



Response to NPT's Decision on MTRs:
**Analysis of LRIC Methodologies
and Consequences**

Submitted to:
Post-og teletilsynet

Norwegian Post and Telecommunications Authority



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1. EXECUTIVE SUMMARY

CSMG was recently engaged by Tele2 and Network Norway to review NPT’s proposed determination of Mobile Termination Rates (MTRs) in Norway. This document sets out our views and findings.

Based on our assessment of the characteristics of the Norwegian mobile market we conclude that the proposed move to LRAIC (Long Run Average Incremental Cost), and potentially to pure LRIC (Long Run Incremental Cost) in the future, create a substantial risk of under-recovery of true network costs. Furthermore, we reason that this would lead to undesirable outcomes for Norwegian consumers and society.

We urge NPT to strongly weigh the expected benefits of the proposed reduction in MTR against the potential unintended consequences and to reconsider whether the change in methodology is necessary or desirable.

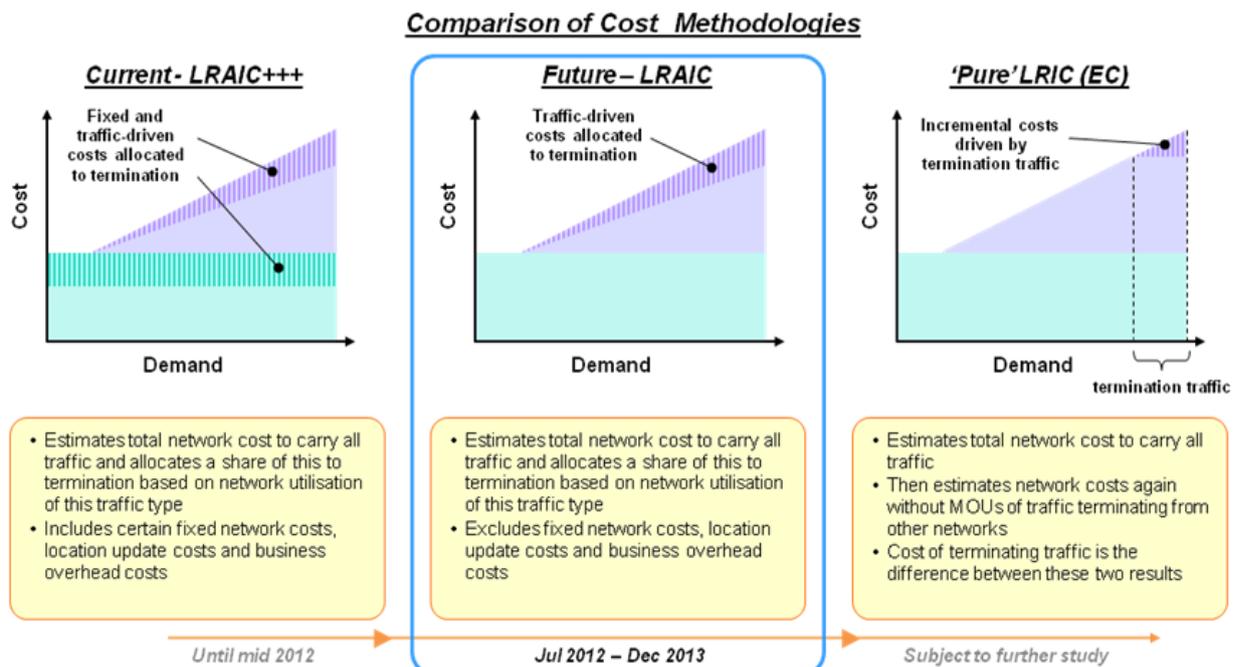
1.1 Context and Background

In mid 2012, the NPT proposes to move from the existing LRAIC+++ cost methodology to LRAIC, which will result in a reduction in MTR over 2012 and 2013. NPT has also indicated that it will consider adopting a Pure LRIC methodology to set rates after 2013.

The following chart shows the conceptual differences between three cost model regimes:

- “Long Run Average Incremental Cost” with shared costs (LRAIC+++)
- “Long Run Average Incremental Cost” without shared costs (LRAIC)
- “Pure LRIC” (Pure Long Run Incremental Cost)

LRAIC+++ is the current regime; NPT proposes to adopt LRAIC in mid 2012 and will consider the adoption of Pure LRIC after 2013.



This report discusses a number of issues with the planned move from LRAIC+++ to LRAIC, and the potential further move to Pure LRIC. It also analyses the EC Recommendation on MTRs and NPT's interpretation of the EC Recommendation in Norway.

1.2 Suitability of EC Recommendation to Norway

The European Commission (EC) released a Recommendation on the treatment of MTRs on 7th May 2009. The Recommendation advocates the reduction and harmonisation of fixed termination rates and mobile termination rates across EU countries, to address potential competition bottlenecks and to deliver economic and social benefits to telecommunications consumers. Under the Telecommunications Framework Directive, national regulatory authorities (NRAs) in EU Member States are required to take utmost account of the Commission's Recommendation. The requirement extends to European Economic Area (EEA) countries, and hence to NPT in Norway.

A wide variation in MTR existed across EU countries before the release of the EC Recommendation, with some particularly high MTR outliers in countries such as Bulgaria. In contrast, Norway had set termination rates close to the EU average, indicating that the competition bottlenecks noted by the EC were present to a greater degree in EU countries other than Norway.

To address perceived issues in the market for call termination in mobile networks, the EC recommended that NRAs adopt a Pure LRIC (Long Run Incremental Cost) model to determine the cost-oriented MTR for mobile operators, and that this methodology is in place before the end of 2012.

As stated above, as a consequence of Norway's membership of the EEA, NPT is obligated to take utmost account of the Recommendation. However, as Norway is not an EU member state, the particular characteristics of Norway would not have been considered by the EC when the Recommendation was developed and characteristics particular to Norway indicate that adopting the Recommendation would have extreme local consequences. These should be evaluated before deciding to adopt the Pure LRIC methodology.

1.3 Termination regime change from LRAIC+++ to LRAIC

LRAIC+++ is the long-standing best practice technique for setting the cost of terminating traffic. It can be considered the optimum methodology for determining termination cost on a network because it allocates all network costs to traffic types on the network in proportion to the capacity each consumes.

Termination itself is a key and inseparable part of an MNO's business, and a service that an MNO is obliged to provide under the mobile network license conditions. Therefore, the costs incurred in key network infrastructure, functionality and services should be recoverable in part by termination charges.

To estimate the total cost of termination, the LRAIC+++ methodology includes the variable cost of termination (traffic costs), coverage costs, and shared costs such as common network costs, subscriber lookup costs and business overheads. Each of these is implicated and invoked in mobile termination and so should be recovered in part through MTRs.

LRAIC only considers the variable traffic cost and removes coverage costs and shared costs. This is not justifiable on economic grounds as it would set the MTR below actual cost. The move to LRAIC therefore creates an economic distortion with potentially undesirable consequences for consumers, mobile operators and the wider society.

Specific consumers groups could be affected: there is a significant risk that vulnerable social groups such the poor and elderly will be disproportionately impacted, potentially leading to a reduction in mobile penetration and consequent loss of consumer utility, and ultimately social welfare.

MNOs will respond to the practice of setting MTRs below cost: this could lead to a partial waterbed effect, where MNOs raise prices for other services to recover the cost of termination that is no longer supplied by the MTR, and to protect margins.

There may be a redistribution of call volumes leading to a “double impact” on MNOs, and a particularly strong waterbed effect. The voice call-value proposition risks being devalued by the emergence of arbitrage players such as call back operators, leading to further pressure on mobile networks and their consumers.

Finally, social welfare is at risk: academic studies have attempted to predict the impact on welfare that the proposed reductions in MTR would have in EU countries. Some studies have identified potential adverse welfare effects, however there is as of yet no consensus. Given the uncertainty of outcome, and the exaggerated impact our analysis predicts for Norway, we believe a change in cost methodology presents a risk which cannot be ignored.

1.4 High coverage cost in Norway

Mobile networks are dimensioned according to capacity and coverage. In countries with a low population density, and particularly where the license conditions include coverage obligations, coverage will drive a substantial part of the network dimensioning.

The cost of coverage is a function of the land area to be covered whereas the cost of capacity is driven by subscriber volumes and demand. In countries with sparsely populated land area, the coverage cost will dominate the network investment. Norway is such a country, with a uniquely low population density among European countries.

LRAIC+++ allows the recovery of the portion of coverage costs that are due to termination using an accepted economic cost allocation technique called EPMU: “Equal Proportional Mark-up”. In this respect, Norwegian mobile operators would be able to recover a portion of coverage costs incurred in building their networks, in the rate which is applied to terminating traffic.

The LRAIC methodology does not allow coverage costs to be recovered in the termination rate. This creates a risk if under-recovery of network costs in any geography, but the effects of removing coverage costs from the MTR are more pronounced in low-population density countries such as Norway. Norwegian MNOs have invested more in coverage than many of their European counterparts, and therefore the move to LRAIC creates an especially serious risk of cost under-recovery in Norway.

1.5 Wholesale access regulation

The market for wholesale access (market 15) is regulated separately from the market for mobile termination (market 7).

Following the determination that Telenor has Significant Market Power (SMP) for National Roaming and MVNO access prices, the NPT decided to regulate wholesale access pricing, and uses a cost accounting separation model to set prices. We welcome the NPT’s decision to regulate wholesale access, but consider that if MTRs are reduced in Norway in line with NPT’s proposal, the wholesale access regulation is insufficient to avoid potential margin squeeze issues for users of National Roaming and MVNOs.

Our analysis indicates that the cost-accounting obligations imposed by the NPT may not be sufficiently robust to combat margin squeeze. Effective regulation of the margin between wholesale access prices and MTRs is necessary to allow a reasonably effective competitor a normal profit. Absent this, there is a substantial risk that the MVNO or National Roamer would operate at a net loss for received traffic produced on external networks.

To ensure sustainable competition in the Norwegian mobile market, we recommend NPT ensures the margin between MTRs and wholesale access charges is closely policed. Ideally this would be achieved through alignment of the remedies applied to Markets 7 and 15, for example applying similar cost-oriented methodologies in both. In practice, we recognise that NPT is unlikely to be able to achieve this alignment sufficiently quickly given the timetable for MTR reductions. We would therefore suggest an adjustment to the MTR of operators using wholesale access for call termination as an interim measure.

1.6 Consequences of adopting Pure LRIC

The EC has recommended that NRAs adopt the Pure LRIC methodology by 2012 to address potential competition bottlenecks and deliver benefits to consumers. Pure LRIC is an aggressive cost methodology which considers termination to be the “last increment” of network cost. Only the strictly avoidable costs of termination are included in the calculation of Pure LRIC.

Termination is a fundamental, indispensable part of the service a mobile operator provides and is not an optional extra. There is no sound economic justification to single out termination over any other service as the final increment.

The Pure LRIC methodology necessarily removes all costs which termination shares with other services. The exclusion of these shared costs from termination puts the EC in contradiction of its own principle of “cost causation”. The principle states that only those costs incurred in the performance of a service should be included in determination of the price for that service and that operators should refrain from transferring the true cost of termination to origination, or to other services (e.g. data).¹

Finally, given Norway’s unique position with regards to coverage costs, our analysis indicates that a move to Pure LRIC could bring about even more severe consequences than moving from LRAIC+++ to LRAIC. We find the Pure LRIC methodology to be particularly inappropriate for the Norwegian mobile communications market.

¹ See EC Recommendation 2005/689/EC – Accounting Separation and Cost Accounting Systems.

2. INTRODUCTION

CSMG was recently engaged by Tele2 and Network Norway to review NPT's proposed determination of MTRs in Norway. This document sets out our views and findings.

CSMG has extensive telecom experience and qualifications in several areas that are of particular relevance to this engagement:

1. We have developed numerous mobile operator business case models with a granular focus on both demand drivers and network costs.
2. We have analysed and developed detailed MTR LRIC models in a variety of different regulatory markets across the world.
3. We have worked with telecom regulators in the US, Europe, and Asia on a range of critical topics and decisions.

As a result of our past wireless and regulatory experience, CSMG is well positioned to provide an in-depth analysis and assessment of the present MTR regulatory decision, cost model methodologies and regulator intentions.

3. CONTEXT & OVERVIEW OF LONG RUN INCREMENTAL COST

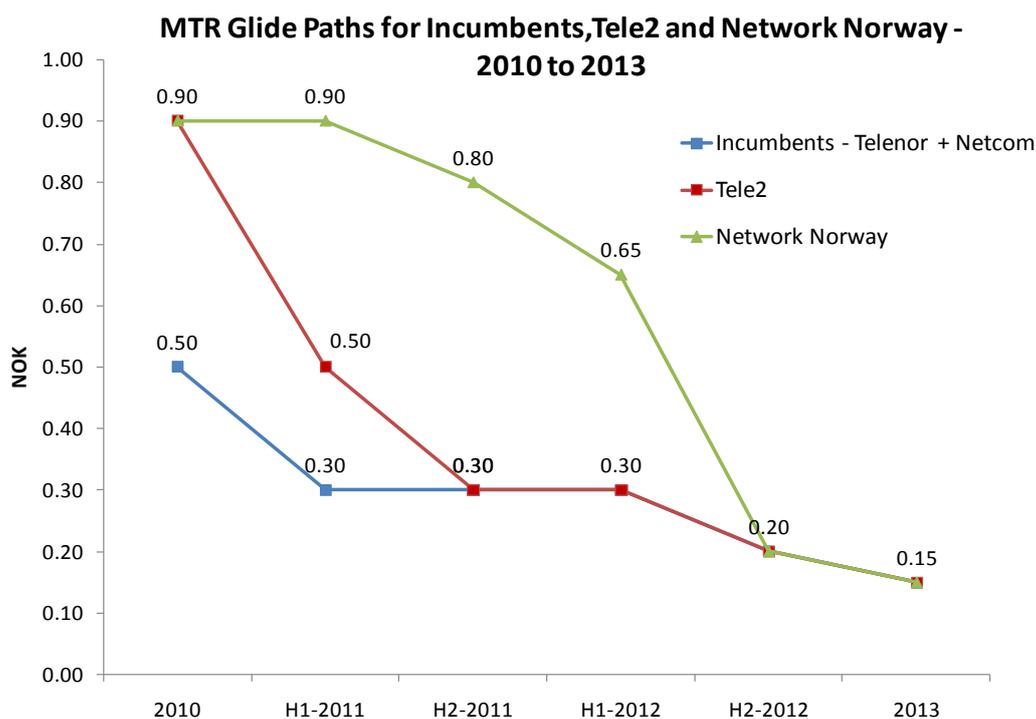
3.1 Current interconnection regime and future plans including glide path

NPT currently uses an LRAIC+++ model to set MTRs in Norway. LRAIC+++ is a long-standing accepted methodology of determining the cost of terminating voice traffic. The model outputs a “per minute” MTR that mobile networks can apply to each terminated voice minute, thereby allowing cost recovery for terminating traffic.

Following a Recommendation released by the European Commission on 7th May 2009, and following its own investigations into mobile termination in Norway, the NPT has decided to adopt a methodology to set MTRs in mid 2012. Currently the NPT is using an LRAIC+++ model to set MTRs; in mid 2012 NPT proposes to change to LRAIC.

A “glide path” will be used to transition from the current methodology. The LRAIC+++ methodology currently determines the MTR to be 0.30 NOK; the LRAIC methodology sets MTR at 0.15 NOK. NPT has decided to set the MTR to 0.20 NOK in 2012 by way of transition.

The glide path for Norway, describing historical, present and expected future MTR, is shown below:



During the next regulatory period, and before the end of 2013, NPT will carry out an impact study which shall focus only on traffic related costs and exclude coverage costs from LRIC calculations for Norway, i.e. it will consider the impact of adopting Pure LRIC in 2014.

Uncertainty between Decision language versions

We have observed a discrepancy between the Norwegian and English language versions related to the risk of undercoverage that the adoption of a Pure LRIC methodology would entail.

Recital 166 in the Norwegian (and adopted) Decision is written as follows:

*“NPT will make a new calculation based on Pure LRIC [...] NPT deems using **LRAIC** as a basis for price regulation in the next period will not pose any likely risk of undercoverage.”*

However, recital 166 in the English version states:

*“NPT will make a new calculation based on Pure LRIC [...] NPT deems using **LRIC** as a basis for price regulation in the next period will not pose any likely risk of undercoverage.”*

We interpret the Norwegian text in the adopted decision to be that NPT does not express any opinion on whether or not Pure LRIC poses a likely risk of undercoverage, and that the only opinion that NPT has made is related to LRAIC, not to Pure LRIC.

Given that NPT has adopted the Norwegian version, by implication, NPT is silent on whether Pure LRIC poses a risk of undercoverage. However, Pure LRIC produces an MTR output significantly below LRAIC; hence it is reasonable to conclude that Pure LRIC does pose a risk, particularly in Norway.

3.2 European Commission’s Recommendation on MTRs

As mentioned in section 3.1, the European Commission published a Recommendation on the “Regulatory Treatment of Fixed and Mobile Termination Rates in the EU” on 7th May, 2009.

The MTR has commonly been set across Eurozone countries by use of a “Long Run Average Incremental Cost” model. There are a number of variants of the Long Run methodology. Prior to the publication, LRAIC+++ was the long-standing accepted best practice. A definition and description of LRAIC+++ and the other long run cost model variants is given in section 3.33.3.

In its Recommendation of May 2009, the Commission renounced the LRAIC+++ methodology, instead advocating a new and an aggressive “Pure LRIC” methodology which would significantly reduce MTRs to a fraction of their original levels.

For the purposes of brevity, the most relevant points to our report made by the EC can be summarised as the following:

- MTRs are a competitive bottleneck for the telecommunications markets in the EU.
- If MTRs are set above cost, there is a danger that fixed to mobile (FTM) subsidy will go unchecked, and that small mobile operators entering the market may be unfairly disadvantaged. In addition, consumers are expected to benefit from lower retail pricing if MTRs are reduced to cost levels.
- Therefore the EC recommends strongly that NRAs in the EU all adopt the same means of regulating MTRs. The recommended approach is to use a Long Run Incremental Cost model to estimate the actual network cost that is incurred for each terminating minute.
- The EC recommends that the “Pure LRIC” variant of Long Run Incremental Cost should be adopted by the end of 2012. Before this date, NRAs are encouraged to adopt methodologies that move towards Pure LRIC in order to smooth the transition to the new methodology.
- NRAs without sufficient resources, which feel that a methodology other than Pure LRIC could result in outcomes consistent with the EC Recommendation, can set interim prices based on an alternative approach until 01 July 2014. However, the objectives and outcomes must be aligned with the EC Recommendation overall.

In this paper we will examine the Commission’s Recommendation and reasoning, as well as NPT’s interpretation of the Recommendation and NPT’s resulting intentions.

3.3 Long Run Incremental Cost and its variants

The Long Run Incremental Cost (LRIC) methodology calculates the future long term cost for a service or group of services, which is divided by total traffic to produce average incremental cost for each service.

NRAs consider mobile termination to be a market in which operators have Significant Market Power (SMP), in that each operator has a monopoly on termination on its own network. Potential competitive issues can arise, in principal due to the existence of absolute entry barriers in the relevant market: operators have little incentive to set efficient prices for voice call termination on their own network.

Thus there is a need for regulation. Pricing should be cost-oriented, firstly to allow network providers to recover investment costs, and secondly to prevent price inflation which would lead to the aforementioned competition issues. LRIC models are widely used as the basis for determining the cost-oriented price of termination.

The LRIC model outputs the termination rate that should be set by a mobile operator to recover the network investment cost that can be allocated to terminating traffic.

A LRIC model simulates a hypothetically “efficient operator”, or an actual operator’s business, taking accepted industry standard cost benchmarks and accepted business modelling techniques to output an estimated MTR. If the traffic forecasts (in terms of volumes, types and splits) are accurate, then the mobile operator will recover the greatest part of cost due to termination over the cost model period. In Norway’s case, this is up to 2041.

LRIC models are often large and complex, taking in account many factors in order to calculate the costs of building and operating a network, such as equipment costs, bandwidth and demand calculations, changes in customer usage, traffic mixes and realistic lifetimes of networks assets. In addition, LRIC models often utilise a degree of economic manipulation and various depreciation methods to estimate the actual cost over time.

There are several variants of LRIC that NRAs have employed in setting MTRs. We discuss three that the NPT has used in the past or intends to use in the future:

1. LRAIC+++

The LRAIC+++ methodology estimates total network cost to carry all traffic, and allocates a share of this cost to termination, pro-rata to the network utilisation of this traffic type.

It includes certain non-traffic-driven costs, specifically: network common costs, location update costs, and business overhead costs. These are discussed in further detail in sections 5.1.1, 5.1.2, and 5.1.3.

There is thus an element of cost that varies with traffic, and an element that increases as subscriber numbers increase (non-traffic-driven), as network assets often have limits on the numbers of subscribers that they can support.

There is also an element that does not vary with either traffic or subscriber numbers, which includes costs associated with coverage: additional expenditure is required to cover larger, less populated areas. The LRAIC+++ approach accounts for these “coverage costs” and allocates them proportionally to the MTR.

Additionally, these shared costs include business overheads associated with corporate offices or executive compensation. While there would be a relationship with the volume of minutes a network carries over its network, or the number of subscribers it has, the business overheads do not *directly* vary with these, or the relationship is not a simple one, and therefore they are considered “non-traffic-driven”.

2. LRAIC

As above, the LRAIC methodology estimates total network cost to carry all traffic and allocates a share to termination based on the traffic’s network utilisation.

However, the non-traffic-driven costs (network common costs, location update costs and business overhead costs) which are included in LRAIC+++ are not included in LRAIC: this approach does not allow the recovery of costs which do not directly vary with traffic, unlike with LRAIC+++.

In the documentation accompanying the latest version of the Norway LRIC model, AMG state that “it includes a share of all traffic-related network elements and intra-traffic common costs except wide-area coverage, licenses and [network management system]”. These last three would not be expected to increase as traffic volumes increase, and thus they are excluded.

Hence, under a LRAIC methodology, the only kinds of costs which can be recovered in the MTR are those which will directly vary with traffic volumes.

3. Pure LRIC

Pure LRIC is a more aggressive (i.e. includes less cost) methodology that departs from the overall philosophy of LRAIC+++ and LRAIC.

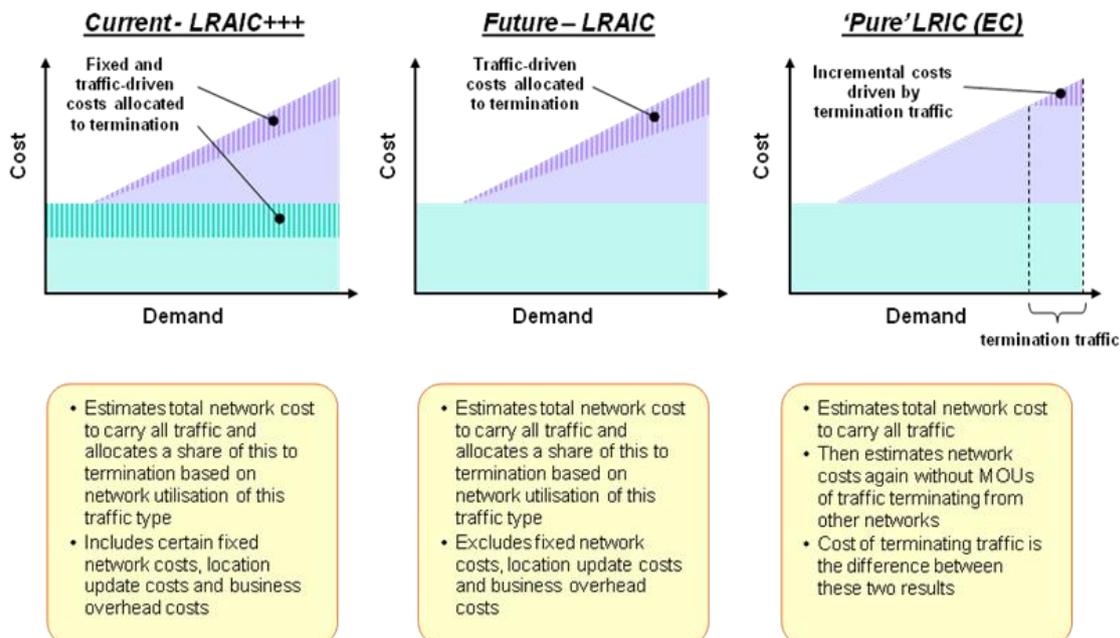
Under Pure LRIC, the total network cost to carry all traffic is estimated. Then the model estimates the total network cost to carry all traffic, minus voice minutes which terminate from other networks. The cost of terminating traffic is defined as the difference between these two results.

This methodology can be applied to the cost of any element of the business, whether technical, operational, commercial or support: the cost of the business with the element is compared to the cost of the business without the element.

Implicit in the Pure LRIC methodology is an assumption that termination is the “last increment” in a network’s total cost base.

These three methodologies are illustrated comparatively in the following diagram:

Comparison of Cost Methodologies



The parts of the plot area with vertical shading are reduced in area as one moves from the chart on the left to the chart on the right. The reduction in area represents a reduction in the MTR that results from the cost model. The effect on MTR of moving from LRAIC+++ to LRAIC, (stripping out non-traffic driven costs) is less impactful than the effect of moving from LRAIC to Pure LRIC (taking termination as the last increment).

4. SUITABILITY OF THE EC RECOMMENDATION TO NORWAY

4.1 Norway’s consideration in the EC Recommendation

The European Commission published a Recommendation on the “Regulatory Treatment of Fixed and Mobile Termination Rates in the EU” on 7th May, 2009. The Recommendation was aimed primarily at EU states, which implies EEA countries would not have been considered as part of the Recommendation. As would be expected, there is no mention of the EEA or any of any EEA countries in the Recommendation document.

This is of particular importance for Norway which is not a member of the EU, but of the EEA. On one hand, as an EEA state, Norway must take the “utmost account” of Commission recommendations. In this case, however, the characteristics of Norway are sufficiently different to the EU states, and Norway would have not been considered when the EC made its Recommendation.

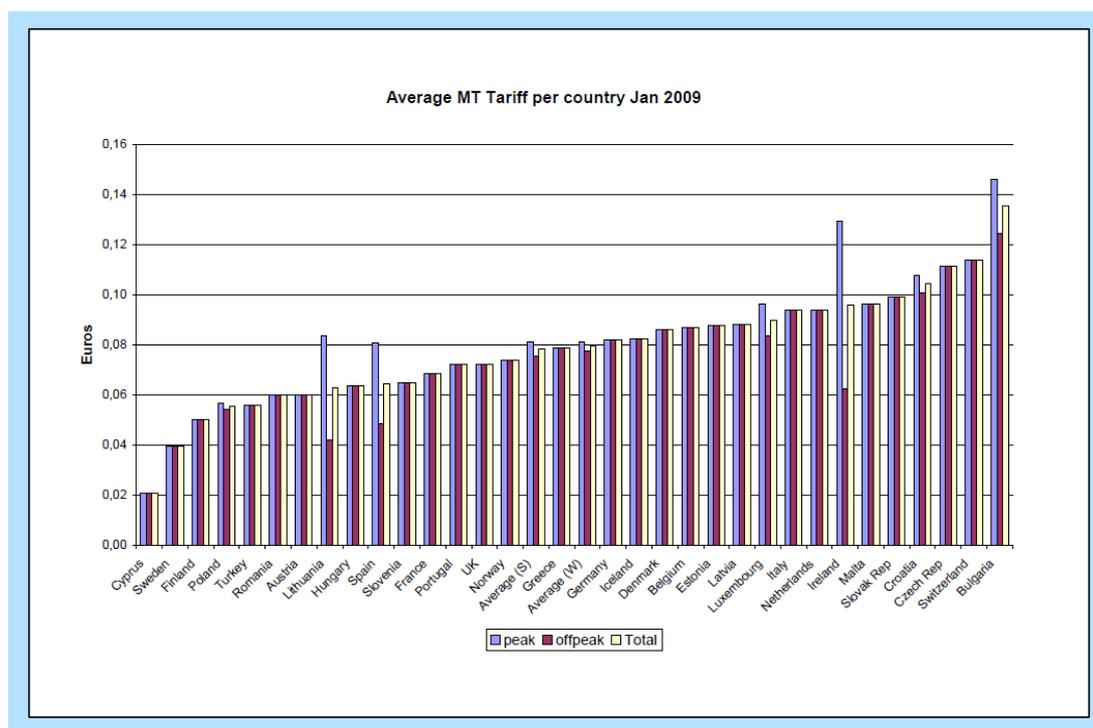
As stated above, as a consequence of Norway’s membership of the EEA, NPT is obligated to take utmost account of the Recommendation. However, as Norway is not an EU member state, the particular characteristics of Norway would not have been considered by the EC when the Recommendation was developed and characteristics particular to Norway indicate that adopting the Recommendation would have extreme local consequences. These should be evaluated before deciding to adopt the Pure LRIC methodology.

4.2 Useful extent of harmonisation

The EC is clear on its objective of harmonising termination rates across Europe, citing a number of reasons: lowering the price of voice calls within and between Member States, promoting the competitiveness of fixed and small mobile operators, and paving the way for “innovative new products combining fixed and mobile calls”.

Prior to the EC Recommendation of May 2009, a wide variation in MTR existed across EU states. From the chart below, we can see a potential number of issues:

- While peak and off-peak termination rates are for the most part equal, a few countries have large asymmetries
- The highest termination rate (over 0.14 EUR in Bulgaria) is more than seven times that of the lowest (~ 0.02 in Sweden and Finland)



However, we note that Norway’s MTR was in fact close to and just under the average for the Eurozone. I.e., it was not excessively high in the context of the EEA.

The EC’s claims and objectives can be contested:

Evidence for lowering of retail prices by reducing MTR is inconclusive and counter examples have emerged.

Regulators should remain technology neutral (as stated in Article 18 of the Common Regulatory Framework: Framework Directive of 2002) and neither impose nor discriminate in favour of the use of a particular type of technology; thus NRAs should not attempt to rebalance cost recovery between fixed and mobile networks.

The EC wished to address the wide variation in MTRs across the Eurozone that existed prior to the Recommendation. Ultimately however it is economically unsound to set termination costs for different geographies to be too similar. Differences in traffic volume, call type splits, population, subscriber density, spatial dimension, topology, license costs, wages, taxes etc. are all sound rationales for termination rates not being aligned across Member States. While a Pure LRIC model captures some of these differences, other key factors are omitted (e.g. topology and subscriber density)

For example, 3G license costs in Germany and UK are more than threefold of that in other countries. LRAIC+++ takes such variations into account; LRAIC does not and so appears economically unsound.

Of particular relevance to Norway is that the geography and population density of the country is not considered under Pure LRIC, causing a disproportionately low MTR output.

Therefore, whilst taking the “utmost account” of the EC Recommendation, EEA countries will need to consider the extent to which the Recommendation is reasonable given their local circumstances and what the consequences could be of adopting a Recommendation that has not taken these into account.

5. CONSEQUENCES OF MOVING FROM LRAIC+++ TO LRAIC

We prioritise four areas of concern in NPT's planned migration from LRAIC+++ to LRAIC in mid 2012:

- LRAIC+++ correctly estimates network cost, and so a move to LRAIC will reduce MTRs below cost.
- The reduction of MTRs below costs is detrimental to consumers, mobile operators and the wider economy.
- High coverage costs in Norway mean that the move to LRAIC would be particularly detrimental for Norwegian MNOs when compared with other EU MNOs.
- Disparity in regulation between the Norwegian termination and wholesale market exists; a reduction in MTR will lead to margin issues for MVNOs and National Roamers.

We examine each of these in turn.

5.1 Advantages of LRAIC+++ over LRAIC as cost methodology

Termination is a fundamental, inseparable, indispensable part of being a MNO. Mobile networks must connect voice calls with each other. Were mobile users only able to call others on the same network, the value proposition of mobile would be greatly reduced. Even in some countries where the incumbent mobile network holds significant market share (e.g. over 75%) there is still a need for users to call off-net and internationally.

Termination incurs network cost, but also provides a source of revenue to recover non-traffic-driven costs that are associated with running a mobile network business. The other principal source of revenue is revenue from call origination.

It is economically unsound to only allocate costs to certain services provided by utilizing the network, while excluding other services. I.e. it does not make sense to only charge for origination, while not charging for termination. There is no reason why origination should subsidise termination.²

Furthermore, it can be demonstrated that each of the shared costs (or “+++” costs) is invoked during a terminating call. For some costs, the practice of stripping out this cost from the terminating minute, or reallocating it somewhere else, would have larger than average effects in Norway compared to the rest of the EEA.

As previously discussed, there are three types of non-traffic-driven cost: Network Common Costs, Location Update Costs and Business Overhead Costs, which we discuss in turn:

² A Note on Possible Regulatory Strategies in Sweden to 2015, Martin Cave, 2008

5.1.1 Network Common Costs

Network common costs are those that do not directly vary with the number of subscribers. They are generally driven by network requirements, such as coverage costs and license fees.

1. Coverage costs

There are two demand factors to consider when building out a network: capacity and coverage. Capacity is principally driven by the number of subscribers and expected call profiles, data usage, etc.

Coverage costs are proportional to the geographic area to be covered. Where mobile operator license conditions require agreed population coverage, then the population density distribution will determine the amount of land to be covered, and hence the coverage cost. Such costs vary by country.

When a mobile network builds base stations to provide rural coverage, the cost recovery timeline will be longer than for building base stations in more densely populated areas. This is because the volume of traffic that can be expected for a rural base station is much lower, hence it carries fewer minutes, and generates less revenue. Hence, at a base station level, networks are already pressured in recovering costs in rural areas.

A proportion of calls that this base station carries will be terminating, i.e. caused by someone calling the rural subscriber. The LRAIC+++ model allocates a portion of the total coverage costs of the network (driven in large by rural coverage) to terminating minutes, thus enabling a network to recover the correct coverage cost for each terminating minute. The rest of the coverage cost is recovered by revenue associated with call origination.

As will be expanded later in our report, the coverage costs in Norway are above average due to the country's low population density, and therefore excluding them from the termination calculation (as in LRAIC) would have a disproportionate effect in Norway.

2. License fees

License fees are paid by network operators for spectrum, and often as a fee to the government for operating a communications service.

License fees in Norway are substantial and greater than license fees associated with fixed networks. Yet there is an element of external benefit to fixed users for the service that mobile networks provide. The "reachability" of mobile users is provided by the mobile networks. As fixed users benefit from being able to reach mobile users almost all the time, the value of the fixed service benefits from mobile network investment. Hence it is reasonable for mobile operators to recover some cost from fixed to mobile calls.

MNOs also provide a public service, particularly with regards to contacting the emergency services, or gaining access to information and help when the appropriate individuals and points of contact are not locally available.

The cost of license fees varies widely across EU countries, driven by competition, the auction process, the health of the local economy, the tax regime, and the financial resources of the mobile operators which bid for spectrum.

License Costs must be recovered; it is an implicit assumption that the purchase of spectrum enables the network to collect revenues in the future. The LRAIC+++ methodology allows a

mobile network to recover a portion of its license costs from terminating traffic. Removing the license cost from the calculation of MTR necessitates that mobile networks must recover these significant costs in other ways.

Finally, conditions of the mobile operator license require, amongst other obligations, the MNO to offer interconnection and termination services. The linkage between the two demonstrates that the cost of license fees should be recovered in part by termination.

5.1.2 Location Updates

Location costs are incurred in “finding” the recipient of a call. The location, defined by the base station to which the caller is currently assigned, is readily available information and is passed over during call set-up. The call recipient must be located before the call can be routed to the recipient’s base station.

Location costs include Home Location Register (HLR) lookups, software and switching support plants.

Calls that terminate on a network will require HLR and associated switching infrastructure to locate and route the call appropriately, regardless of whether the call originates on another network. This infrastructure is essential for terminating calls, and its cost should be appropriately allocated to terminating traffic.

The LRAIC model does not allocate location update costs to terminating traffic, and therefore is not aligned with the principles of cost causality.

5.1.3 Business Overheads

Business overheads include costs associated with corporate offices and executive compensation. It does not include advertising costs or “discretionary costs”, i.e. costs that are not essential for running the network.

Without termination the network would not be able exist in the first place, and so all costs that are essential to the network should be recovered by the equally essential termination.

In addition, termination requires maintaining commercial and technical connections and agreements with other networks, leading to some administrative cost and illustrating that there are overhead costs directly associated with termination.

Finally, the removal of business overheads from the MTR calculation could reduce competition by disproportionately impacting MNOs for which termination is a significant activity. For example, a pure play MNO with no fixed business would be impacted to a greater extent than an operator with both fixed and mobile operations. The latter would be able to allocate a share of the overheads to the fixed network, and so the drop in cost recovery for overheads would be smaller than it would be for the pure play mobile operator.

We thus find that the removal of network common costs, location update costs or business overhead costs, from the network cost calculation, will necessarily set MTR below actual cost.

5.2 Consequences of reducing MTRs below actual cost for operators, consumers and the wider economy

There are a number of potential consequences associated with price regulation of MTRs which are undesirable for operators, consumers, and the wider economy.

In its Decision of 27th September, 2010, NPT sets out the reasons for regulating termination rates. We have summarised them as follows:

1. To avoid excessive pricing (for the consumer and for other networks who wish to terminate traffic on the network in question)
2. To remove barriers to entry to new players
3. To avoid excessive Fixed to Mobile (FTM) or Mobile to Mobile (MTM) cross subsidisation
4. To avoid price discrimination (e.g. to providers in the same group, or partner companies)

We argue that the relatively blunt practice of reducing MTR is not the solution to each of these objectives. Rather, reducing MTR below cost will bring the following unintended consequences:

5.2.1 Existence of partial waterbed effect

The theoretical existence of the waterbed effect has been recognized by regulators including Ofcom and the New Zealand Commerce Commission, but its empirical relevance has been questioned. However, Genakos and Valletti³ tested empirically the existence of the waterbed effect and have found that it exists and it is strong (although not “full”).

Genakos and Valletti constructed a detailed panel of mobile operators’ prices and profit margins across more than twenty countries over six years. They found that regulation had on the whole reduced termination rates by about 10%, but this has led to a 5% increase in mobile retail prices.

In a recent press release of 28th September, 2010, NPT has acknowledged the existence of the waterbed effect:⁴

[Note, the original text was in Norwegian – the following is an English translation]

We [NPT] are aware that this tighter regulation of the termination rates can also cause negative effects in the retail market, for example, that the retail prices may increase rates or the subsidization of handsets may be reduced. But this would then ensure that end users are confronted with the accurate prices for the various services and will adapt their spending in line with this. This is economically profitable.

NPT’s view that “end users are confronted with the accurate prices for various services and will adapt their spending in line with this” is unsubstantiated in two aspects.

First: consumers will be confronted with the “accurate prices”. We argue that prices under tighter regulation are less accurate, as the cost incurred in terminating calls will have to be borne across the board in call origination charges. The total amount of revenue any one mobile user generates can be

³ “Testing the ‘Waterbed’ Effect in Mobile Telephony”, Genakos and Valletti, 2007

⁴ Press release on NPT website:

http://www.npt.no/portal/page/portal/PAG_NPT_NO_NO/PAG_NPT_NO_HOME/PAG_NPT_NO_VIS_NYHET?p_d_i=-121&p_d_c=&p_d_v=122378

divided into origination and termination. By removing the termination component, networks are likely to respond by setting higher prices for the origination component to mitigate the loss in cost recovery.

Consequently, the cost incurred by the network would still be aligned to a user's usage profile, but revenue would not. Hence, the user would not pay the "accurate" price for the service.

The second claim is that this is "economically profitable", which we understand to mean that it will bring about an increase in welfare. Such an increase can occur only if individuals can be made better off without making others worse off. Price adjustments across the board could bring about a situation where some individuals were made less well off.

For certain groups of users (i.e. those whose call profiles are heavily weighted towards inbound traffic), a reduction in termination rate below cost would in fact make these users "economically un-efficient" since their cost would be much greater than their revenue, and thus of less value to the network operator. We address this argument in section 5.2.4.

Having accepted that a partial waterbed effect does exist, we consider the likely responses of network operators to ensure cost recovery of termination.

1. Data pricing

As voice revenues are eroded, network operators will look to other products for revenue. An increase in data pricing could slow adoption of mobile broadband and reduce usage of the mobile internet. Other potential consequences could include data plans becoming less affordable, which may in turn curtail the growth in consumer usage of data, particular for poorer individuals.

2. Handset subsidies

Across Europe, the degree of handset subsidy varies significantly. In those markets with a large handset subsidy, many vulnerable consumers, such as the poor and the elderly, enjoy low cost access to entry-level handsets. The network handset subsidy has been crucial in providing access to low-revenue, low-cost users, who may not have decided to purchase and use a mobile phone in the absence of this subsidy.

In the above press release on 28th September 2010, NPT alluded to the possible consequence of handset subsidies being reduced following a reduction in MTR. This implies therefore that there is a risk that a reduction in handset subsidies could have unintended consequences for vulnerable individuals and groups, and potentially lead to a decline in penetration among those groups (and possibly overall).

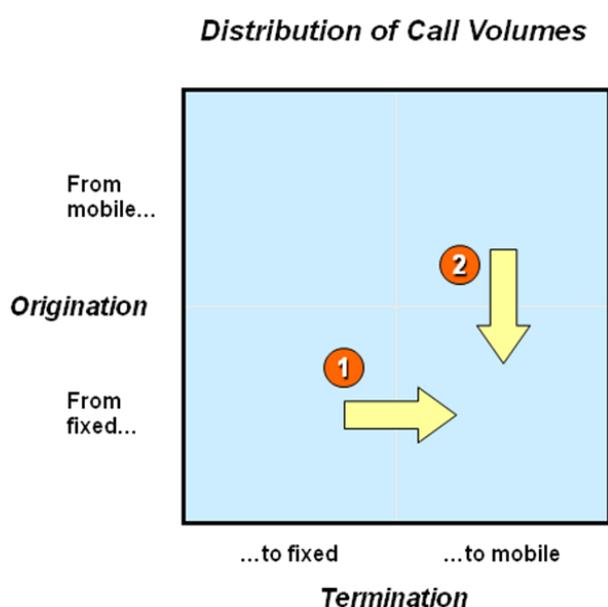
5.2.2 Shift in distribution of call volumes

A reduction in MTRs could bring about unexpected changes in patterns of call origination and termination, especially between fixed and mobile networks. Unforeseen consequences on pure play mobile networks could be greater than at first appearance, and the impact to MNO cash flows could be sufficient to prompt increases in origination prices for consumers.

We would expect reductions in MTR to partially translate in reductions in retail price for fixed consumers, particularly in the rate charged for fixed to mobile calls. Potentially fixed operators may be able to start bundling calls to mobile networks at attractive prices. This would be beneficial for fixed users, but could be detrimental to mobile users.

Given lower pricing for fixed to mobile calls, users calling from fixed lines will increasingly choose to call users on their mobile phones as opposed to their fixed lines, for two reasons:

1. By calling a fixed line, there is an increased chance that the caller will have to speak to a family member or someone who shares the home, rather than the intended recipient. This makes the call less personal. Secondly, the caller is more likely to reach someone on their mobile phone, as the recipient can only be reached on their fixed line when he/she is at home. Thus we expect that lower FTM prices could quickly translate into larger FTM volumes, and there would be volume substitution from **fixed-to-fixed to fixed-to-mobile**. This is shown in the chart below as effect (1).
2. Lower fixed to mobile pricing could also have another effect, related to the declining price differentiation between calling a mobile from a fixed phone as opposed to calling it from a mobile phone. Currently it is cheaper to call mobile phones from other mobile phones. As the price difference decreases, the relative proportion of users calling mobile phones from fixed phones will increase, as users look to maximise their fixed bundle and are less disincentivised from making fixed to mobile calls. This will cause call volume substitution from **fixed-to-fixed to fixed-to-mobile** and is shown in the chart below as effect (2).



Hence the reduction of MTR below cost will alter consumer behaviour in call origination and termination, creating a double impact on MNOs:

- Fewer calls will be originated on mobiles, causing a loss in revenue
- More calls will be terminated on mobiles, causing an increase in cost without sufficient compensation due to below-cost tariff; i.e. cost is greater than cost recovery and each accepted call represents a loss to the mobile operator

This will not be limited to FNOs: VoIP providers will significantly benefit from lower MTRs and so we expect to see them contribute more FTM volumes following a termination regime change.

The likely responses of mobile operators would be related to the partial waterbed: either imposing charges for receiving calls, which would disadvantage vulnerable groups (poor, elderly), or raising prices for other services.

5.2.3 Erosion of voice call value proposition by call back operators

If MTRs are reduced below cost, there could be other consequences related to the emergence of new arbitrage players.

As termination rates fall, there is a potential for call back operators to emerge and erode the retail revenues (also noted by Ovum in a recent thought leadership piece).⁵ A call back operator makes two termination calls to make a complete call, thus the cost of the call to the call back operator is twice the MTR (providing rates are symmetrical). If MTRs are significantly lowered, this call cost becomes negligible and the call back operator can afford to significantly undercut retail pricing.

Such arbitrage players take advantage of the fact that on-net calls have a real cost to MNOs which is greater than the cost of two terminated calls. In addition, call back operators have relatively lower investment costs to recover, and a much lower operating cost base, hence can offer retail rates to the customer that are much lower than the market average. MNOs could not hope to match these rates in a low MTR market.

While that may be seen to be an advantage for the consumer as it places downwards pressures on retail pricing, the difference in pricing between that offered by the call back operator and the traditional MNO would be so large as to severely damage the value proposition of voice calls.

This could exacerbate waterbed effects discussed throughout the rest of this report.

5.2.4 Disproportionate effect on vulnerable groups and individuals

A mobile operator receives two revenue streams from a single mobile subscriber: direct revenue associated with call origination and indirect revenue associated with call termination. The more calls an individual user receives from other networks, the more termination revenue he or she provides to the MNO.

Recognising this, MNOs are able to provide service to a group of users that primarily receive calls on their mobile phones. Contract users in this category are profitable because they pay a monthly recurring charge; regardless of value, this is still regular income for the MNO.

Prepay users who primarily receive calls instead of making them, do not provide much call origination revenue to the operator, but provide an above average termination revenue stream. The MNO can afford not to impose regular retail payments on the prepay customer (i.e. requiring monthly top-ups) as it still profits from these user groups. Thus the MNO generally does not set the condition that prepay users have to top up regularly to be able to receive calls.

Thus, while termination rate is at actual cost, prepay users which receive calls and do not regularly top up are still valuable customers to the mobile network. Once MTRs are set below actual cost, the prepay user who mainly receives calls is now unprofitable, and as such, the network operator has no incentive to keep this user.

Therefore, as MTRs are reduced below cost, mobile networks will either seek to abandon such unprofitable customers or adjust their prepay propositions to maintain profitability. The latter could be achieved in a number of different ways:

- Decrease maximum period without top-up

⁵“The reduction of voice termination fees is a new beginning”, Ovum, 2010

- Increase value of minimum top-up
- Increase retail price per minute rate
- Charge for receiving calls

Each of these would have a cost implication for the user. As such, the user would consider the prepay service less affordable and may choose to abandon their mobile phone altogether, leading to a reduction in penetration, focussed among lower income families. Such groups of users are limited in terms of the other options available to them. The attraction of mobile prepay is that the user does not have to top-up on a regular basis. Fixed networks do not generally offer this flexibility. So the user has two options: forgo a prepay mobile service that has become less attractive and take up a regular fixed service which could be more difficult to pay for, or to just accept the less beneficial terms of the prepay service.

Finally, the loss of the prepay service to certain groups of users could affect their credit rating: by forcing them to adopt a fixed solution which could not reliably pay for on a monthly basis, or by making the mobile service more unaffordable.

Setting MTRs below cost in therefore has an undesirable social effect: it penalises poor or less well-off families or individuals, who currently predominantly use mobile phones to receive calls. This is an undesirable consequence of termination regulation, and at odds with NPT's stated purpose of the providing value to the consumer and ensuring the absence of excessive pricing.

5.2.5 Wider economic effects

A number of recent papers have argued that reducing MTRs will reduce consumer surplus, and possibly welfare, in the mobile market.

The economic literature for mobile termination and interconnection is abundant in theoretical modelling exercises which attempt to predict and understand the social and economic benefits or costs which may result from the trend in reductions in MTRs.

Some of the academic literature predicts that reductions in MTR will not necessarily bring about an increase in consumer surplus and possible welfare, or could in fact decrease welfare.

Armstrong et al. modelled a number of different scenarios in the UK market, calculating the economic benefits (specifically consumer surplus and welfare). They concluded for each scenario, that the socially efficient charges were above the cost of supplying termination.

Gans and King show that low (below marginal cost) interconnect charges can still be used to sustain high subscription prices under network competition with two-part tariffs and price discrimination.

Hoernig examined two competition problems commonly associated with high termination rates: underprovision of calls and permanent disadvantages for small networks. He found that in all cases a trade-off has to be found between efficiency and network's profits on one hand, and consumer surplus on the other, and that the total welfare effects of regulation are ambiguous and depend on demand characteristics.

Other academics have taken alternative positions: In a calibrated welfare study of the UK mobile telephony market, Harbord and Hoernig concluded that reductions in MTR would lead to an increase in social welfare, depending on the strength of call externalities.

There is an ongoing debate on the social and welfare consequences of reducing MTR, and Armstrong and Wright correctly point out that only empirical evidence will prove who is right and who is wrong.

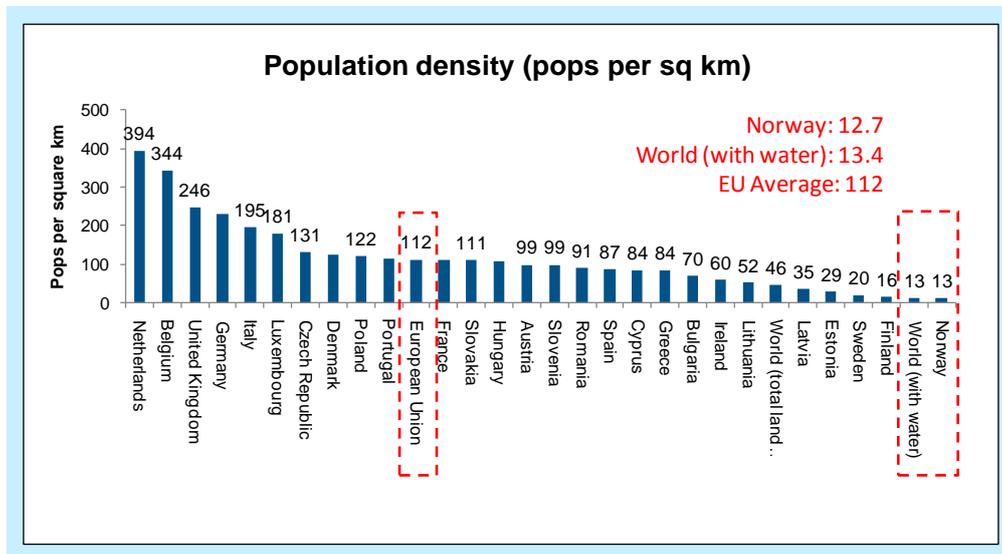
Hence, setting MTRs below cost is a risky strategy for NPT. If a partial waterbed effect occurs in Norway, consumers could experience unpleasant price rises for some products, and lower value customers may be discriminated against. The networks, which face continuing ARPU pressure and volume increase, will at some point have to respond to the loss of a key source of cost recovery, and this response is unpredictable.

On balance, our view is that the potential negative consequences of MTR regulation have not yet emerged because MTRs still remain at cost. Once MTRs fall below cost, negative “side effects” are inevitable.

5.3 High coverage cost in Norway

Networks are dimensioned according to capacity and coverage. In countries with a low population density, such as Norway, and particularly where the license conditions include coverage obligations, coverage will drive the network dimensioning over capacity.

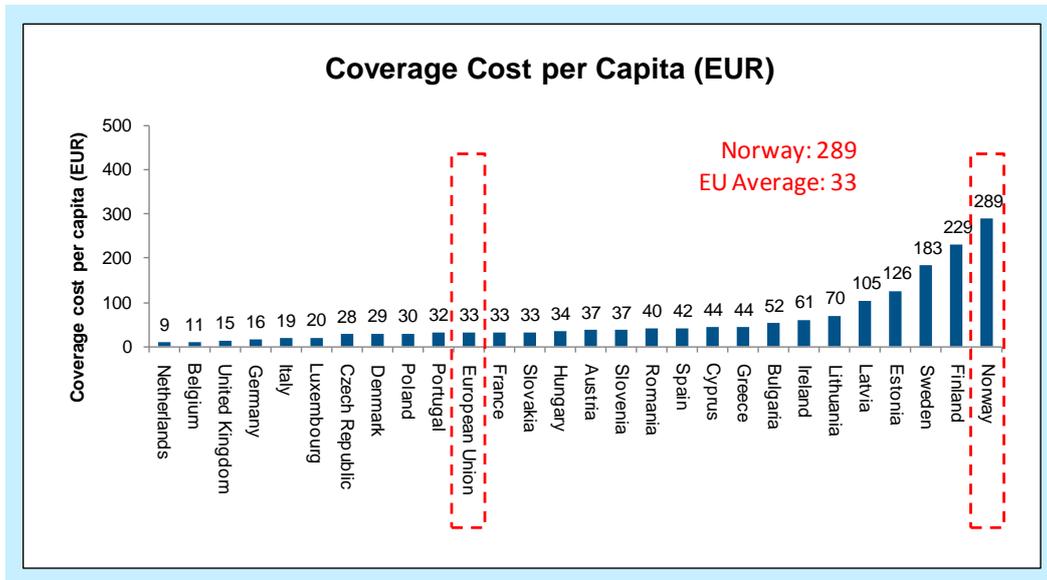
Norway is such a country, and not representative of other EU countries in this respect, having a very low population density of approximately 12.7 pops per square km, vs. 13.4 for the entire world, and 112 for the EU as an average. Norway’s population density is extremely low when compared with Europe as a whole.



LRAIC+++ allows the recovery of the portion of coverage costs that are due to termination using the accepted economic cost allocation technique “Equal Proportionate Mark-Up” (EPMU). Under an LRAIC+++ methodology, Norwegian mobile operators are able to recover the portion of coverage costs due to termination, by charging for terminating traffic.

However, the LRAIC methodology does not allow coverage costs to be recovered in the termination rate and the effects of removing coverage costs from the MTR are even more pronounced and serious in a country such as Norway. Norwegian MNOs have invested more in coverage than many of their European counterparts, and such the move to LRAIC is especially impactful in Norway.

Taking coverage cost outputs from the Norway AMG model, we calculated the relative coverage costs across EU countries. Coverage obligations vary by country, and cost varies by terrain type. In the interests of comparative simplicity we have held both of these constant. The difference in coverage cost per capita in Norway is so significant (approximately one tenth of the EU average), that it is economically unsound to adopt a standardised cost methodology that does not take the magnitude of this difference into account.



In summary, building a mobile network for coverage in Norway is a disproportionately costly exercise compared with the rest of the EU, and adoption of the LRAIC methodology would mean that Norwegian MNOs significantly under-recover the coverage costs incurred while building their networks.

Or in other words: in adopting LRAIC, the NPT would be setting the MTR significantly below the average long run cost.

5.4 Wholesale access regulation

In its Decision of 5th August 2010, the NPT determined that Telenor continues to hold SMP in the Norwegian market for access and call origination on mobile networks. To address competition problems within the market NPT determined that a general access obligation should be imposed on Telenor for MVNO and national roaming access linked to the obligations for non-discrimination, reference offers and publication.

Under the current regulation Telenor must provide separate financial accounts for National Roaming (NR) and MVNO access. The rate charged to the MVNO/NR customers for wholesale is set by Telenor based on these published accounts.

MVNO and NR customers are charged access fees by Telenor for call origination and termination. The termination charges levied by Telenor create a relationship between the wholesale access market and the market for mobile termination.

We identify two issues with the NPT's approach in regulation of mobile termination and wholesale access.

1. Incorporation of wholesale access cost into termination cost

The EC Recommendation states that the avoidable cost (that which would not be incurred without the incremental provision of the given service) of termination should be efficiently recovered by MNOs.

In its Recommendation, the EC states that the MTR should allow the recovery only of costs which would be avoided if a wholesale call termination service was no longer provided to third parties.

As Telenor levies access charges on MVNO and NR customers for terminating minutes, it necessarily follows that the wholesale access is an avoidable cost of termination: were the MVNO/NR not to receive terminating traffic on the host network, the wholesale access fee would not have to be paid to the host MNO.

As the wholesale access cost is an avoidable cost of termination, it is part of the total termination cost, and thus should be considered in the MTR calculation of operators with MVNO and NR agreements.

There are two possible solutions:

- First, the wholesale access charge can be combined with the LRIC-calculated Mobile Termination Cost (MTC) to give a blended MTR.
- Secondly, the methodology of calculating the wholesale access charge can be altered to align it with the MTR calculation, i.e. by using the LRIC methodology to set wholesale access prices.

We recognise that there will be further analysis and deliberation required by the NPT for the second option, and therefore identify the first option as the most realistic near term solution to treating the wholesale access cost as an avoidable cost of termination.

In calculating a new MTR for MVNOs and NRs which takes in to account the wholesale access cost, we recommend that NPT takes the following into consideration:

- Each MVNO and NR should be treated separately, not in the manner of the “highest cost operator” as is the current practise for MTRs.
- The most straight forward solution is to calculate a weighted average based on the expected distribution of call volumes which can in turn be easily derived from the LRAIC+++ model.
- For internal calls that terminate on the MVNO’s/NR’s own network, the mobile termination cost can be determined by the output of the LRAIC+++ model.
- For external calls that terminate on the MVNO’s/NR’s host network, the wholesale access charge is the avoidable cost of termination.
- Based on the relative call volumes of the internal and external calls, a blended MTR can be calculated from the associated internal and external costs of termination.
- This would be consistent with principles of cost recovery: the MVNO would neither profit nor lose from receiving calls from other networks, as it would recover cost for use of its own network, and recover the wholesale access cost for use of the host network.

2. Change in MTR regime unaccompanied by a corresponding change in wholesale access regime leading to margin squeeze

For both LRAIC and Pure LRIC, costs are not fully allocated (shared costs are removed from the calculation) and the cost is determined by a model of an efficient operator. As discussed elsewhere in this report, we find that either of these methodologies will set MTR below cost.

However, the accounting separation methodology used to calculate wholesale prices could not set prices below cost for two reasons: First, costs are fully allocated, and so include shared costs. Secondly, the actual and real costs are used (in contrast to costs estimated by a cost model of an “efficient network”). Thus the “internal transfer price” will be at cost or above, and so the wholesale access fee will also be at cost or above.

Hence the real and total cost of termination to the MVNO/NR, which is the net of the MTR and the wholesale access price, will not be efficiently recovered. This is against the principles of the EC Recommendation, which advocates efficient cost recovery for termination.

As a consequence of using two different methodologies for calculation wholesale access charge and MTR, there is a risk of margin squeeze. NPT has stated that it expects Telenor to reduce wholesale tariffs in order to avoid a margin squeeze when MTRs are reduced, but this cannot be guaranteed and appears to contradict NPT’s decision to regulate this market in the first place.

Should the NPT move to a below-cost calculation for MTR, Telenor cannot be expected to reduce its charges below cost and hence it is likely that MVNOs/NRs will experience a negative margin for terminating calls.

This presents an uncomfortable situation. Through differential regulation of markets 7 and 15, the NPT creates the necessary conditions for margin squeeze and should it move forward with the change in methodology for determining MTRs, it will force MVNOs and NRs into a loss-making position with respect to call termination.

6. CONSEQUENCES OF MOVING TO PURE LRIC

6.1 Use of Pure LRIC by the EC as a tool to address competitive bottlenecks

In its Recommendation on the “Regulatory Treatment of Fixed and Mobile Termination Rates in the EU”, the EC advocated a move to a Pure LRIC regime by the end of 2012. The EC has also defined where it is acceptable for an NRA to delay implementation, principally when NRAs do not have sufficient resources to develop a Pure LRIC cost model in the allotted time period.

The EC believes that MTRs are “competitive bottlenecks” which can disadvantage both fixed networks and new mobile entrants. The EC also believes that high MTRs encourage network operators to maintain high retail prices, and that reductions in MTR will be passed through to consumers.

Having decided to harmonise and lower termination rates, the EC has identified Pure LRIC as a defensible methodology based on sound economic principles, with which to lower termination rates.

Under a Pure LRIC regime, termination is considered to be the last increment. As such, a Pure LRIC cost model first estimates the total network cost to carry all traffic, then estimates network costs again, without minutes of traffic terminating from other networks. The cost of terminating traffic is held to be the difference between these two results. This is then divided by the number of minutes to estimate the MTR.

Whereas the LRAIC methodology estimates traffic-driven costs and allocates a share to terminating traffic, Pure LRIC calculates the difference in total network costs between a hypothetical network with no terminating traffic and a network with terminating traffic.

6.2 Methodology and economic logic under scrutiny

We argue that Pure LRIC is not defensible and based on economically unsound principles⁶ and therefore is more appropriately considered a tool recommended by the EC to accomplish its objective of harmonising and lowering MTRs across Europe.

We recommend that NPT examines both the economic philosophy and potential problems associated with adopting the aggressive Pure LRIC regime.

We identify the following issues with the Pure LRIC methodology in general:

1. Termination as last increment

The Pure LRIC methodology advocates that termination should be the last increment of a network operator’s cost base. This would be a sound approach if it were applied to a non-essential service, such as traffic alerts, mobile video downloads, or some other value added service. However, termination is a fundamental part of a network’s core function, and so it does not make sense to take this termination increment last.

To accept Pure LRIC, one must accept that termination is a dispensable component of a network’s business. This is not the case.

2. Perverse results from subtraction

⁶ “A Note on Possible Regulatory Strategies in Sweden to 2015”, Martin Cave, 2008

Pure LRIC is an unpredictable and complex modelling process which can produce perverse results. Analysys Mason Group (AMG), a company which has developed a number of LRIC models, provides an example in the documentation accompanying the latest version of the Norway LRIC model (version 7.1)⁷

Slide 37 acknowledges that as the Pure LRIC involves subtracting the network cost without termination volumes from that with termination volumes, there are perverse results.

“Calculating the difference in two profiles of annualised costs, post-economic depreciation, results in an unexpected time variance to the incremental costs for Telenor and Netcom.

This is caused by the interactions between the dynamic multi-year model and economic depreciation in the with and without cases in the calculation

Subtracting an increment (wholesale termination) that is not a constant proportion of traffic (as in the case for Telenor and NetCom) results in a ‘horizontal’ time shift in annualised costs”

However, AMG offer no solution to this issue.

In summary, due to the calculation of economic depreciation used in the Pure LRIC model, the network with termination traffic can have a lower cost than the network without, and hence the subtraction process produces a negative MTR.

This supports our principal argument that the Pure LRIC process is economically unsound, as it does not survive an accepted economic depreciation technique without producing illogical outputs.

6.3 NPT’s justification in adopting Pure LRIC

In its Decision on Market 7 (voice call termination on individual mobile networks) of 27th September 2010, NPT discusses some of the advantages and disadvantages of moving to a Pure LRIC methodology, and concludes that the best approach is to take to instead adopt LRAIC in the next regulatory cycle.

We challenge two items:

1. Non-traffic-driven costs should be excluded as markets are two sided

In its Decision, the NPT states:

“159. However, in line with the Commission’s Recommendation, pure LRIC disregards such a mark-up for common costs (as well as location costs and business overhead costs). The reason for this is that the market for mobile termination is a so-called double-sided or reciprocal market where both the subscriber who calls and initiates a call (origination) and the subscriber who receives the call (call termination) benefits from the occurrence of the call. It is thus not a given that all the costs associated with termination of a call should be covered through the termination charge charged to the operator that originates the call (the CPP principle). On the contrary, it can be argued that the subscriber receiving a call should help cover a portion of the costs of

⁷The updated cost model of mobile termination, AMG, 24 November 2009

termination. On this basis it may be necessary to extract common costs etc. from the calculation of the termination cost, precisely to recognise that the market is twofold.”

The above paragraph can be summarised thus: Call recipients gain some benefit from the call, and so should contribute towards cost. Non-traffic-driven costs are currently recovered by the MTR, and so paid by the originator. As call recipients should contribute towards cost, they should pay for the non-traffic-driven costs involved in termination, and thus these should be stripped out from the MTR.

Concern over the two-side nature of markets is a concern of economic efficiency. It is more economically efficient for the proportion of benefit between the called and calling party to be aligned to the proportion of cost assigned to each. If termination rates are reduced below cost, network operators will have a number of options:

1. Impose some sort of Receiving Party Pays (RPP) per minute billing, especially for those users who are “net receivers” and receive more calls than they make
2. Identify which groups of subscribers are now incurring too much cost relative to origination revenue, and charge higher monthly fees, or increase the price per minute cost of origination
3. Impose increases in prices across the board, or for other services (i.e. the waterbed effect)

None of these options is satisfactory. RPP is not identified as a desirable retail pricing scheme by the EC, and is unlikely to be adopted by operators in Europe as the large-scale change in regime would be deeply unpopular with consumers.

Option 2 would penalise more vulnerable groups of society as discussed in section 5.2.4. Option 3 is economically inefficient as cost is being borne in other services (i.e. there is cross subsidy), and price rises are fundamentally unpredictable.

Therefore, the argument that common costs should be removed from the termination calculation to address the two-sided nature of markets is not valid: any response by operators would not result in a situation that is more economically efficient or socially beneficial than the current situation.

There is also an argument that while a single **call** is one-sided under a Calling Party Pays regime, as long as termination rates are set at cost, then the market as a whole becomes two-sided when multiple calls are taken into account. For the most part, outbound and inbound call volumes between operators balance out, thus the two-sided nature of markets is already sufficiently addressed by the current regime.

2. Allocation of non-traffic-driven costs to regulated wholesale product

In its Decision, the NPT states:

“161. The distribution of common costs etc. to a regulated wholesale product is in addition associated with uncertainty, and there are different opinions about the allocation principles that achieve the best welfare effects. NPT’s opinion is that an allocation principle based on the EPMU (Equal proportionate mark-up) is more appropriate compared to using, for example, the Ramsey principle. In a situation where neither retail nor wholesale prices to originate a call are subject to the obligation of cost-oriented prices, the Authority nevertheless sees that it can reduce uncertainty related to determining the level of the mark-up if there is an implicit requirement that these costs are to be covered through other products.”

The above paragraph can be summarised thus: There is uncertainty on how non-traffic-driven costs should be allocated to terminated minutes, with EPMU currently the best option so far. However, this uncertainty is undesirable: networks could recover too much cost, or not enough. Therefore, it is better to strip out the non-traffic-driven costs entirely from the MTR, such that they can be recovered through other products. That means that the network will not recover more or less than the actual cost.

We identify problems in NPT’s reasoning on this point:

First, the waterbed effect is partial, so at best only some of the non-traffic-driven costs can be recovered. Second, costs should be recovered where they are incurred, not passed to other services – this is more economically inefficient. Third, the assumption that the correct amount of cost will be recovered for one product (termination) through unrelated products (e.g. voice origination revenue, data revenue) is ill-founded. There is no evidence to suggest that uncertainty in the amount of cost recovered will be reduced.

Stripping out non-traffic-driven costs from the MTR calculation means that country differences (e.g. coverage, license fees) are not modelled at all, and so the MTR may be set too low for the non-traffic-driven costs to be reasonably recovered elsewhere. This implies that price rises in other products could be painful for consumers, or that mobile networks will not manage full cost recovery. Both of these consequences are undesirable.

NPT is considering setting the MTR below cost and assuming that the rest of the cost is recovered elsewhere. This introduces more uncertainty than if it were to use an EPMU technique on non-traffic-driven costs in the first place.

6.4 Issues with Pure LRIC and high coverage cost in Norway

1. Problems associated with low population density

We show in section 5.3 that the cost of coverage in Norway is disproportionately high when compared to EU countries, driven by Norway’s extremely low population density and large land area.

In its Decision, the NPT acknowledges this and states:

“164. However, there are many indications that the results based on a pure LRIC approach in mobile networks are relatively low in Norway compared with other countries in Europe. This could be because Norway has a large land area with scattered settlements and therefore relatively high coverage costs compared with, for example Netherland, Belgium or Denmark. Because rollout of mobile networks in Norway is more driven by coverage than traffic, and only traffic-driven costs are relevant in a pure LRIC context, the results for Norway are correspondingly lower. For this reason, NPT believes more time should be used in Norway to phase in rates based on pure LRIC for mobile networks than the Commission’s Recommendation implies (by the end of 2012). NPT’s experience is also that the results from a pure LRIC model for Norwegian providers as currently defined by the Commission will not be very robust.

165. NPT has therefore concluded that LRAIC without mark-up of common costs, etc. should be phased in to form the basis for the regulated termination charges during the next regulatory period.

166. NPT will make a new calculation based on pure LRIC by the end of 2013. In the course of the next regulatory period, NPT will also do a more detailed impact assessment by only including traffic-related costs and exclude all coverage costs from the LRIC calculation in Norway. Since LRIC model uses conservative estimates for traffic growth and development of equipment costs, etc., NPT deems using [LRAIC] as a basis for price regulation in the next period will not pose any likely risk of [incomplete cost recovery]. If NPT were to find it appropriate to introduce pure LRIC after 2013, these results would likely be considerably lower than [today’s result].”

Note: [text in square brackets] replaces NPT’s English translation in the draft decision notified to ESA based on a more faithful translation of the original Norwegian text in the final adopted decision.

The above paragraphs can be summarised thus: Pure LRIC will produce a lower MTR than on average for EU countries because of low population density in Norway compared to the rest of Europe. However, the Norway LRIC model assumes low traffic growth, and high growth in equipment costs, which means that the MTR will reduce by less than it might do in other countries. Hence, the population density effect would be adequately off-set.

We identify two problems with this logic: First that the differential between Norway and the rest of Europe for the coverage effect is already extremely large, as we show in the chart in section 5.3. This implies any coverage differences will greatly outweigh the opposite differential for traffic growth and development of equipment costs, which are likely to be relatively minor.

Second, the population density effect demonstrates the limitation of applying the Pure LRIC methodology across countries with different demographics; the traffic and equipment projects, which may be conservative, are based on agreed projections. It is not logical to equate the validity of these two drivers and use an existing correct effect to cancel out an acknowledged flaw. Simply identifying a valid driver that partially mitigates the population density problem does not resolve the population density problem. The correct solution is to account for the large coverage cost that Norwegian networks have and will experience in building out their networks.

Additionally, we have observed a discrepancy between the Norwegian and English language versions related to the risk of undercoverage that the adoption of a Pure LRIC methodology could bring.

Recital 166 in the Norwegian (and adopted) Decision is written as follows:

*“NPT will make a new calculation based on Pure LRIC [...] NPT deems using **LRAIC** as a basis for price regulation in the next period will not pose any likely risk of undercoverage.”*

However, Recital 166 in the English version states:

*“NPT will make a new calculation based on Pure LRIC [...] NPT deems using **LRIC** as a basis for price regulation in the next period will not pose any likely risk of undercoverage.”*

We interpret the Norwegian text in the adopted decision such that NPT does not express any opinion whether or not Pure LRIC poses a likely risk of undercoverage, and that the only opinion that NPT is made is related to LRAIC, not Pure LRIC.

This implies that NPT is silent on whether Pure LRIC poses a risk of undercoverage. However, given Pure LRIC gives an outcome significantly below LRAIC, it is reasonable to conclude that Pure LRIC does pose a risk, particularly in Norway.

2. Logic in moving the timeline

NPT has recognised the problems associated with a Pure LRIC model for Norway, and intends instead to instantiate LRAIC without mark-up of non-traffic-driven costs, etc. as the methodology for the next regulatory period.

In its Decision, the NPT States:

162. Based on the discussions above, NPT finds that mark-ups for common costs, localising of handsets and business overhead costs shall not be included in the calculation of efficient price.

164. [...] For this reason, NPT believes more time should be used in Norway to phase in rates based on pure LRIC than the Commission’s Recommendation implies (by the end of 2012). NPT’s experience is also that the results from a pure LRIC model for Norwegian providers as currently defined by the Commission will not be very robust.

165. NPT has therefore concluded that LRAIC without mark-up of common costs, etc. should be phased in to form the basis for the regulated termination charges during the next regulatory period.

The above paragraph simply states that while NPT believes that LRAIC is justified on a standalone basis (principally that shared costs should not be included), an element of NPT’s decision to adopt LRAIC may be to smooth the move to Pure LRIC in the future.

We have already set out our arguments against LRAIC over LRAIC+++ in section 5. As the NPT has acknowledged that a Pure LRIC model would not be appropriate for Norway, the intended adoption of LRAIC could only be justified based on its own merits.

The EC has stated that it is acceptable for countries to put in place other cost methodologies as long as the outcome is not higher than the EU average. However, because of potential

consequences we identify in this report, in particular Norway’s high cost of coverage, it is not economically or socially beneficial for NPT to set MTRs to the EU average or lower.

Hence, it would not be beneficial for NPT to adopt LRAIC in Norway while carrying out its review of Pure LRIC.

6.5 Market-level issues

Finally, there are a number of market-level unintended consequences that may result from adopting Pure LRIC.

1. Impact on competition

Throughout our report we point to the demonstrated existence of a waterbed effect that is real but not full, i.e. network operators will seek to recover termination cost through other services by raising prices, although the whole amount may not be recovered. This may be considered a good thing from the regulator’s perspective as it would result in a reduction in retail pricing for some services (although others may rise).

Regulators hope that such financial pressures will push network operators to develop efficiencies – however these are not necessarily aligned with competition.

One example is that reduced profitability means that customers are less “valuable” to the network operator, and so there is a reduced incentive for network operators to compete for these customers. Hence a reduction in overall competition in the mobile market could result.

Secondly, significant financial pressures will encourage operators to consider merging (e.g. T-Mobile / Orange merger in the UK), which reduces choice to consumers and price competition. Thus it does not follow that encouraging operators to reduce prices by developing “efficiencies” will necessarily result in an outcome that is best for the consumer.

2. Uncompetitive advantage to Telenor

As the largest operator in Norway and the incumbent, Telenor stands to gain more (or lose less) from reductions in MTR than other pure play mobile operators. Given that Telenor has both fixed and mobile operations, it is hedged against reductions in MTRs; a loss in mobile termination revenue for its MNO is a loss in mobile termination cost for its FNO. Thus the reduction in MTRs impacts the incumbent less than other fixed businesses. As MTRs fall, Telenor’s fixed business will experience an increased margin for FTM calls. This could be used to reduce fixed pricing (as indicated in section 5.2.2) which would create a churn reduction / market share advantage for Telenor over the other fixed operators.

Secondly, Telenor can benefit from the reduction in FTM cost in a manner that pure play FNOs cannot. As MTRs fall, Telenor’s fixed business will experience a reduction in cost for FTM calls, not just to its own MNO, but to other MNOs as well.

Telenor could unevenly distribute the benefit from FTM cost reductions such that it can offer very low Telenor fixed to Telenor mobile call prices. It could then offer packages for subscribers who join both its fixed and mobile networks, where subscribers benefit from low Telenor FTM prices, and low Telenor MTM prices. This would promote Telenor’s attractiveness over pure play FNOs and MNOs, giving it the opportunity to gain and lock-in share, which is anti-competitive.

3. Transfer of value outside of Norway

If NPT were to implement a Pure LRIC regime in Norway, the resulting MTR would be lower than other EU countries (estimates are EUR 0.006 in Norway vs. EUR 0.014 to 0.0030 in other EU countries). This disparity is driven by Norway's low population density and relatively large land area.

Thus, international calls from mobiles to and from Norway to the rest of the EU would result in a transfer of value out of Norway. In addition, for non-European countries with higher MTRs, which are not planning to implement Pure LRIC, or to reduce MTRs so aggressively, there would be a transfer of value out of Norway for international calls.

7. CONCLUSION

Based on our examination and analysis of the intended evolution of the termination regime in Norway, we recommend that the NPT reconsider its plans for regulation of MTRs.

There are a number of unintended potential negative consequences associated with the move from the current LRAIC+++ regime, which is a long-standing accepted method of determining the true cost associated with termination.

We summarise our findings and recommendations as follows:

1. That the NPT reconsiders the move from LRAIC+++ to LRAIC in mid 2012, and thus re-evaluates the interim glide path.
 - a. There are flaws in the LRAIC cost philosophy.
 - b. Adopting LRAIC will set MTR below cost.
 - c. This could have a number of undesirable economic and social effects.
 - d. Issues specific to Norway such as coverage cost and wholesale access pricing would justify the NPT in taking a different approach from that advocated by the EC.
2. That the NPT continues its plans to fully investigate and evaluate the Pure LRIC regime and its potential consequences in Norway.
 - a. Pure LRIC is an aggressive cost methodology used by the EC to address competition bottlenecks across the Eurozone.
 - b. MTRs were already set at an appropriate level in Norway before the EC's regulation.
 - c. The economic and cost theory behind Pure LRIC is deeply flawed.
 - d. Coverage cost issues in Norway would be even more problematic under a Pure LRIC regime than under LRAIC.
 - e. A move to LRAIC can only be justified on its own merits and not as part of smoothing the transition to Pure LRIC.
3. That NPT reviews the terms of wholesale access regulation on Norwegian MNOs, given NPT's intentions for Termination Regulation.
 - a. In Norway, mobile termination and wholesale access are regulated using different methods.
 - b. The methodology used in setting wholesale access prices for MVNOs and National Roamers is not sufficiently robust.
 - c. Wholesale access is an avoidable cost of termination and subject to the same conditions of efficient cost recovery.
 - d. If MTRs reduce in line with NPT's intentions, MVNOs/NRs can expect a margin squeeze for terminating traffic, followed by negative margin (a net loss for each terminated minute).
 - e. NPT should reinvestigate wholesale access regulation and consider blending the internal mobile termination charge and wholesale access price to derive the correct MTR for efficient cost recovery by MVNOs/NRs.