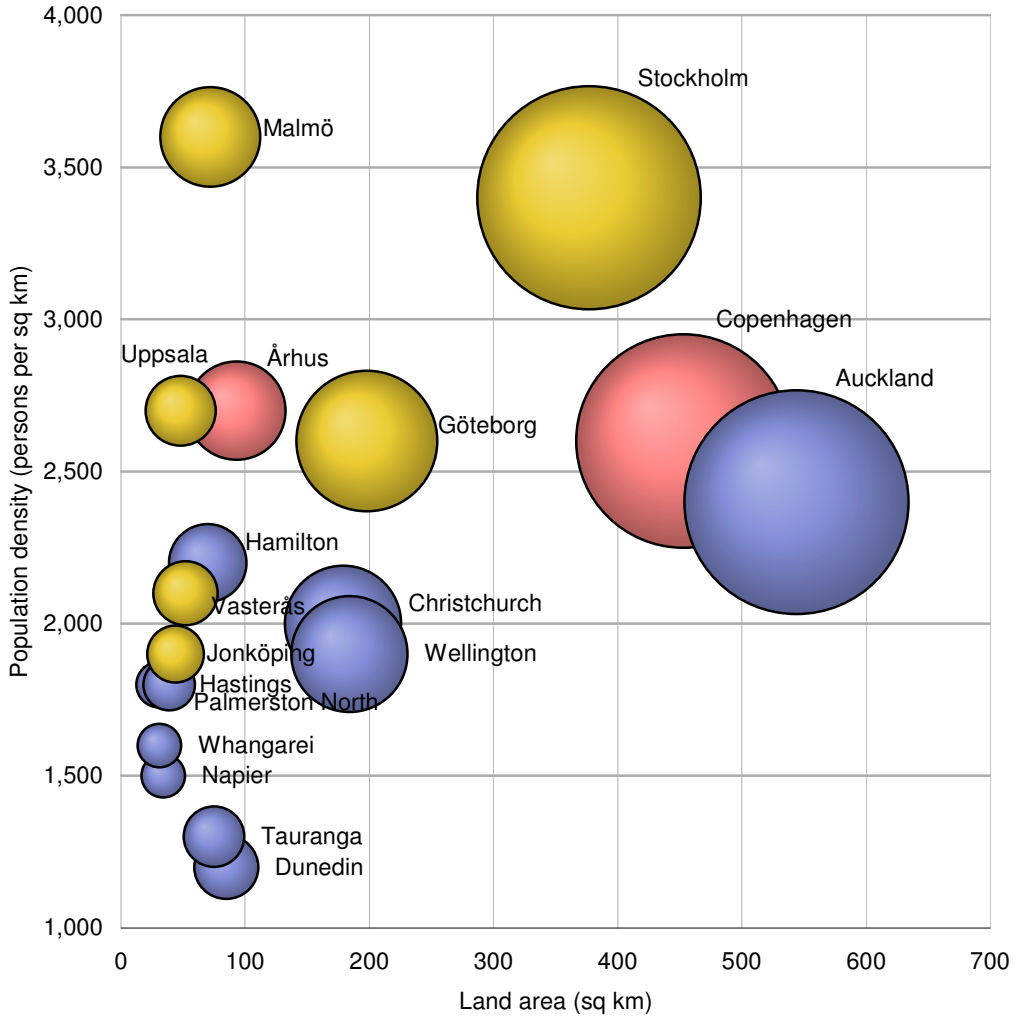
This small sample was explicitly selected to achieve the desired outcome, that is for the MTR in Poland to be amongst the lowest in Europe.

The second case can be appropriate if the individual datapoints within the sample represent jurisdictions that are relatively similar to New Zealand., or that there is an *a priori* expectation that an estimate for New Zealand would be very similar to those values within the benchmark sample. In this respect, we note that Denmark and Sweden are certainly more comparable to New Zealand than many other jurisdictions, across a variety of relevant statistical measures (Exhibit 4).

	New Zealand	*Denmark*	*Sweden*
Population (2011)	4 405 200	5 574 000	9 453 000
Land area (sq km)	263 310	42 430	410 340
Population density (persons per sq km, 2011)	16.7	131.4	23.0
Urbanisation (2011)	86.2	86.9	85.2
Teledensity (fixed services per 100 persons, 2011)	42.6	45.1	48.7
DSL subscribers (2011)	n.a.	1 207 000	1 515 000
Broadband subscribers (2011)	1 174 790	2 100 521	3 046 065
DSL subscribers per 100 persons (December 2011)	25.4	21.7	16.2
Broadband subscribers per 100 persons (December 2011)	26.9	37.9	32.5

Exhibit 4: *Comparison of various statistical indicators for selected countries [Source: World Bank, ITU, OECD, regulators]*

Urban areas in all countries are also very similar in terms of population size, geographic area and population density (Exhibit 5).



Note: The size of the bubbles is proportional to population.

Exhibit 5: *Characteristics of major urban centres in New Zealand, Denmark and Sweden [Source: Demographia, July 2012]*

3.2 Price point

When deriving an estimate based on benchmark data, that estimate should fall within the range spanned by the benchmark data. If it is believed that a New Zealand estimate falls outside this range, the sample data provides no guidance on how far outside this estimate

should be. Any estimate of the relativity of a New Zealand estimate against the benchmark sample would therefore be arbitrary in nature.

Even if the estimate is derived by some form of benchmark model that adjusts for variation in the data, there is a high degree of uncertainty and associated risk if extrapolating 'outside the sample'. This approach is not recommended.

4 Alternative methodological approaches

Indexing approach

For the UCLL Final Determination an indexing approach was used, however for the UBA service the circumstances are very different. Indexing will not alleviate the problem of the small sample size.

Trend line approach

WIK describes a 'trend line approach' for dealing with the different handover points amongst the various jurisdictions. The advantage of this approach is that it includes more datapoints in the analysis.

However WIK notes that the trend line simplifies the cost relation between the various handover points. In the example shown below (Exhibit 6), it is assumed that the four handover points are equidistant, and thus the differences in cost between those handover points are the same.

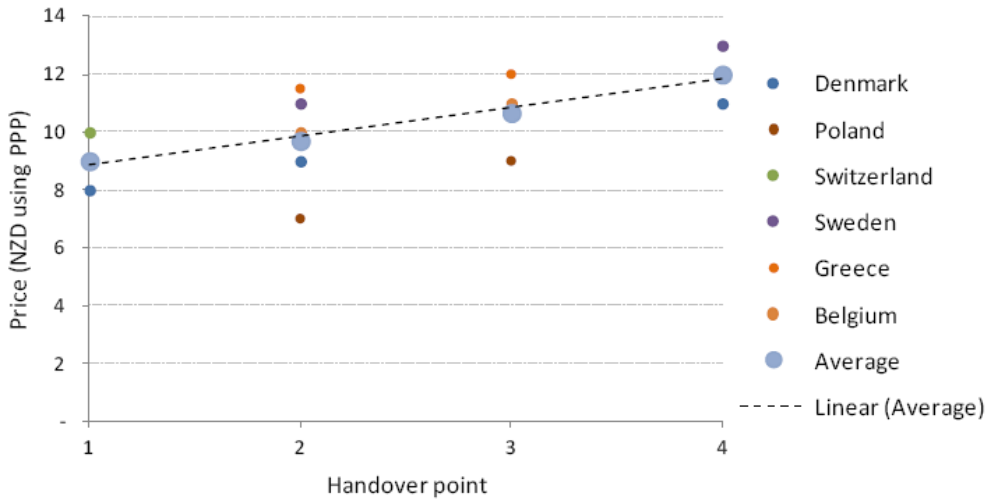


Exhibit 6: *Trend line approach [Source: Commerce Commission]*

As WIK points out, in reality this assumption is incorrect, and that the handover points should not be equidistant. We agree with WIK and conclude that this approach should not be used, as it misrepresents the cost relationship between the handover points and would deliver spurious results.

It may be possible to represent the cost relationship between the handover points within each country, however this is likely to differ from country to country. However the question then becomes what points in the trend line should be used to represent New Zealand handover points? The benchmark data would provide no guidance on this issue.

5 Currency conversion

The Commission has applied its blended currency conversion method to the benchmark sample. This consists of an equal weight of purchasing power parity (PPP) and a ten year average for market exchange rates. This approach is justified on the basis that the bitstream services comprises 50% tradable and 50% non-tradable components. The Commission assumes that capital-related charges use the market exchange rate as a reference point while PPP would be relevant for non-capital charges. However market exchange rates are only relevant for investment decisions of individual companies. With international

benchmarking the only issue is how to adjust for relative prices across countries. PPP rates are ideal for this type of price comparison and are commonly used by regulators. Thus PPP rates alone should be applied for currency conversion.

The Commission has used the World Bank as its source of PPP rates, however as at 23 January 2013 the 2012 rates have not yet been released. Ideally the 2012 rates should be used.

In contrast 2012 PPP rates are available from the OECD for its member countries. We found that the 2011 rates from both the World Bank and the OECD[18] appear to be identical for Belgium, Denmark, New Zealand and Sweden, suggesting that the same data source is used by each organisation. We would therefore accept the use of the OECD 2012 PPP rates.

We also note that there are very slight differences in the World Bank PPP 2011 rates used by the Commission and those downloaded on 23 January 2013. We are aware that the World Bank revises its economic data from time to time and suspect that this may be the cause of the difference.

6 Asymmetric costs

The Commission notes (in paragraph 116 of the Draft Determination) that since the Initial Pricing Principle (IPP) serves only as a proxy for the Final Pricing Principle (FPP) the benchmarked price may be different from the price obtained through cost modelling.

> A benchmarked price that is different from this 'true' price could affect access seekers' decisions in a way that may not be beneficial for end-users. There is an asymmetric cost on the access seeker or access provider when the economic cost of an incorrect estimate in one direction is greater than the opposite direction[19].

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18 Sourced from the relevant websites on 23 January 2013.

19 Draft Determination, paragraph 116.

In other words, the Commission is concerned that the margin of error inevitably associated with benchmarked price estimates may distort decisions of service providers to the detriment of consumers. Consequently the Commission asks for views as to whether a higher price point than the benchmarked mean 'would be justified by an asymmetric cost of error'[20] on the basis that:

> A price that is 'too low' may discourage investment by access seekers in UCLL and competitive bitstream services that would benefit end-users in the long-run[21].

However the Commission also acknowledges (in paragraph 117.1) that a price that is 'too high' may increase consumer prices.

The choice of a higher price point than the median or mean of the benchmark sample could only be justified if we have evidence of the direction of bias of the results, and confidence in the assumption that the magnitude of the bias would be sufficient to distort access seekers' behaviour in the matter suggested by the Commission. Since we have no evidence about either the direction or magnitude of bias it would be difficult to justify the selection of a higher price point than the median or mean.

It is worth noting that we do, however, have evidence that many of the country characteristics of Denmark and Sweden are similar to those of New Zealand, as discussed in Section 3. Given these similarities it is more likely than not that a cost-modelled estimate for New Zealand may not diverge significantly from the results for Denmark and Sweden.

7 Comments on speed / traffic distinction

Speed (maximum upstream/downstream line speed), throughput and QoS (delay, jitter and packet loss ratio as per the Commerce Commission definition) are all specifications which define a service/product. All should be simultaneously addressed in order to avoid

20 Paragraph 118.

21 Paragraph 117.2.

distortions when comparing prices in a benchmark exercise. A difficulty arises in that there is no differentiation by speed in the Commerce Commission definition (only throughput and QoS are established). Ideally UBA services should be benchmarked against services with equivalent characteristics (that is, UBA-basic against products without QoS, and UBA-enhanced against products with QoS) considering different speed ranges for each case (based on the New Zealand speed distribution).

We conclude that broadband products are certainly only relevant as throughput / QoS combinations and the benchmark should not be adjusted for one then the other. However, despite WIK's statement (in Section 4.4.3) that 'it appears reasonable to separate access line speed and QoS' the report does not recommend actually doing this.

8 Concluding remarks

The initial pricing principle (IPP) for the bitstream service requires a benchmark methodology, however we have found that data from only two jurisdictions – Denmark and Sweden – can be used. A larger sample would be preferable, but we can find no grounds on which more datapoints can be incorporated – no additional countries are suitable, and we do not recommend the use of the trend line approach for handover points.

However we note that Denmark and Sweden have a number of relatively similar characteristics to those of New Zealand, and in particular for a range of relevant cost drivers, encompassing demographic, geographic and market factors. These two jurisdictions are more comparable to New Zealand than many other countries, and it is expected that New Zealand costs would not diverge markedly from costs in these countries.

The Danish and Swedish data used by the Commission have been revised by the relevant regulatory authorities, and so we recommend that the Commission updates its analysis with the final 2012 regulated prices for both countries. In addition we recommend that 2012 PPP rates be used for currency conversion.

In terms of an asymmetric cost of error, we find that there is no evidence of the direction of bias of the results, nor confidence in the assumption that the magnitude of the bias would

be sufficient to distort access seekers' behaviour. It would therefore be difficult to justify the selection of a price point higher than the benchmark sample mean or median.

Finally, our view is that broadband products are specified by combinations of both throughput and QoS – it is therefore inappropriate within a benchmarking exercise to adjust for each parameter independently.