



RJIL/TRAI/2016-17/876
17th October 2016

To,

**Shri Arvind Kumar,
Advisor (Broadband & Policy Analysis),
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawaharlal Nehru Marg,
New Delhi - 110002**

Subject: Comments on TRAI's Consultation paper on Review of Interconnection Usage Charges (Consultation Paper No.17/2016 dated 5th August 2016).

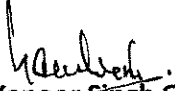
Dear Sir,

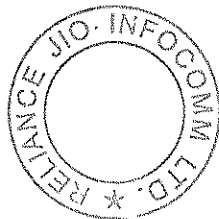
Please find attached comments of Reliance Jio Infocomm Limited on the issues raised in the Consultation Paper on 'Review of Interconnection Usage Charges (Consultation Paper No.17/2016 dated 5th August 2016)'.

RJIL also appointed internationally renowned telecommunication expert firm M/S Detecon International, Germany to provide their independent opinion on the paper taking into account Indian telecom landscape, economic principles and international best practices. The 'Position Paper on Review of Interconnection Usage Charges (October 2016, by Detecon)' is also enclosed herewith.

Thanking You,

Yours sincerely,
For **Reliance Jio Infocomm Limited**,


Kapoor Singh Guliani
Authorised Signatory



Encl.: As above.

RELIANCE JIO INFOCOMM COMMENTS ON TRAI'S CONSULTATION PAPER ON
'REVIEW OF INTERCONNECTION USAGE CHARGES'
(Consultation Paper No. 17/2016 Dated 5th August 2016)

A. General Comments

1. At the outset we thank the Authority for initiating the consultation process to review the Interconnection Usage Charges ("IUC").
2. Pragmatic changes in policy and regulations have made it possible for operators to invest in new technologies and made it possible for India to be the second largest telecom subscriber market in the world. Such policy changes should continue by reducing the IUC to zero, which is the need of the hour.
3. It is commendable that TRAI has chosen to release this consultation paper at this crucial juncture, especially in the light of the fact that it had already recommended a move to Bill & Keep regime even as early as 2011, for implementation within the next two years.
4. TRAI already has set this holistic framework path through successful implementation of the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 (IUC Regulation, 2015) by adopting Bill and Keep (BAK) approach for termination charges for wireless to wireline, wireline to wireline and wireline to wireless calls. It is evident from the trends depicted in the consultation paper itself that this BAK arrangement has benefitted the wireline telephony and wireline broadband segments.
5. It is of great importance that the regulatory framework drives deployment of more efficient technologies that have the benefit of lowering the cost of delivery to enable innovative and customer friendly offerings.
6. It should be considered that retaining IUC based on the technologies employed by different operators (next generation networks compared to legacy networks) is subsidizing inefficiencies of legacy networks and preventing deployment of more efficient latest technologies.
7. Ultimately, it is the consumer interest which is most important and any policy or regulatory change should primarily fulfil this requirement.
8. The Prime Minister's vision of Digital India will be fulfilled only by encouraging investment in new technologies and not by subsidizing legacy technologies by way of IUC.



B. Key Points For Consideration

1. TRAI has already recognised the need to move to Bill & Keep and has already implemented for all segments, except for wireless to wireless

- a) It may be recalled that in 2011, post an elaborate consultation process running about a year and after an extensive costing exercise, TRAI determined Mobile Termination charges using various methods and filed a report with Hon'ble Supreme Court on 29.10.2011. In the report, TRAI had concluded in 2011 itself that BAK was the way to go in two years' time.
- b) Some of the relevant extracts from the report filed by TRAI in Hon'ble Supreme Court are presented here:

Para 8.8 of the report:

"When a telecom service provider establishes a network, it is not only for sending but also for receiving calls. The operator therefore does not do anything special or extra to provide for receiving another service provider's calls. Thus, additionality of costs for receiving calls, in the strictest sense, is close to zero. The revenue from termination charges does not go to pay for any specific additional expenditure caused by the call termination, but it is just a partial compensation of the total costs incurred for creating and operating the network."

Para 7.3 of the report:

"BAK represents an approach to interconnection charging in which the networks recover their costs only from their own consumers rather than from their interconnecting operators. In respect of cost recovery under BAK, the European Commission made the following observations:

Given the two-sided nature of call termination, not all related termination costs must necessarily be recovered from the wholesale charge levied on the originating operator. Even if wholesale termination rates were set at zero, terminating operators would still have the ability to recover their costs from non-regulated retail services. Rather it is a question of how these financial transfers are distributed across operators in a way that best promotes economic efficiency to the benefit of consumers."

Para 7.4 of the report:

"The theory and practice of identifying an optimal termination charge is complex. The result is that any conclusions on termination charge, even if



arrived at with great care and at a cost, could be disputed by a set of operators perceive it to be against them. Various factors like determination of costs, method of allocation, determining costs sensitive to traffic volumes and the extent to which different products/ services should contribute to common costs, etc. can at times be debated.”

Para 7.5 of the report:

“BAK is a simple and low cost mechanism as it requires no billing and related costs. It imposes minimal upfront and ongoing direct and indirect regulatory costs. It avoids the need for reconciliation, billing and payment collection.”

Para 7.6 of the report:

“A termination charge becomes an effective floor for retail tariffs. BAK helps to remove this barrier to the retail pricing for off-net calls (i.e. inter operator calls) and has been proven to result in significantly higher levels of calling activity as operators are given the flexibility to offer innovative customised tariff plans to their consumers.”

Para 7.7 of the report:

“The European Commission also summarised the advantages often associated with BAK, in particular that:

Bill and Keep obviates the need for regulatory intervention and resolves the termination bottleneck. Moreover, it is further argued that Bill and Keep leads to lower retail prices for call origination and appears to increase usage due to the price elasticity of demand. Furthermore, proponents of Bill and Keep consider that it facilitates development of innovative offers, e.g. flat-rate offers promoting increased usage. It also brings immediate benefits by decreasing transaction and measurement costs. Finally, Bill and Keep takes account of the call externality.”

Para 7.8 of the report:

“International evidence from countries where BAK has been used in practice also appears to support the conclusion that BAK arrangements tend to encourage a more efficient retail pricing structure.”

Para 7.10 of the report:

“Further, if traffic between two networks is essentially balanced, then the revenue flows between carriers generated through termination charges and BAK will be effectively the same since approximately zero net transfers would occur between networks. Thus, the costs of billing need not be incurred.”



Para 7.11 of the report:

“With the evolution of technology and convergence, more and more networks are migrating towards IP network. Regulators the world over are working towards facilitating migration towards Next Generation Networks (NGN) which will be IP based networks so that innovative services could be provided to the customers. In Internet networks which are IP based networks there are no interconnection charges and networks can connect globally without any need for interconnection charges. One argument is that termination charges work as disincentive to deployment of IP networks by operators. Moving towards BAK will encourage the deployment of IP-based telecom networks. Since IP based networks are poised to be the networks of the future for providing telecom services, a BAK regime should be seen as a natural progression in line with the development of technology.”

Para 8.9 of the report:

“As discussed in an earlier chapter, BAK or sender-keeps-all is a model of interconnection pricing in which the originating service provider keeps the revenue billed i.e. there is no settlement of termination charges for off-net calls. We have seen that reducing termination rates will benefit consumers and competition and reduce imbalance in traffic flows. Going the full distance i.e. reducing terminating rates to zero by introduction of the BAK regime would arguably help in immediately realizing these benefits. The Bill and Keep regime will encourage flat rate billing and time differentiated charges, both of which will improve capacity utilization and will be in the interests of consumers. It will also reduce the inter-operator off-net traffic imbalance, and thus could help in convergence to an equilibrium situation.”

Para 8.12 of the report:

“.....TRAI is of the opinion that there should be a progressive reduction in termination charges finally converging to zero termination charges i.e. BAK at the end of 2 years from the present. In the meantime, TRAI is of the view that the termination rates arrived at through the Pure LRIC method may be made applicable now i.e. from year 2012 to provide a glide path towards BAK in 2 years. This will give sufficient time to operators to adjust to the changes in the termination regime and will ensure a smooth transition.”

- c) Five years have now elapsed against the two years proposed by TRAI for the migration to Bill & Keep. Every one of the above reasons given by TRAI is more valid today. Implementation of Bill & Keep regime should not be delayed at all as there are no grounds that could justify such delay. Perhaps one of the reasons for the legacy networks to continue in this country and the fact that none of the existing big operators have invested in the next generation networks is a pointer to the fact that the regulation should immediately move to Bill & Keep.

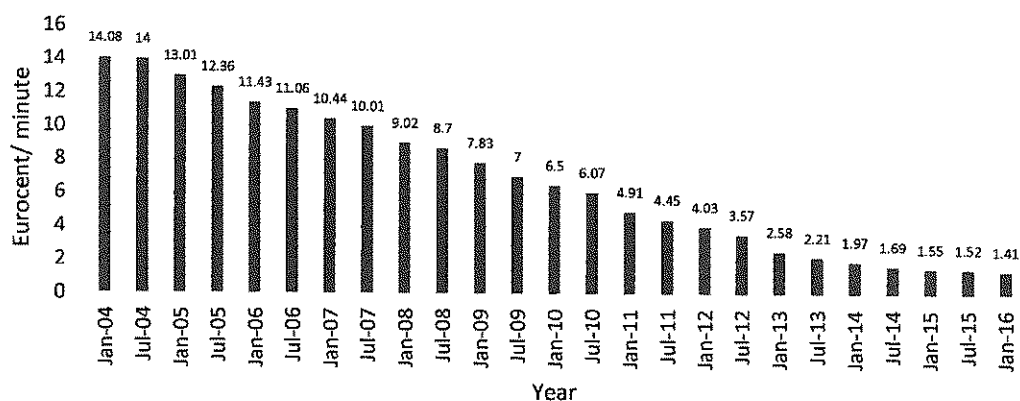


- d) It is also pertinent to mention that in line with the above recommendations in 2011, TRAI in 2014 moved to Bill & Keep for all segments except wireless to wireless. There is no reason that what is true for all the other segments like wireline to wireless, wireless to wireline and wireline to wireline cannot be true for wireless to wireless. It is evident from the trends depicted in the consultation paper itself that the BAK arrangement has benefitted the wireline telephony and wireline broadband segments

2. Global Trends support moving to Bill & Keep

- a) Regulators around the world have been reducing termination charges in order to maximize consumer welfare and operator efficiencies. For Mobile termination charges, the international trends are to move towards establishing 'Bill and Keep' or 'Free Peering' wherever possible and if the termination charges continue to be regulated, these are being brought down towards zero as fast as possible. **As shown below, the Mobile termination rates have fallen rapidly over the last 10 years especially in Europe due to determined efforts by the regulators. (Please refer to Annexure 1 for International case studies)**

European MTRs Trend (simple average)



Source: Termination Rates at European Level January 2016, BoR 16(90) May 2016, Body of European Regulators of Electronic Communications

- b) Some of the important extracts from renowned international institutions/ organizations are as follows:

ITU, Trends in Telecommunication Reform: Special Edition, 2014

"Keep interconnection regulation as simple as possible to avoid unintended consequences, following these Guidelines.



- establish “bill and keep” or “free peering” wherever possible;
- if termination charge continues to be regulated, bring them down towards zero as fast as possible”

Commission of the European Communities

“.....It is argued that Bill and Keep **obviates the need for regulatory intervention** and resolves the termination bottleneck. Moreover, it is further argued that Bill and Keep **leads to lower retail prices for call origination and appears to increase usage due to the price elasticity of demand**. Furthermore, proponents of Bill and Keep consider that it facilitates **development of innovative offers**, e.g. flat-rate offers promoting increased usage. It also brings immediate benefits by **decreasing transaction and measurement costs**. Finally, Bill and Keep takes account of the call externality” (Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, 2009)

European Regulators Group

“...Therefore, Bill & Keep is more promising than CPNP as a regulatory regime for termination for the long term and based on national circumstances (including legal issues) NRAs could set a glide path to Bill & Keep within the regulatory period related to the next market analysis they carry out for voice termination.” (ERG DRAFT Common Position on Next Generation Networks Future Charging Mechanisms / Long Term Termination Issues) – **(Comment - the glide path in India was already set in 2011.)**

The Organisation for Economic Co-operation and Development (OECD)

“...Regulators in the OECD are looking into a future where there may possibly not be a charge for interconnection anymore. The FCC in its National Broadband Plan warns that interconnection rates are keeping fixed networks in the United States from moving to Voice over IP”(Developments in Mobile Termination Rates, 2012)

3. Rewarding the legacy networks with IUC subsidy will prevent moving to newer and more efficient technologies which can bring down the cost to the consumer and fulfil the Digital India vision of the Hon’ble Prime Minister.

- a) There is no denying the fact that moving to Next Generation IP networks will reduce the cost of service and bring down the cost to the consumer. Any policy should direct itself to achieving this. Continuance of IUC, which is only a subsidy for inefficient networks, will prevent operators from moving to the newer technologies besides keeping the cost of service at a very high level which only results in higher cost to the consumer.



- b) It is pertinent to mention that the National Telecom Policy- 2012 (NTP-2012) has undertaken the task of developing a robust and secure state-of-the-art telecommunication network providing seamless coverage with special focus on rural and remote areas for bridging the digital divide and thereby facilitating socio-economic development. The availability of affordable and effective communications for the citizens is at the core of the vision and goal of the NTP-2012. The NTP-2012 proposed to achieve the same by means of 'Right to Broadband', 'by enhancing the investment in All-Internet Protocol (IP) networks including NGN', by Enabling seamless delivery of converged services in a technology and service neutral environment'. Further, the Digital India Program of Government of India envisages to transform India into a digitally empowered society and knowledge economy. It also aims that every Indian will have smart phone by 2019 and use mobile as delivery mechanism to offer one stop shop for all Governmental schemes.
 - c) The visions of NTP-2012 and Digital India i.e. convergence, affordability, digitally empowered society, smart cities, knowledge economy etc. can only be achieved by shift to Next Generation IP technology with greater network efficiencies .
 - d) Any argument that different levels of IUC termination charges should be levied based on the technology employed by different operators will (i) only fill up the loss of revenue and profit for the legacy networks; (ii) discourage moving to newer technologies; and (iii) keep the cost to the customer at very high levels.
- 4. Proof of the pudding is in the eating – Progressive reduction in IUC charges have helped the Government to achieve its objective in the telecom sector and benefit the consumer.**
- a) The IUC which was originally fixed at Rs. 0.40 per minute in 2003 now stands at Rs. 0.14 per minute for wireless to wireless. This reduction over the years has led to phenomenal growth in tele-density, has lowered the tariffs for the customers, encouraged innovations and overall growth of the sector.
 - b) It is only reasonable to assume had the reduction in IUC been faster, more would have been the benefits to the consumer and the sector.



5. Reason of asymmetry in traffic as a justification for levy of IUC is flawed; even if assumed right, situation does not exist any more.

- a) Any asymmetry in traffic which is temporary cannot be a reason for imposition of IUC.
- b) A long term asymmetry in traffic of some operators arises only due to their inefficiencies.
- c) Therefore, asymmetry as a reason for imposition of IUC is flawed.
- d) Even assuming that IUC is justified for reasons of asymmetry, (i) IUC cannot continue till every operator reaches symmetrical traffic pattern; (ii) it is an admitted fact that for operators controlling dominant market share, the traffic pattern is almost symmetrical (refer COAI's letter – outgoing : incoming is 51:49, which is nothing but symmetrical).

6. Given the admitted fact that traffic pattern is symmetrical for the major operators, continuance of IUC is not justified due to the following reasons:

- a) An IUC for the incumbent operator was introduced only to compensate the non-revenue earning network usage of the existing monopolistic (mostly Government) telecom operators especially due to the fact that the new competing private operators acquire new subscribers (hitherto not telecom subscribers) who make the traffic pattern asymmetric to the existing operators.
- b) In 2002, perhaps India was closer to this position in the sense that there were only few operators and the tele-density was hardly 5%. Any new operator would only capture new subscribers (not persons who churn from the existing operators) who will make the traffic pattern asymmetric for the existing operators.
- c) 2016 is different from 2002. Tele-density is at 84%. Market is mature. It is admitted fact that traffic pattern of major operators are symmetrical.
- d) The overall minutes of usage has almost become inelastic in the sense that for the last few years it has averaged at only about 400 minutes per month per subscriber.
- e) In such a matured market, for any new operator, subscribers will come mostly as a churn from existing operators, i.e. subscriber shift from one operator to another.



- f) This cannot grow the total number of minutes usage. It is only a shift in traffic from the existing operators to the new operator.
- g) The total number of minutes of usage in the market does not change and for the existing operators the ratio of incoming minutes to outgoing minutes does not change materially.
- h) Therefore, entry of a new operator cannot be a justification for continuance of IUC at this point of time.
- i) Any demand for continuance of IUC only means that the incumbent operators want to compensate the loss of revenue due to subscriber shift by way of IUC.
- j) Continuance of IUC for the reason that a new operator has entered will amount to compensating the existing operators for loss of profit due to competition or their inability to compete in the market.

7. Tariff differential among operators cannot be a reason for continuance of IUC.

- a) A cry and clamor for continuance of IUC by the incumbent operators due to the reason that a new operator offers tariff which is much lower than the existing levels can only mean that:
 - (i) they are not interested in consumer benefit – a lower tariff is only in the interest of consumer and nothing else.
 - (ii) they are seeking subsidy from the new operator for their inability to match the tariff.
- b) In view of the above, this cannot be a reason for continuance of IUC.
- c) In any case, this argument is completely flawed. Lower tariffs of certain operators will only lead to shift of customers to those operators. Beyond a point, the minutes of usage will not increase infinitely. This is the experience world over. This is also proved by the experience in India over the last few years when telecom tariffs have gone down and again increased and the total minutes of usage has been inelastic.
- d) Accordingly, in the existing scenario where there is no asymmetry of traffic for the major operators, this symmetrical pattern is not bound to be disturbed over the medium and long term to justify continuance of IUC.



In addition to RJIL's general comments submitted as above, the comments on the Questions raised in the Consultation paper are as follows:

Q.1 In view of the recent technological developments in the telecommunication services sector, which of the following approaches is appropriate for prescribing domestic termination charge (viz. mobile termination charge and fixed termination charge) for maximization of consumer welfare (i.e. adequate choice, affordable tariff and good quality of service), adoption of more efficient technologies and overall growth of the telecommunication services sector in the country?

- (i) Cost oriented or cost based termination charges; or**
- (ii) Bill and Keep (BAK)?**

Please provide justification in support of your response.

Response:

- (i) Irrespective of the existing technology that is deployed by various operators, only Bill and Keep Approach is appropriate for both Mobile Termination charges and Fixed Termination charges for the following reasons:
 - (a) TRAI has already recognized the need to move to B&K regime, even in 2011 in the report filed in the Hon'ble Supreme Court for the reasons given in the report.
 - (b) TRAI in its present Consultation Paper has mapped the annual growth in wireless telephony, wireless broadband and the AGR in the last one year, since it has prescribed Bill and Keep regime for all calls originated and terminated on wireline as well as for the calls originated from wireline and terminating to wireless networks. TRAI has cited a growth of 1.5 million wireline broadband subscribers and annual growth rate of 11.6% for the AGR of the access service segment. The Consultation Paper states that the twin factors viz. (i) lowering of domestic termination charge resulted in overall good for the telecommunication services sector in the past one year; and (ii) the need to nudge the sector for deploying more efficient network technologies, together suggest a need for adoption of BAK regime.
 - (c) Trends from all over the world support moving to Bill & Keep.



- (d) India's experience also shows that lowering of IUC has led to the growth in telecom sector in all ways including reduction of tariffs to the consumer.
- (e) Continuance of IUC charges will prevent adoption of new technologies resulting in impediments to implementing the Digital India vision of Hon'ble Prime Minister.
- (f) Even if the flawed justification of asymmetry in traffic as a reason for IUC is assumed (without admission), asymmetry does not exist anymore with respect to major telecom operators in India as has been admitted by them.
- (g) A mature market such as India with 84% tele-density does not justify continuance of IUC just for the reason that there is a new operator (explained above).
- (h) Tariff differential among operators cannot be a reason for continuance of IUC.
- (i) IUC results in distortion of level playing field and enables the incumbent operators to profit at the cost of the consumers.
- (j) The clamor and cry for continuance of IUC by incumbent operators can only mean that they don't have consumer interest in mind and want the IUC subsidy to compensate the loss due to competition.
- (k) Bill & Keep:
 - (i) is the most efficient competitive method of setting price in a free market;
 - (ii) creates a level playing field for all operators, whether new or existing;
 - (iii) promotes competition;
 - (iv) is most beneficial to the customers by way of low tariffs and passes on the benefits of newer technology and technology innovations to the consumers;
 - (v) prevents artificial floor to tariffs in a free market which is not in the interest of consumers;
 - (vi) promotes Level Playing Field between variety of competing networks. With an increasing variety of competing networks and piggy-backing 'Over the Top' services, we need a network neutral and future proof approach of regulation of services. The current IUC regime gives huge advantage to OTT players providing telecom services likes voice calls and messaging as they are not required to pay any termination charges. Players like Skype, Viber, Vonage,



WhatsApp, Apple Facetime etc. are being used to exchange billions of calls and messages. Such calls are routed through internet and not through conventional interconnection, therefore termination charges are not payable for such calls and messaging. BAK regime would provide equal field to PSTN operators to help reclaim the lost market to the OTT players.

Q2: In case your response to the Q1 is 'Cost oriented or cost based termination charges', which of the following methods is appropriate for estimating mobile termination cost?

(i) LRIC+

(ii) LRIC

(iii) Pure LRIC

(iv) Any other method (please specify)

Please provide justification in support of your response.

Response: Not Applicable in view of response to Q1.

Q3: In view of the fact that the estimates of mobile termination cost using LRIC method and LRIC+ method yielded nearly the same results in year 2011 (as filed in the Hon'ble Supreme Court on 29.10.2011) and in year 2015 (as estimated for the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2015), would it be appropriate to put to use the estimates of mobile termination cost arrived in the exercises of year 2011 and year 2015 in the present exercise?

&

Q4: If your response to the Q3 is in the negative, whether there is a requirement of running the various LRIC methods afresh using the information on subscriber, usage and network cost for F.Y. 2015-16 for estimation of mobile termination cost?

Response: Not Applicable in view of response to Q1

Q5: In what manner, the prescription of fixed termination charge as well as the mobile termination charge from wire-line networks as 'zero' through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 is likely to impact the growth of the Indian telecommunication services sector as a whole? Please support your viewpoint with justifications.



Response:

- (i) We agree with the observations in the TRAI Consultation paper that moving to Bill & Keep for wireline to wireline, wireline to wireless and wireless to wireline has immensely benefited the fixed line and the broad band services.
- (ii) We strongly believe that Bill & Keep, if implemented for wireless to wireless, will lead to substantial benefits to the consumers, result in adoption of new technology and fulfil the Digital India vision of the Hon'ble Prime Minister.
- (iii) It is further stated that earlier apprehensions were raised by some TSPs that the BAK regime is not compatible with the Calling Party Pay's (CPP) regime. However, after successful operability of the BAK regime (except for wireless to wireless calls) for more than one year, it can be concluded, without any iota of doubt, that BAK regime is working well with the CPP regime and is conducive with the telecom environment of the Country.
- (iv) The most positive impact of the BAK regime, after being introduced under the IUC Regulations, 2015, has been on the tariff of wireline services, wherein BSNL has started offering unlimited free calls between 9pm to 7am and on all Sundays to landline and mobile of any network within India.

Q6: Whether termination charges between different networks (e.g. fixed-line network and wireless network) should be symmetric?

Response:

- (i) Our view is that Bill & Keep arrangement should be implemented for all networks and there should not be any termination charge whatsoever.

Q7: Which approach should be used for prescribing International Termination Charge in the country? Should it be kept uniform for all terminating networks?

Response:

- (i) International Termination Charge is the charge paid by ILDO to the access provider for terminating an international call. We support uniform fixed termination charges for incoming international traffic. As far as appropriate level for International charge is concerned, the present regime of Rs. 0.53/ minute uniform across all terminating networks can be continued, which is more advantageous to Indian operators and consumers.



Q8: Whether, in your opinion, in the present regulatory regime in the country, the standalone ILDOs are not able to provide effective competition owing to the presence of integrated service providers (having both ILDO and access service licenses) and therefore, there are apprehensions regarding sustainability of the stand-alone ILDOs in the long-run?

Response:

- (i) In our opinion, the international settlement rate has no impact on whether the ILDO is a standalone one or an integrated one. The ILDO access charges atleast acts as some floor for the settlement charges payable by the foreign operator and this subsidises the Indian consumers.

Q9: If your response to the Q8 is in the affirmative, which of the following approach should be used as a counter-measure?

- (i) Prescription of revenue share between Indian ILDO and access provider in the International Termination Charge; or
- (ii) Prescription of a floor for international settlement rate (levied by ILDO upon the foreign carrier) for international incoming calls; or
- (iii) Any other approach (please specify)

Please provide justification in support of your response.

Response: Not Applicable in view of response to Q 7 & Q 8

Q10: Is there any other relevant issue which should be considered in the present consultation on the review of Interconnection Usage Charges?

Response: Nil



INTERCONNECTION USAGE CHARGES
International Trends & Case Studies

MEXICO

In July last year, Mexico's Chamber of Deputies passed a new telecommunications bill promoting substantial reform of the sector in order to promote competition and foreign investment. Previously only the largest player, Telcel, was obliged to use a specific cost model to set rates while other operators were free to negotiate charges, but the new law seeks a gradual move to a **"bill and keep" system for both fixed and mobile termination rates across the market**. Furthermore, Telcel was mandated to eliminate MTRs as a result of its status as a "preponderant economic agent" with greater than 50% market share.

CHILE

In January last year, Chilean regulator Subtel announced a **70% cut in mobile termination rates for the 2014** — bringing the country to just above the global average — with further smaller cuts expected through to 2018. Chile has been reasonably well aligned with international practice regarding MTRs, applying models to determine rates directly oriented by costs, and the new glide path follows a **wave of cuts between 2009 and 2014 that produced a 44.6% decrease over a five-year period**.

BRAZIL

Brazil has also seen large cuts in mobile termination rates, having held the distinction of having one of the highest mobile termination rates worldwide at US\$0.12. Last year the regulator, Anatel, instituted a **new cost model for MTRs that will see a phased decrease over a five-year period, resulting in a 90% cut, from BRL 0.23 to BRL 0.02**. Anatel expects the measure to bring off-net call charges down and closer to on-net ones and even prompt price reductions in fixed-to-mobile calls.

AUSTRALIA

The Australian Competition and Consumer Commission in 2015 has more than halved mobile termination rates, and has set a price for SMS termination rates for the first time. **The ACCC has reduced the wholesale price of terminating calls on an Australian mobile network from 3.6 cents per minute to 1.7 cents per minute and also a regulated SMS termination rate of 0.03 cents per SMS to apply from 1 January 2016.**

In terms of the trend over the years, the Mobile Terminating Access Service (MTAS) charge has been steadily reduced from **21 cents per minute (AUD) in 2004 to 1.7 cents per minute in 2016.**



EUROPE

The European Commission Recommendation on relevant product and service markets 2014 identifies:

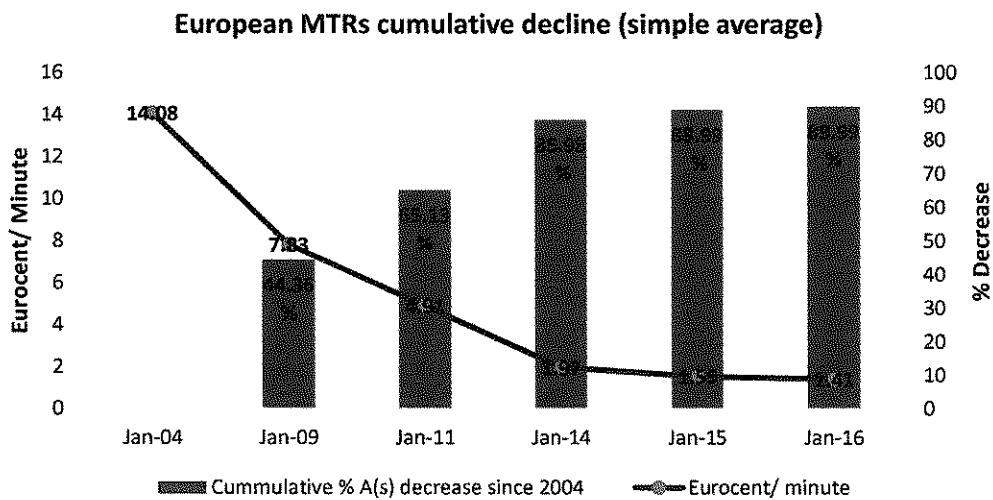
- Wholesale call termination on individual public telephone networks provided at a fixed location as a relevant market susceptible of ex-ante regulation;
- Wholesale voice call termination on individual mobile networks as a relevant market susceptible of ex-ante regulation.

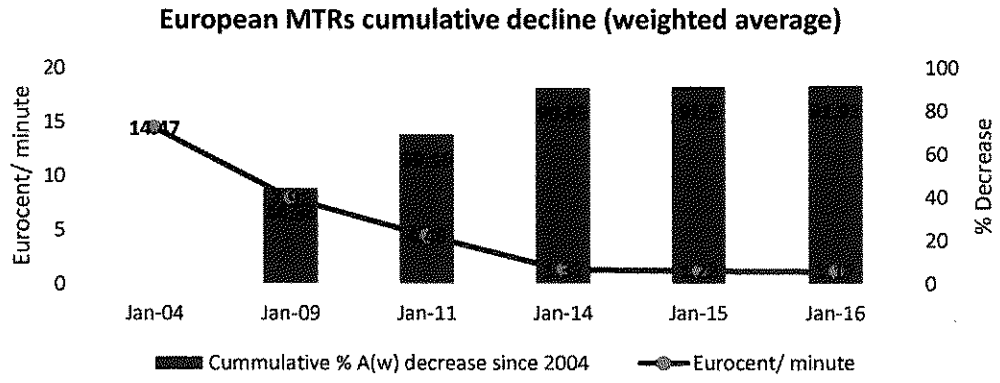
Because of the structure of these two markets, in general each network operator has an SMP position (i.e. a monopoly) for termination on its own network and therefore its termination rates are regulated.

ANALYSIS OF MOBILE TERMINATION CHARGES IN EUROPE

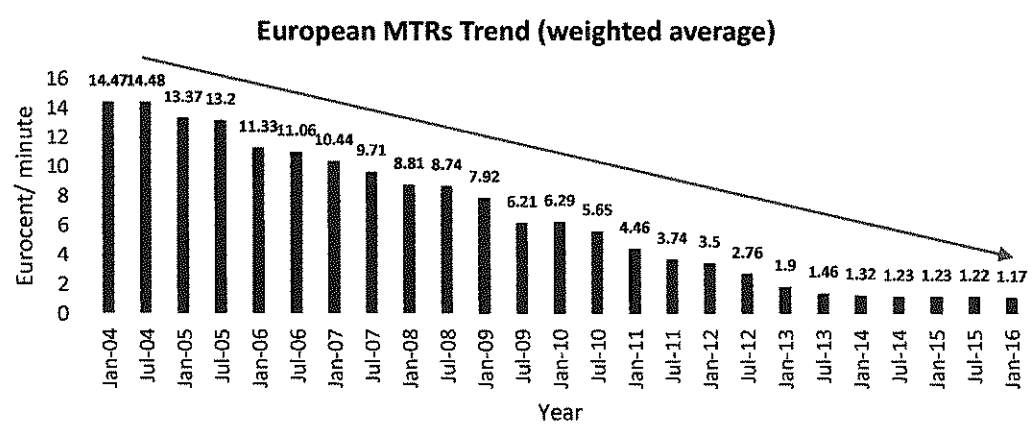
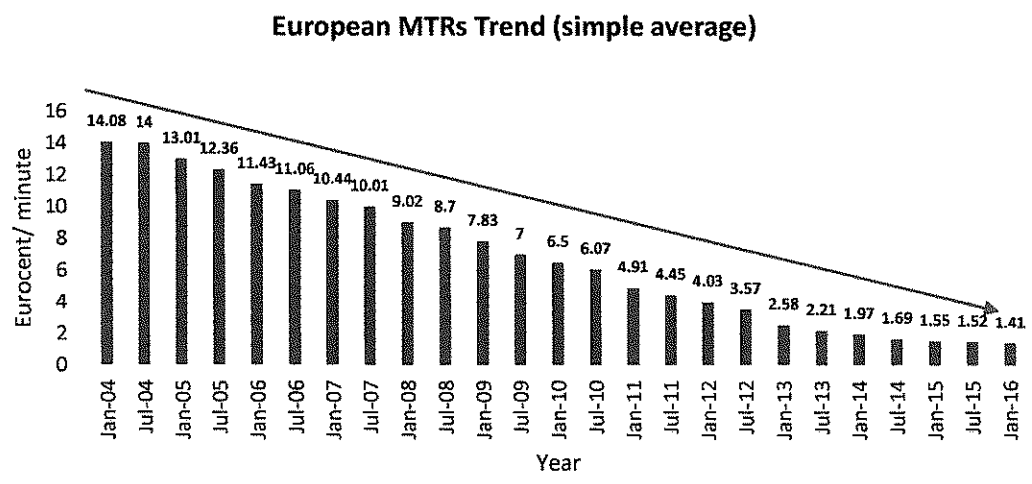
a. Comparison of MTRs in Europe from 2004 to 2016

Representation 1:

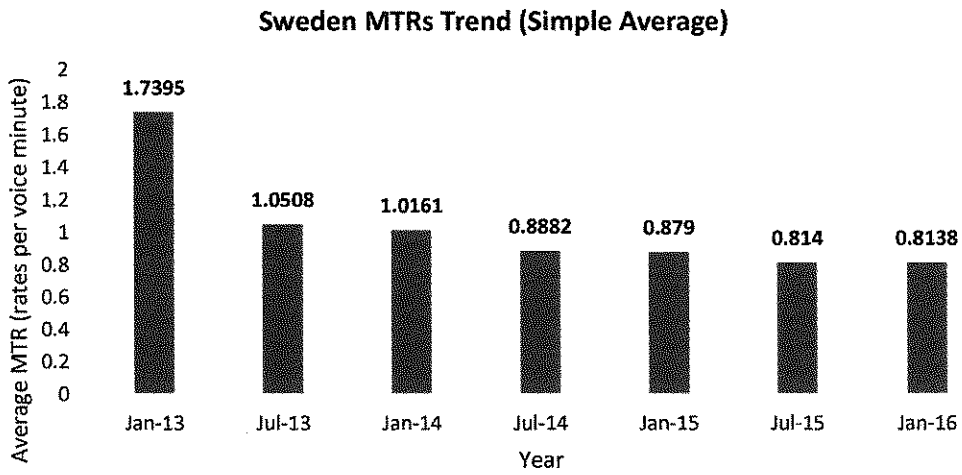




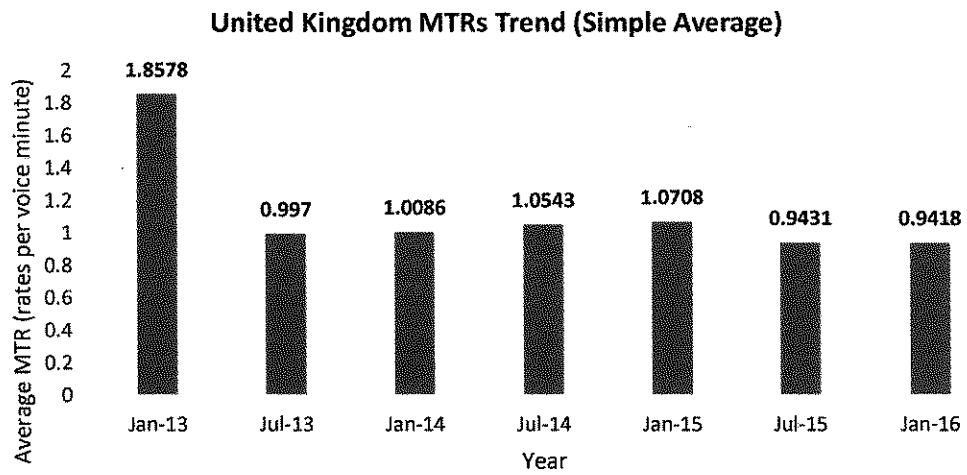
Representation 2:



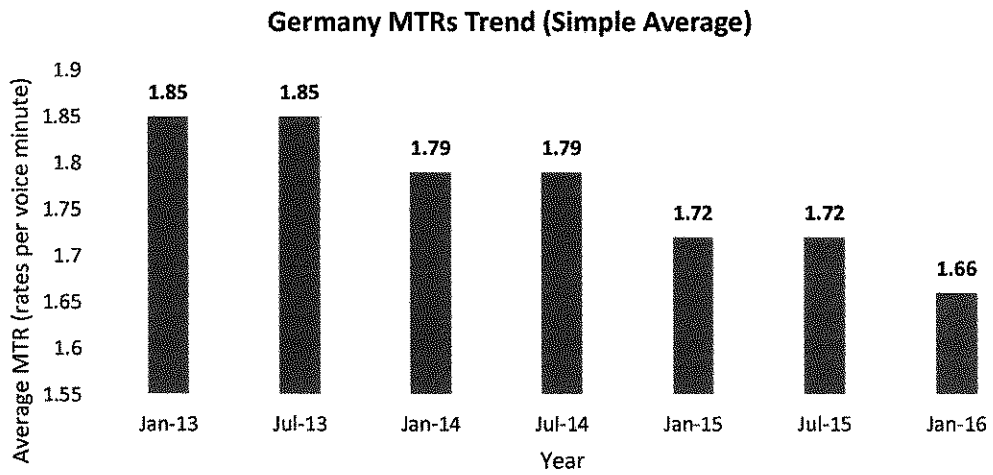
b. Comparison of MTRs in Sweden from 2013 to 2016



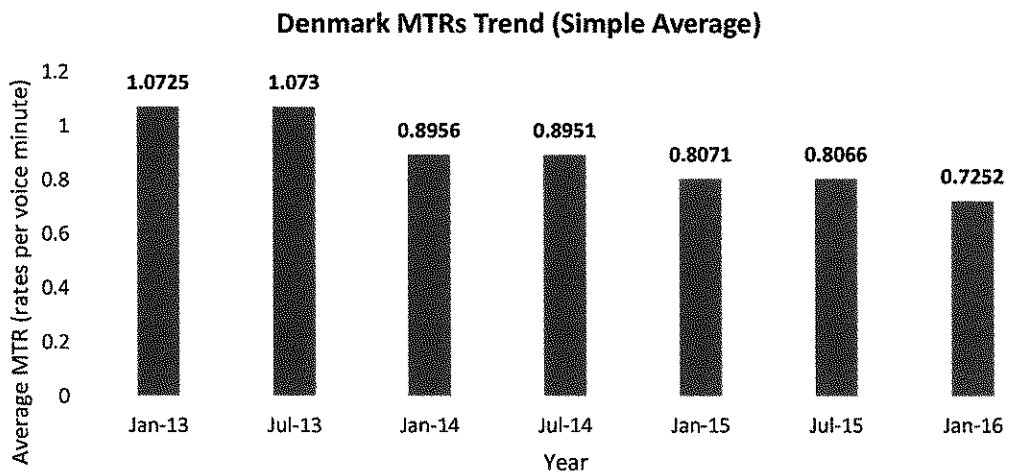
c. Comparison of MTRs in United Kingdom from 2013 to 2016



d. Comparison of MTRs in Germany from 2013 to 2016



e. Comparison of MTRs in Denmark from 2013 to 2016



(Source: Termination rates at European level, January 2016)



Position Paper on Review of Interconnection Usage Charges

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1 Introduction

On 5th of August 2016 the Telecom Regulatory Authority of India (TRAI) has issued a Consultation Paper on Review of Interconnection Usage Charges. In this paper the TRAI is inviting stakeholders to give answers and comments to a set of 10 questions related to interconnection usage charges with focus on domestic termination charges, international settlement rates and international termination charges in the country. This opinion paper is addressing Chapter II of the Consultation Paper covering the regulatory aspects of domestic termination charges.

A fundamental question is, whether regulated termination charges should be cost oriented or cost based or based on the system of Bill and Keep in view of the recent technological and market developments in the telecommunications sector. In case of TRAI opting for cost-based approach, the question is which methodology for the determination of the relevant costs should be selected.

- Detecon would like to argue in favour of the Bill and Keep approach in India in chapter 2 of this paper (Question 1 in the TRAI Consultation paper), from the perspective of the most recent technological and market developments in the telecommunications sector.
- In chapter 3 we are commenting on the basic questions which costing approach should be selected and on some of the more detailed questions how to deal with regulatory costs, spectrum charges and rising data traffic.
- With regards to the fact that some opponents of Bill and Keep approach raise the argument of symmetry of the interconnect traffic between telecom service providers (TSP) in India, Detecon would like to examine the nature of the issue and comment on the possible factors behind in chapter 4.
- Chapter 5 finally will give some background about global trends, the approaches of leading regulatory authorities and a recommendation for India.

2 Bill and Keep, the Future Termination Approach

This chapter looks at the merits of the Bill and Keep (also called Sender Keeps All) approach to interconnection compared with systems where an interconnection charge is paid, most commonly by the originating network to the terminating network, in most countries termed a 'Mobile Termination Rate' (MTR) and in India termed an Interconnection Usage Charge (IUC)¹.

The logic of charging for an incoming call is that in a circuit switched network there is a cost (in terms of network resources to be covered) in terminating a call².

In the early 1990's when most countries had already introduced competing mobile operators into a previously monopolist environment, the need to compensate for traffic imbalances and different network topologies (particularly between fixed and mobile networks) compelled the introduction of a system of interconnection fees, usually mobile termination fees paid by the originating network, i.e. the Calling Party Network Pays (CPNP) in which the receiving party pays nothing.

Some countries have continued to maintain the alternative, Bill and Keep (BAK), where the cost for incoming traffic from other operators is borne by the network access provider. In an NGA this may be applied for the terminating segment up to the first router or switch and associated service control function after the access / concentration network. Any transit services behind this point are not included in BAK and will be paid extra.

There is momentum towards BAK.

- In the USA, the FCC has dictated the Local Exchange Carriers should move to BAK by 2020.
- In the EU, the Body of European Regulators for Electronic Communications (BEREC) have concluded³ that "*BEREC considers BaK more promising than CPNP as a regulatory regime for (voice) termination in the long term*".

There are a number of advantages from Bill and Keep for India including:

- BAK has already been implemented by alternative platforms (OTTs)
- Positive consumer welfare effects
- Efficiency gains
- Increased innovation
- Prevention of anti-competitive behaviour

¹ In this chapter which looks at international practice, the term MTR is used, where the reference is specifically to India in other chapters, the term IUC is used.

² In some countries a subscriber was charged for receiving a call (sometimes, confusingly, called Receiving Party Pays), but this approach dramatically suppressed traffic as calls would go unanswered or phones were kept switched off.

³ BEREC common statement on Next Generation Networks Future Charging Mechanisms. Long Term Termination Issues – June 2010

- Reduced transaction costs and cost of regulation
- Reduction in legal and regulatory uncertainty
- Technology neutrality

Subsequently, these issues are described in detail.

2.1 BAK has already been implemented by alternative platforms

The internet follows the BAK principle and accordingly voice services over the internet offered by platforms such as Skype⁴, WhatsApp (calls), CISCO WebEX, Google and Apple are effectively BAK as the costs for termination of voice calls are paid by the receiver of the call (treated as data traffic). These services are growing significantly and exponentially around the world and hence BAK is already implemented through the back door. The following graph shows the voice traffic explosion of such 'OTT' services.

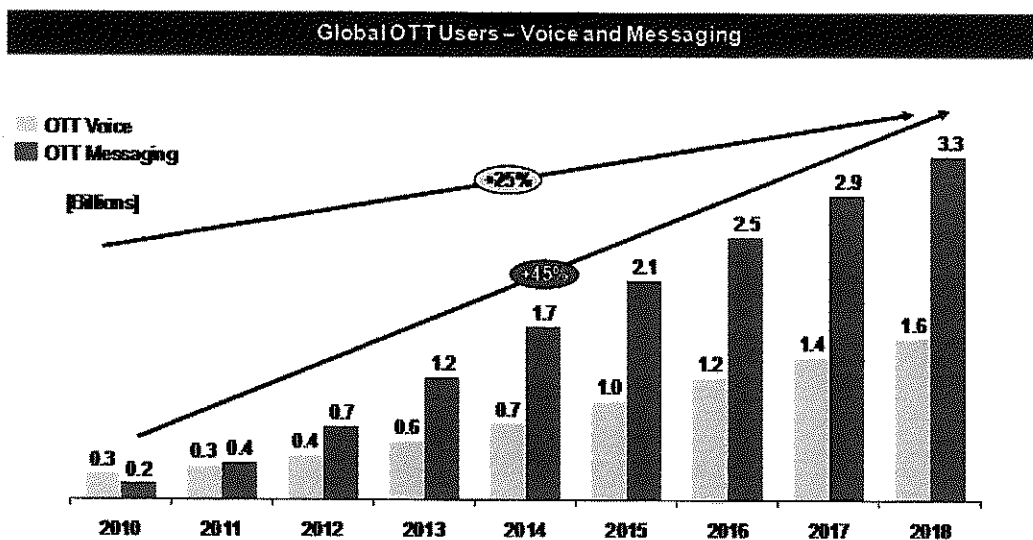


Figure 1: Global OTT Users - Voice and Messaging Services

The rise in data volumes and the growth in voice using OTT platforms has already had an impact on telecommunications operators' revenues, leading to a situation where traditional voice services are becoming insignificant. As shown below, for telecommunications operators in Europe revenue generation has already shifted away from voice services to data/transport services:

⁴ For Skype to Skype calls – Skype out calls to telephone numbers are still subject to termination charges.

Revenue growth rates in Europe 2012-2016 ⁵	
Telecom carrier services	-10.0 %
Business data services	-0.8 %
Fixed voice telephony	-17.2 %
Internet access and services	13.1 %
Mobile data services	9.9 %
Mobile voice telephony	-30.8 %

By not implementing BAK for termination provided between telecommunications operators while the OTTs are growing in significance, the following major drawbacks will occur:

- Telecommunications operators are not able to respond to the success of free OTT voice calls, resulting in an un-level playing field.
- Telecommunications operators are losing additional revenues to free OTT services without being able to keep the customer relationship for voice calls.
- The OTT will be able to generate additional revenues from these customer relationships, without paying for the underlying telecommunications networks they are using. This will lead to a regulatory failure as operators will lack the money to invest in their networks and an erosion of service quality as the ultimate result.

Hence, BAK must be implemented for telecommunications operators and their termination services as well in order to stay competitive.

2.2 Positive consumer welfare effects

The problem of a CPNP arrangement is that termination fees on a per minute basis are seen as additional costs with regarding to on-net calls and build a retail price floor for off-net calls, even if the traffic structure is symmetric. In calling party pays regimes therefore typically off-net calls are priced higher, resulting in reduced traffic volume in the retail markets.

The figure below shows intuitively this effect, where countries with CPNP charging mechanism charge significantly higher than countries with BAK.

⁵ EU Broadband scoreboard 2016; 2 Analysis, "The digital single market and telecoms regulation going forward", Report for ECTA, September 2015

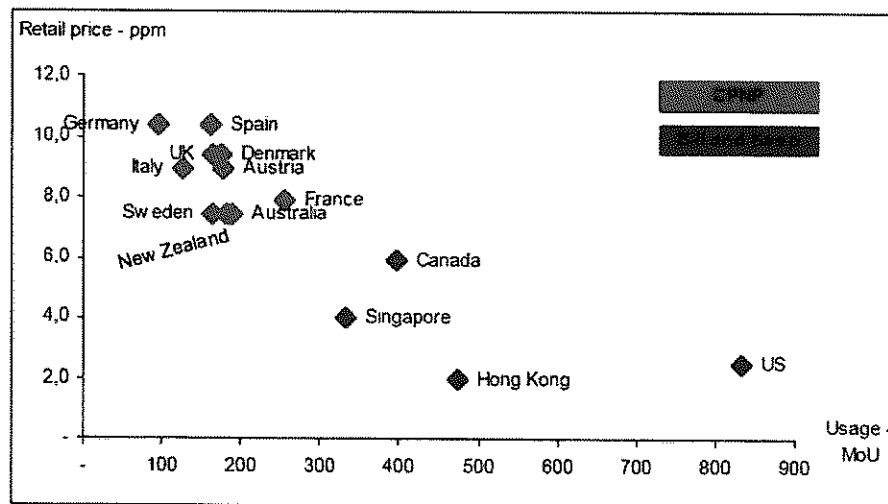


Figure 2: Retail prices - PPM⁶⁷

The consumer welfare effect has been scientifically evaluated by WIK (2010), using econometric methods to study the impact of MTRs on retail prices and demand over 5 years for 61 MNOs from 16 European Member States, all using a CPNP wholesale regime. The researchers show, "that lower MTRs tend to result in a lower average retail unit price, with a highly significant coefficient of +0.71." (...) "Our results also demonstrate that lower MTRs (presumably operating through the mechanism of lower retail prices) lead to increased mobile call initiation in terms of minutes of use per month per subscription. (...) The overall policy implication, in our view, is that efforts to drive MTRs to lower levels are appropriate and will tend to increase consumer welfare." This is in particular true for a BAK system bringing termination rates to 0.

An additional argument is the positive network externality of the receiving party. Not only the calling party derives a benefit from the call, but also the receiving party. This externality would be better reflected under a BAK regime.

There are usual fears in BAK regime regarding increasing number of unwanted calls being terminated. This can always be regulated by effective consumer protection regulation and this cannot be a reason against the BAK regime.

⁶ Merrill Lynch, "Global Wireless Matrix 1Q07", 15 June 2007

⁷ Detecon based on GSMA Operator Rankings 2Q 2014

2.3 Efficiency gains

Wholesale charging mechanisms differ with regard to the incentives they set for efficient network usage. If termination rates exceed marginal costs (what they do by definition in the case of Fully Allocated Costs) this will lead to sub-optimal network usage. In future networks access costs will be increasingly usage insensitive and more capacity sensitive. Vogelsang (2006) elaborates, "the risk of a non-optimal level of network usage is circumvented under BAK, as this system does not require efficient termination costs to be determined. Moreover, the flexibility under BAK to apply different tariff schemes at the retail level may also be conducive to an efficient network usage because operators can offer tariff schemes best suited to customer needs."

BAK offers incentives for each operator to minimize its own costs

2.4 Innovation effects

If in a CPNP regime unit costs for termination are paid by competitors, the incentive to switch to an all IP network is reduced. In a BAK regime on the other hand the access network operator has to optimize all costs. NGAs have significant lower OPEX and CAPEX due to less physical layers and network hierarchies, much less network components and interfaces and higher capacity of the packet-switching NGN equipment technology. This will finally lead to lower cost per unit.

2.5 Prevent anti-competitive behaviour

As noted, under CPNP there is no market pressure to keep termination costs low. On the contrary, there is an incentive to strategic pricing by keeping incumbent networks cost for off-net calls high and thereby harm newcomers and smaller competitors. Under a BAK regime the operator has to bear his own cost of termination and has to find innovative pricing schemes if he does not want to lose customers.

Another anti-competitive behaviour may be the abuse MTRs through arbitrage or phantom traffic. A well-known example is 'tromboning', less well known is the method of buying SIM cards of competitors with a flat rate contract and using these SIMs by artificially creating traffic that is terminated in the own network.

2.6 Transaction costs and costs of regulation

One of the drawbacks of regulated Mobile Termination Rates is the cost and effort required to generate the data in the first place.

In general, BAK has the advantage of removing significant effort for billing and invoicing. In a CPNP regime, the operators are forced to implement wholesale billing platforms imposing additional costs. Further, the cost of settlement of charging disputes incurs costs for negotiations and legal procedures. All these costs are removed by introducing a BAK system and thereby increases the efficiency of the sector.

On almost all CPNP countries, regulating MTRs has evolved to one of the major tasks, and costs of regulatory authorities. A whole set of activities, including the establishment of cost models, termination charge determination and settlement of disputes have been implemented to mitigate the negative outcomes of the CPNP regime. Where these

decisions are not accepted by all market participants, the process ends up in costly litigation.

The whole legal process including the drafting of regulations, amendments to primary legislation, public consultation and operator lobbying also adds to the cost.

In short, CPNP imposes significant regulatory costs for operators, regulatory authorities, the judiciary and governments which would not occur in a BAK regime.

2.7 Removal of legal and regulatory uncertainty

There is always regulatory uncertainty regarding the future direction of regulated termination rates posing a significant barrier to investors and hence, lead to higher investments in the telecommunication networks. This uncertainty is removed by BAK where there are no termination fees to be paid and hence no constraints to the setting of retail tariffs.

2.8 Impact of new technologies and usage patterns

As noted, most of the traffic carried on mobile networks is now data traffic. In Germany, for example, voice traffic is nowadays less than 1% of total mobile traffic. Consequently, mobile technologies are becoming data centric and networks are in the transition towards IP technologies. In fact VoIP at "best effort" quality will be 0, and the only reason why voice still bears some costs in an NGN is the quality of service effort. However, in future networks, the cost of transport for one minute of voice is becoming almost negligible, as voice is only marginally influencing total peak hour traffic in the network, the IP packets are routed more efficiently and the radio access networks uses the spectrum more efficient. This means that the costs of voice traffic are going down significantly. If the regulation of tariffs would not consider this development, the operators become the possibility to conduct anti-competitive behaviour by cross-subsidies financed through MTRs. This situation clearly establishes that the CPNP regime is not future proof.

We must point out here that TRAI recognizes in paragraph 2.15 of the Consultation paper on Review of Interconnection Usage Charges from 5th August 2016 the favourable effect of the effective introduction of BAK for traffic origination and termination for wireline networks. Indeed, as depicted on Chart 2.1, same page, the annual growth of wireline broadband subscribers is accelerating from 0,7mn in 2015 to 1,5mn in 2016. It is reasonable to expect that introducing BAK in wireless-to-wireless interconnect will also turn out similar success.

2.9 Dwindling importance of MTRs

Part of the logic of setting mobile termination rates was to compensate operators who have to terminate more traffic than they send out.

Although off net traffic tends towards equilibrium (i.e. 50:50 incoming : outgoing), it is generally the case that in most countries the leading operator tends to have more off net incoming minutes than outgoing minutes. The question, is how significant is this?

Detecon has analysed the traffic in terms of voice minutes for the leading operator in various countries in order to determine what the net off-net voice minutes (incoming minus outgoing) are as a percentage of the total voice minutes (on-net + off-net incoming + off-net outgoing). The countries are those for which Detecon has recent reliable information.

Country	Largest Operator market share ⁸	On-net domestic Voice Minutes (million)	Off-net domestic Outgoing Voice Minutes (million)	Off-net domestic Incoming Voice Minutes (million)	Net Off-net incoming as % of total domestic Voice Minutes
Country 1 Europe (2013)	48%	51,290	27,320	27,390	0.07%
Country 2 Africa (2013)	39%	25,088	7,960	10,082	4.92%
Country 3 Africa (2013)	56%	2,286	368	647	8.43%
Country 4 Africa (2015)	49%	904	13	20	0.63%

Figure 3: Net Offnet voice minutes as a percentage of total voice minutes

The percentage of net offnet domestic voice minutes is always less than 10% and in 2 cases are less than 1%. Given that voice calls are a rapidly shrinking share of overall voice traffic, the extra cost borne by a leading operator with more incoming traffic can be described as a **“shrinking small percentage of a small percentage”** and not worth the regulatory costs required to measure it or the constraints it imposes on retail pricing.

⁸ Market shares from Telegeography.

3 Cost oriented Interconnection Usage Charges

In the Eleventh Amendment of the Telecommunication Interconnection Charges Regulations from 23th February, 2015, TRAI opted for LRIC+ including spectrum costs, as most appropriate for the Indian telecommunication market. However, in paragraph 88 TRAI recognizes the impact of termination charges on the structure and competitiveness of the industry and telecommunications consumer markets and taking into account their dynamics envisages a 2-year term for reviewing the present interconnect regime.

Although we argue in favour of a BAK system, Detecon also wants to opine on cost based or cost oriented approaches. We believe a clear road map for a future oriented system should be established from the present LRIC+ including spectrum cost via a system based on pure Long Run Incremental Costs to a Bill and Keep system.

We will first deal with the general question, wether the relevant costs should be determined on a historical or forward looking system, based on top-down or bottom-up data and whether non-product specific variable costs should be included in the calculations.

3.1 Fully allocated cost methods versus incremental cost methods

TRAI already decided against FAC for being inappropriate for the Indian telecom market, as stated in paragraph 40 in the Eleventh Amendment of the Telecommunication Interconnection Charges Regulations from 23th February, 2015. Instead the TRAI introduced an LRIC+ approach.

However, as stated in section 2, the BAK system is the preferred option in India providing the most efficient solution to the Indian telecommunication sector. If TRAI decides against BAK, it will still have to deal with MTR regulation to prevent market power abuse and anti-competitive behaviour. Thereby it is necessary to decide on which cost standard should be used.

Detecon has come to the conclusion for India that the only relevant costs are the marginal costs related to the call. The farther away from the marginal costs, the less preferable is the cost standard. Hence, if BAK is not introduced, marginal costs or Pure LRIC is the second best solution,.

The Pure LRIC cost standard has further advantages over LRIC (or LRIC+). The UK regulator OFCOM has also come to this conclusion:

"We now consider, in light of the responses to the consultation and the further evidence, that pure LRIC is the better approach as it will maximise the benefits to consumers as it better promotes sustainable competition, is economically efficient and is unlikely to raise material equity concerns. We have reached this view having

had regard to the relevant legal tests for the imposition of remedies and our wider statutory duties”⁹

Several reasons for Pure LRIC exist, additional to those mentioned above:

- Pure LRIC is the cost standard most consistent with the economic literature.¹⁰ Pure LRIC regards only efficiently incurred costs that would not be sustained if the service included in the increment was no longer produced (i.e. avoidable costs).
- It only includes direct volume-sensitive costs of the given service, excluding all cost categories that are not volume sensitive (e.g. joint and common costs). This implies that changes in volumes does not cause an overcompensation of overhead and common costs (is the case by LRIC+).

As can be seen by all these arguments, Pure LRIC is the best cost standard followed by LRIC and then LRIC+. FAC is by no means a suitable cost standard.

There are a number of aspects important to understand when implementing pure LRIC:

- The costs related to network coverage should not be considered in the regulatory cost assessment. Investments based on basic coverage requirements as a part of the license conditions and hence these costs are not traffic driven. These costs are “sunk” and not “incremental” in any respect. In the LRIC model, the attempt should be to estimate incremental costs that the receiving operator has to incur to offer the termination facility and therefore only capacity related expenses, over and above base coverage network, should be considered.
- Parts of the general network CAPEX that is related to the overall provision of retail services should not be regarded as “avoidable costs” to be factored in the LRIC computation. This is particularly true for the large part of the CAPEX in India that still pertains to coverage rather than capacity enhancement.
- In particular the computation of the number of BTSs required for capacity should be done after factoring in the capacity provided by the number of BTSs for coverage.
- In the same way other elements of the network should also be first looked at from coverage perspective and only the incremental should be considered for capacity requirements.

3.2 Regulatory costs

On all almost all CPNP countries, the tariff and price regulation has evolved to one on the major tasks of regulatory authorities and regulated operators. A whole set of activities from

⁹ OFCOM, Statement „Wholesale mobile voice call termination“, 15 march 2011, p. 171

¹⁰ OFCOM, Statement „Wholesale mobile voice call termination“, 15 march 2011, p. 173

the establishment of cost models, approval of tariffs, termination charge determination and settlement of disputes have been implemented to mitigate the negative outcomes of the CPNP regime. Usually many costs are duplicated, e.g. the NRA develops and uses a proprietary regulatory cost model, but all regulated operators use their own ones. Operators are employing numerous specialists to elaborate the reports and data sets the NRA requires as well as lobbying specialists.

Regulatory decisions are not always accepted by all market participants, these decisions end up for legal disputes in court. In Germany the cost-based determination of monthly rental for unbundled local loops has been determined every 2 years on a new cost basis since 1999. Recently several public courts and the European Court of Justice have declared all decisions since then as illegal, based on some of the underlying cost assumptions. Consequently the costly process of price determination for the last 15 years has to be renewed with considerable insecurity concerning possible indemnities. All stakeholders aim for a better outcome for them and engage heavily in lobbying for new cost standards.

In addition to these operationally cost of regulation, there are also the costs for implementing the tariff regulation into legal documents. This causes costs to the government for drafting and deciding on new laws and by-laws. It also causes costs to the market participants for lobbying activities.

Though regulation in the Telco sector is necessary and some costs cannot be avoided, the system of cost based determination of wholesale prices is adding up for operators, NRAs, courts and governments to a scale, where the efficiency benefit of a more precisely regulated price might be clearly offset by the costs to achieve such a regulation. Hence, by introducing BAK, the cost of regulation is significantly reduced.

3.3 Spectrum charges

In the Eleventh Amendment of the Telecommunication Interconnection Charges Regulations from 23th February, 2015, TRAI expressed the view that spectrum costs must be included in calculating MTR – see paragraph 54. Furthermore in paragraph 55-57, TRAI specifies the method of calculation of spectrum costs and, ultimately stipulates in paragraph 58, that spectrum costs of 0,78 paise per minute should be added to the cost per the LRIC model of 11,83 paise per minute and the common cost markup of 1,18 paise per minute, arriving at 13,79 paise per minute for the mobile termination cost.

Detecon is convinced that the spectrum charges should not be included in the cost assessment. By including the spectrum charges, the incremental costs for voice would be inflated which would lead to excessive MTRs. This has negative impact on consumers and new entrants in the market.

The costs per MHz have increased significantly during the last decade, but the higher costs per MHz of spectrum are not caused by the requirements of the voice services. Instead, it is the mobile broadband services which have made this resource to become a

bottleneck service with astronomical prices. Hence, the cost of spectrum should be allocated to the actual price drivers, which are the mobile broadband services.¹¹

A further reason to not include spectrum charges is that these are no incremental costs and therefore, these should not be included in LRIC, Pure LRIC or LRIC+. The spectrum is acquired to provide the mobile broadband access to the end users. The voice termination minutes are only a by-product which uses the spectrum resources required anyway to meet the resource requirements for mobile broadband access services. Therefore, the need for spectrum and hence the costs do not increase by a typical increase in call volumes.

A further reason to regard spectrum costs as non-incremental is that the operator has to pay for the spectrum also in case the volumes for mobile broadband and voice are decreasing. This is because there is no active secondary spectrum market in which the operator can easily resell the spectrum.

The inclusion of spectrum in the regulatory cost assessment would increase the cost of MTRs and thereby causing the end users to pay more for the voice services. Further it would also create the wrong incentives for the operators. These would get their costs recovered through MTRs for even higher bids in the spectrum auctions. Hence, the end users would pay more for voice services, because operators have higher costs for spectrum (through higher bids in the auctions), which are paid to the government. Hence, higher MTRs to cover spectrum costs would work as a hidden indirect tax on the consumers.

3.4 Non voice services change the game of MTRs

Modern smart-phones are small computers. "Fixed" NGAs with a fibre connected WLAN box and "mobile" NGAs with a fibre connected femto cell are physically very similar. Fixed or mobile application usage will be identical. Only the size of the screen may define somehow whether a device is more frequently used on mobile or fixed locations.

People will use Internet applications on each screen more or less in the same way, and voice applications are just some out of many Apps with similar virtual push-buttons.

¹¹ In case of India, the GSM Association comes to the conclusion that the inefficient spectrum allocation causes significant harm and writes: "The cost of inefficient spectrum allocation in India is in the order of \$3.6 billion per annum on foregone Economic Surplus." (see GSM Association, The Cost of Spectrum Auction Distortions Review of spectrum auction policies and economic assessment of the impact of inefficient outcomes, October 2014, p. 24). It would cause even more harm, if these distortions would be reflected in the MTRs as well.

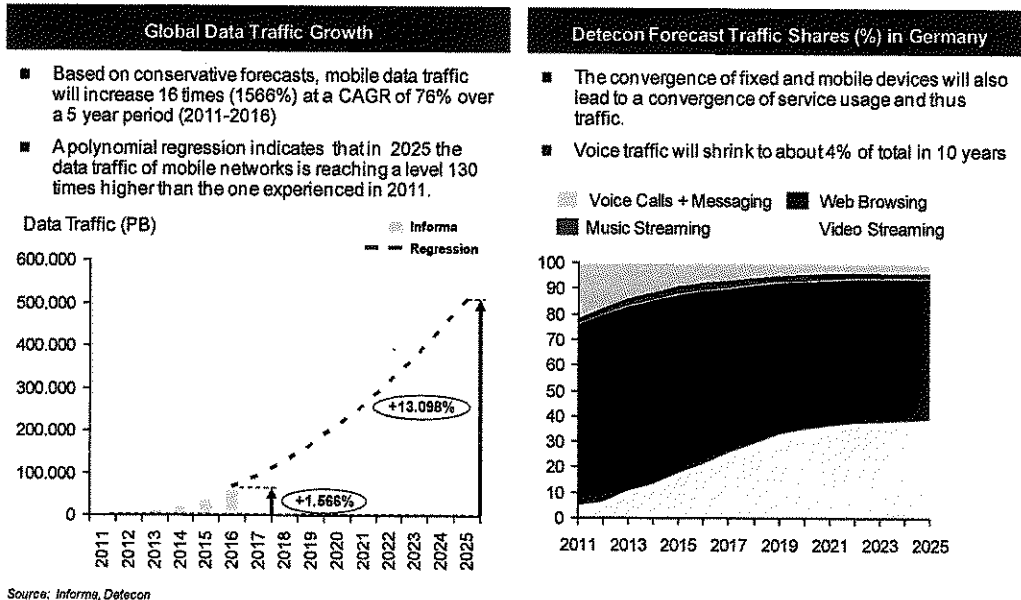


Figure 4: ¹²Traffic growth

Today in Germany just slightly above 10% of total traffic are voice and messaging, with a trend to decrease to about 4%. (The last PSTN connections of Deutsche Telekom will be ported to all-IP by the end of 2016.) This is not because voice is decreasing in absolute terms, but because video and data applications are growing much faster. Data exchange between machines and are increasingly independent from human usage (e.g. update of navigation systems in cars etc.), and therefore their usage is not limited by the time humans are spending on ICT services.

However, current MTRs are based on costs for voice services, only. Data are exchanged via "peering" contracts, which basically are a BAK regime. Voice over LTE or VoIP services are currently converted into PSTN minute traffic to allocate costs of service, but there is no cost per Kbyte charge for the majority of data traffic. In future this would lead to the perverse effect that a small minority of traffic would bear all costs of network expansion, despite the fact that network expansion is dimensioned mainly on video and data traffic in peak hours which "cost" nothing.

This clearly shows that legacy network concepts cannot simply be transferred to modern telecommunications and the cost-based approach in termination will fade out.

¹² Detecon based on GSMA Operator Rankings 2Q 2014

4 Domestic Interconnect Asymmetry

Interconnect traffic asymmetry is usually a central factor affecting the rationale behind different interconnect regimes and their outcomes. In fact, termination tariffs under Calling party network pays (CPNP) are supposed to deal with interconnect traffic asymmetries between operators, resulting in effective payments only for the portion of the outgoing traffic exceeding the incoming traffic between two operators under the assumption of symmetrical termination rates. In practice, the lower the set termination rates in the selected CPNP method the closer its effects to the effects of BAK regime. In fact, in the boundary case of zero termination tariff, in practice, CPNP would replicate the effects of BAK and the two regimes would be equivalent.

On the other hand, domestic traffic asymmetries between the operators have been typically substantial and inherent in the Indian telecom industry therefore, their significance is particularly strong in India from regulatory and business perspective.

With respect to the above and referring to paragraph 30 of the Eleventh Amendment of the Telecommunication Interconnection Charges Regulations from 23th February, 2015, Detecon would like to argue against the argument of BAK oponents, that BAK is best suited for environments where traffic flow is balanced (symmetric) by nature.

First, if the traffic between all networks is balanced, then under the assumption of a symmetric termination charges the application of CPNP method will result in no effective payments between the operators, thus already replicating the effect of BAK. What would be the use of implementing BAK, then if its effects have been already enjoyed?

Second, there is no empirical evidence of strong correlation between BAK introductions and eventual symmetry in domestic interconnect traffic. The benefits of BAK, as elaborated in chapter 2, are manifold but interconnect symmetry is neither necessary nor sufficient condition for BAK introduction.

Lastly, packet networks like public IP networks have been long interconnected under peering agreements similar to BAK, where huge traffic asymmetries are very common. Economic reasoning behind is the general impossibility to allocate the benefits of a c)onnection between the originator and the receiver.

It should be noted, that the Indian telecom market presents a serious threat of market power abuse and anti-competitive exploitation of these substantial network effects (as 70%+ subscriber base is concentrated amongst fewer players with matured voice and almost stangnant market in terms of minutes of usage) by established operators in setting up and maintaining interconnect agreements with the smaller operators. We must point out that the introduction of BAK regime could effectively eliminate this kind of threats and risks.

4.1 Transitional (temporary) case for asymmetry

This section is aimed at elaborating on the transitional and temporary nature of Interconnect traffic asymmetry in a new market entry scenario. The main challenge in entering a new market is growing the customer base towards critical mass, which would allow for sufficient scale for efficient operations and fair recovery of costs. Theoretically, in this crucial period, new entrant will face huge customer acquisition costs, insufficient scale of operations and adverse network effects, already enjoyed by incumbents in a matured market where the minutes of usage is stagnant or nominal.

In the above market entry scenario, it is reasonable to expect that immediately after the launch, outgoing off-net traffic would predominate. However, after reaching a certain customer base the trend would equilibrate towards more balanced interconnect traffic. A variety of factors could contribute to the restoration of the Interconnect traffic balance and Detecon would like to highlight two of these which may be of most relevance to the new market entry case in voice saturated markets.

Second SIM

It can be reasonably expected that a considerable portion of the newly acquired customers would take up trial service as a second SIM card, thus retaining their current mobile voice subscription and continuing using their former SIM card and number. In fact, teledensity has already reached 84%, according to TRAI performance indicator report for January – March 2016, leaving very little, if any, room for growth in overall industry customer base.

While the propensity to try the newly activated voice service by making outgoing calls (most likely off-net, since own customer base is still too low) can be quite high at zero incremental cost of outgoing calls, a newly acquired customer may in the short run, continue receiving incoming calls via her old SIM card and old number. In this scenario, the effect on new entrant's interconnect traffic balance can be two-fold:

- Increase directly the outgoing traffic of the new entrant (most likely off-net as own customer base is still low), as it temporary comes at zero incremental cost, and
- Continue in the short run receiving incoming calls on incumbent's SIM card and number, instead of using the new entrant's SIM and number, thus depriving the new entrant from respective increment of incoming interconnect traffic

The outcome in the described short term scenario, is temporary increasing the interconnect asymmetry in the very beginning of the new operator service.

MNP Impact

Similarly to the second SIM argument above, in the absence of the opportunity to port her former mobile number, a newly acquired customer may continue receiving calls on her old SIM card, using her old number in the short run. Reason may be reluctance or inconvenience or time lag in distributing her newly acquired number, since receiving calls inflicts no incremental cost on her using both numbers, so from direct cost perspective she will be indifferent.

The described scenario causes short term traffic imbalance of the interconnect traffic, which however will be temporal for the starting period of the new operator service.

4.2 Network effects and asymmetry

Traffic asymmetry may also be a temporary transitional phenomenon attributable to faster customer acquisition in market entry cases. However, under the assumption of a successful market entry the customer base will quickly reach the critical mass level, where the entrant will start enjoying own network effects and the adverse network effects on incumbents side will fade. Indeed, every acquired customer will bring more value to new customers and, under the premise of similar customer profiles larger and larger portion of the outbound calls will turn out to be terminated on-net. This will ultimately drive outgoing interconnect traffic down.

In fact, new subscribers may churn to a large extent from the existing customer base of the incumbents. When the challenger increases its customer base he may be able to keep larger portion of its outgoing calls on-net, and in the same time increase the potential for inbound off-net calls.

It is reasonable to expect that the intrinsic interconnect traffic asymmetries in Indian telecom sector (where voice market is already matured) would gradually diminish in the medium to long run, driven by modernization of mobile networks and introduction of advanced technologies. However, it must be noted that the introduction of BAK interconnect regime would only accelerate the process by providing incentives for incumbents to migrate faster their networks to NGN packet-switched technology and to adopt more innovative and competitive service sets and tariffs.

5 International Trends and Best Practice for MTR/IUC

5.1 Regulating tariffs based on Indian market KPIs

When assessing if wholesale tariffs are excessive or not, it is important to consider the national KPIs including retail revenues and retail prices. Benchmarking mobile wholesale tariffs abroad would not provide the right conclusions as the networks in India have been rolled out based on Indian circumstances in order to meet the needs of the Indian consumers.

GSMA lists the effective price per minute for 182 operators across 93 countries worldwide, including 6 operators from India. The following graph shows the tariffs worldwide (except India) and compares these with those in India. As can be seen in the graph, the effective retail tariffs in India are extremely low in an international comparison. While the average tariffs in the world are around 4.3 US-Cents per Minute, the tariffs in India are only making up 1/12th of this. Even the highest effective price per Minute in India (Vodafone: 0,008 US-Cents) is only making up less than 1/7th of the worldwide average.

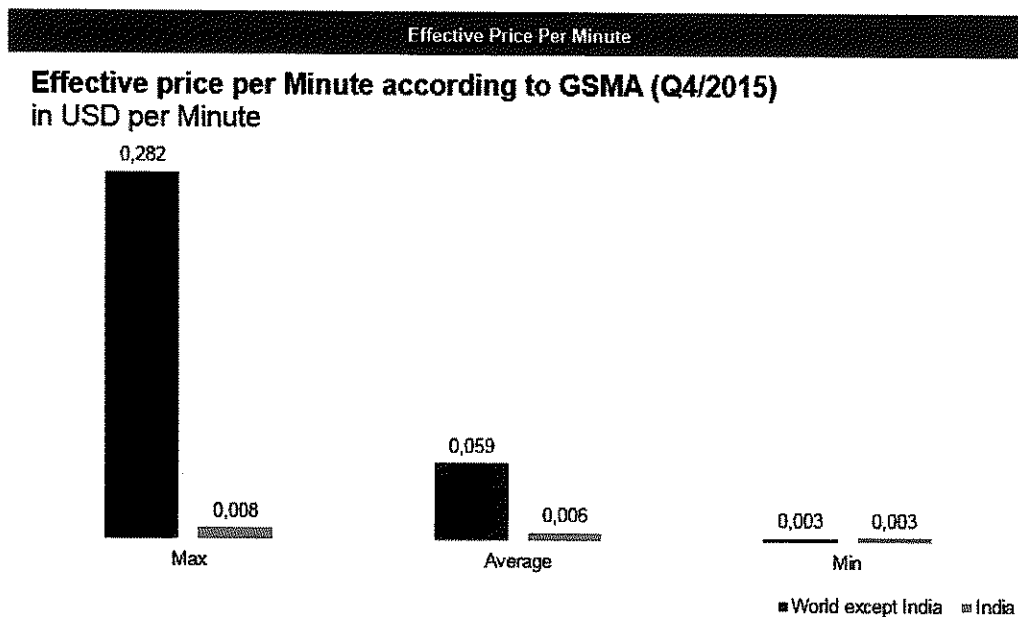


Figure 5: Effective Retail Price per Minute¹³

¹³ GSMA – Mobile Market KPI by Country, 2016

This comparison makes clear that the IUCs (MTRs) in India must be significantly lower compared to international benchmarks, as otherwise price-margin-squeezes would occur. Price-margin-squeezes, where the wholesale tariffs plus retail costs are higher than the retail tariffs, drives all operators with higher traffic out- than inflow out of the market.

The next graph has been included in order to show the gap which is usually existing between wholesale and retail tariffs. As can be seen by these comparisons, the retail tariffs in Asia-Pacific were 5.9 times higher than the wholesale rates. In Europe the retail tariffs were 9.9 times higher than the wholesale rates. Would this gap between wholesale and retail rates be implemented in India, the wholesale tariffs would come close to Pure LRIC or even be comparable to a BAK system:

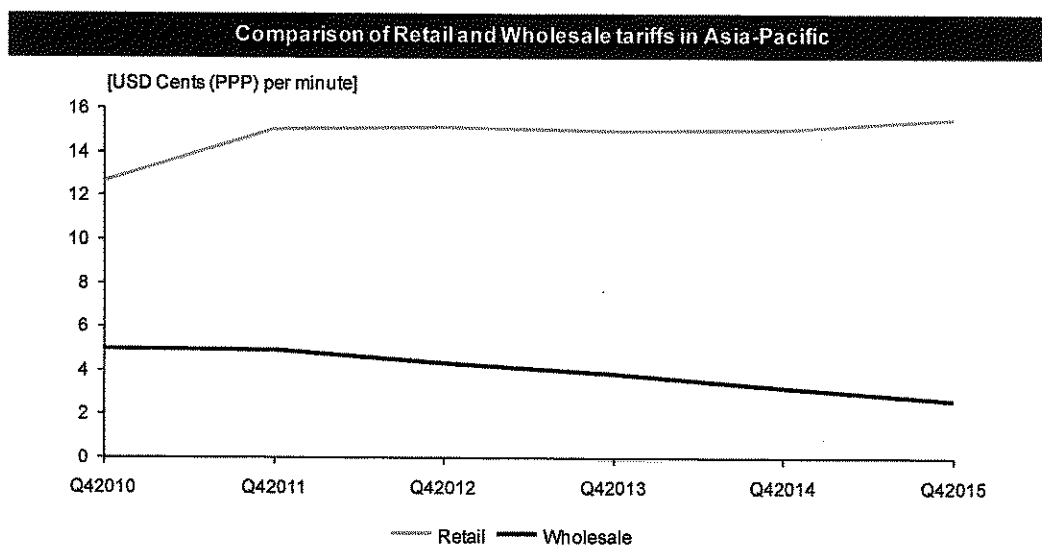


Figure 6: Comparison of wholesale and retail tariffs in Asia-Pacific¹⁴

¹⁴ OVUM, The Global Regulation of Mobile Termination Rates in 2016

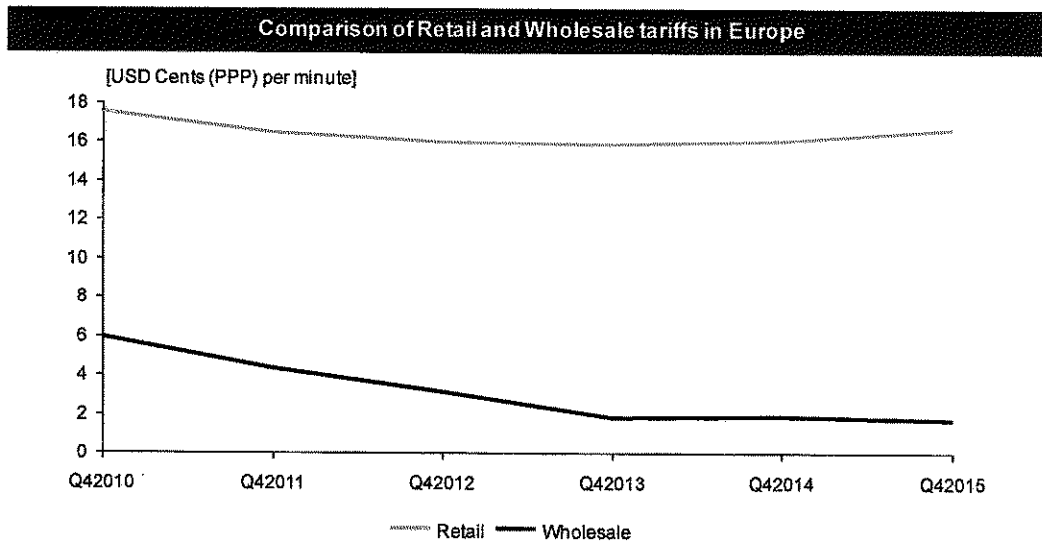


Figure 7: Comparison of wholesale and retail tariffs in Europe¹⁵

The conclusion to be made is that the wholesale termination rates in India need to be reduced significantly in order to reflect the KPIs in the Indian markets. Further, to avoid a situation with a price-margin-squeeze, the wholesale tariffs must be reduced significantly in order to be consistent with the retail tariffs.¹⁶

¹⁵ OVUM, The Global Regulation of Mobile Termination Rates in 2016

¹⁶ In a price-margin-squeeze test, a margin has to be applied between retail and wholesale tariffs to enable a return on investment and coverage of retail costs such as sales costs and costs for customer care.

5.2 Global trends for MTR

As the following figure indicates, MTRs are declining globally with the possible exception of Asia-Pacific, this is also driven by the adoption of incremental costing methodologies instead of FAC.

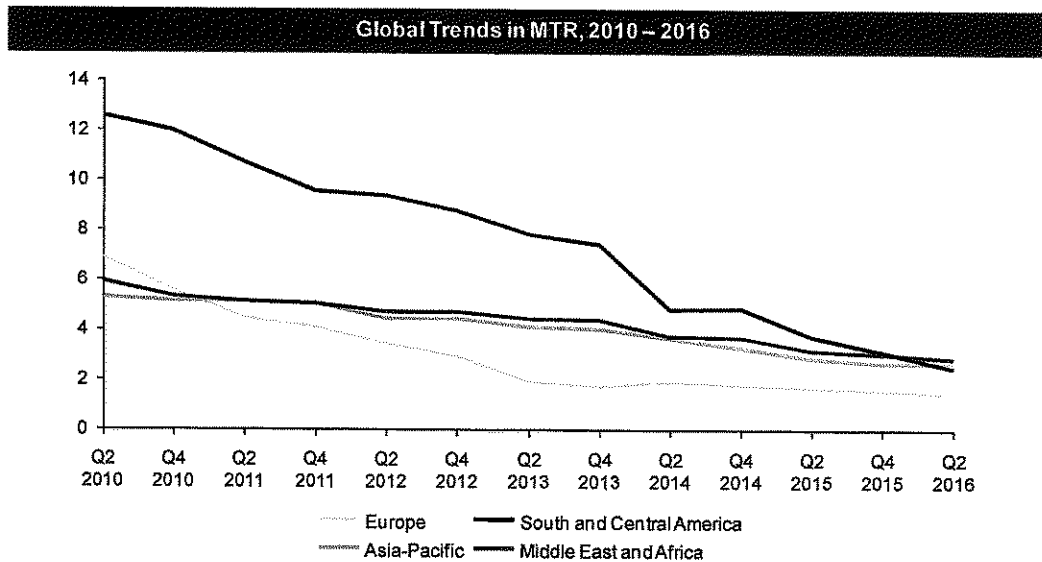


Figure 8: Global trends in MTR¹⁷

The EU trend can mainly be explained by the new policy to regulate MTR prices on the basis of pure LRIC. Although not fully implemented, most EU NRAs have introduced glide paths for lower, uniform MTRs in their countries.

Meanwhile some “Best Practice” countries have gone even further than regulating on a pure LRIC basis and introduced a BAK in fixed and mobile networks. Amongst them are the:

- FCC in the United States,
- IDA in Singapore (monitored BAK),
- CRTC in Canada and
- Anatel in Brazil (introduced a partial form of B&K and will introduce a full CPP system in 2016.)

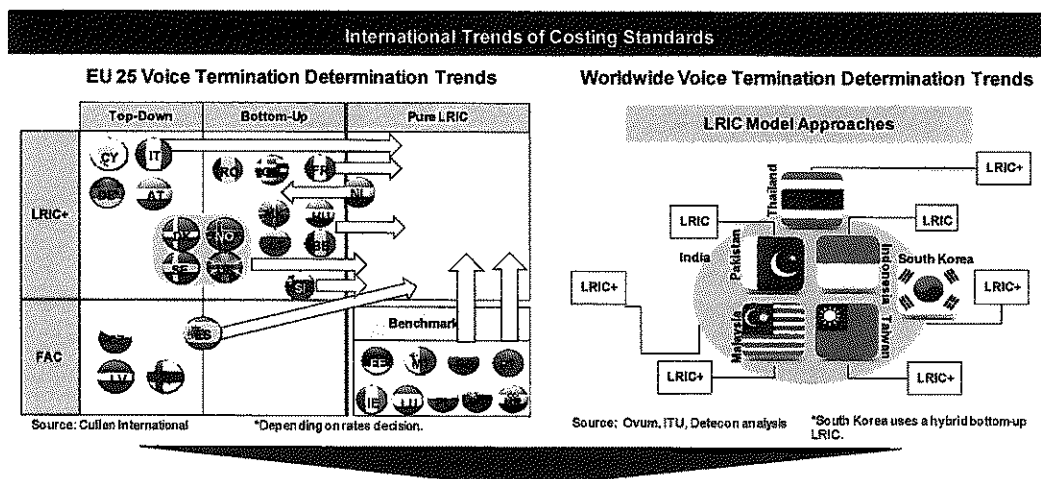
¹⁷ OVUM interconnect Benchmarks : Q2 2016

5.3 Approaches followed by regulatory authorities worldwide

5.3.1 European Commission

In 2009, the European Commission issued a recommendation for a harmonization of the MTRs in all member states. The recommendation is based on a "pure Long Run Incremental Cost (pure LRIC)" approach and that MTR should be set on a symmetric basis for fixed and mobile. Currently the member states are in the process of harmonizing their MTR regulations, with the general trend of strongly decreasing MTRs.

The EU recommended to base the cost evaluation on a bottom-up modelling approach, based on efficient technologies and current costs. This means that the core part of the network should be based on the assumption that it is a modern next generation network, while the access part of the network is currently on a mixture of 2G and 3G. It can be expected that the next recommendation will include all-IP voice and LTE access for mobile.



- European countries with highly efficient and mature markets are considering to follow a pure LRIC approach for termination services, however in most of them the approach stills on debate
- Termination rates regulation in most other countries are pre-dominantly LRIC+ based

Figure 9: Global Trends in Costing standards

5.3.2 IDA Singapore

In a Decision and Explanatory Memorandum issued by the Infocomm Development Authority of Singapore (IDA) on 8th May 2008, it was proposed that the BAK arrangement should be a viable long term Interconnection settlement regime between operators, regardless of the technologies, networks, platforms and the end user devices used. IDA considers that the BAK arrangement would allow each operator to manage their own costs of originating and terminating the traffic in their own networks.

IDA also believes that the speed of deployment of IP-based NGNs and the increasing pace of FMS (Fixed Mobile Convergence) are calling for BAK, as the most appropriate long term interconnection regime.

5.3.3 United States FCC

On October 27, 2011, the U.S. Federal Communications Commission (FCC) announced that it would adopt a Bill-and-Keep framework for all telecommunications traffic exchanged with local exchange carriers (LECs), as part of an effort to reduce arbitrage practices such as traffic pumping and phantom traffic, encourage the deployment of IP-based networks, and reduce artificial competitive distortions between wireline and wireless carriers

The regulator is of the opinion that the present Cost-oriented MTR system distorts investment in technology and hands operators billions of dollars per year in indirect subsidies. It believes that its reforms will eliminate hidden costs in bills and provide economic benefits to consumers through lower prices, better value for money, or both.

The FCC's Transformation Order outlined a nine-year transition to a bill and keep (BAK) regime for call origination and termination. **By July 1, 2020 all LECs will use a BAK system**, whereby each operator bills its own customers and does not exchange payments with other operators for origination and termination.

It is worthwhile noting here that, some ILECs between themselves, as well as some CLECs between themselves, have already implemented, on a voluntary basis, BAK agreements for their local traffic.

A similar debate on the appropriate interconnection regime for IP-based networks is also held in the US where the FCC in its "National Broadband Plan" suggests to phase-out per-minute intercarrier compensation rates for the origination and termination of telecommunications voice traffic by 2017-2020.

4.3 The right interconnection regime for India

In Chapter 2 of the Consultation Paper and in the Eleventh Amendment of the Telecommunication Interconnect Usage Charges Regulation TRAI summarizes the impact of IUC on the telecommunications sector and states its two-fold aim:

- To protect the interest of consumers - by ensuring adequate choice and affordable services by promoting competition and efficiency in the market, and
- to create incentives for TSPs – by ensuring adequate and fair returns on investment, so as to stimulate orderly growth and innovation.

Detecon is convinced that the best IUC system for India will be a BAK arrangement. The TRAI states:

"A well-designed IUC regime should not only allow recover costs of service provider but also provide flexibility to service providers to offer innovative tariff plans."

We have demonstrated in detail that a cost based termination rate would lead to higher retail prices in particular for off-net calls while a BAK regime would provide incentives for innovative tariff plans to recover the incoming traffic costs, including flat rates, capacity pricing, buckets etc.

The TRAI further elaborates:

“...the IUC regime should also ensure that a service provider does not pass on the burden of its own tariff decision to other networks involved in completing the call or to new competing service providers in the form of a high IUC.”

We have demonstrated in chapter 2 that exactly this effect will occur if large (incumbent) operators will charge higher off-net retail prices than on-net prices and that the large operator has incentives to even overstate the cost impact of cost based IUCs. Therefore, a BAK arrangement can eliminate this effect.

A further important objective of the TRAI in the design of an IUC regime is to balance investment incentives and the interest of competition and to ensure that the benefits of positive network externalities are delivered to consumers.

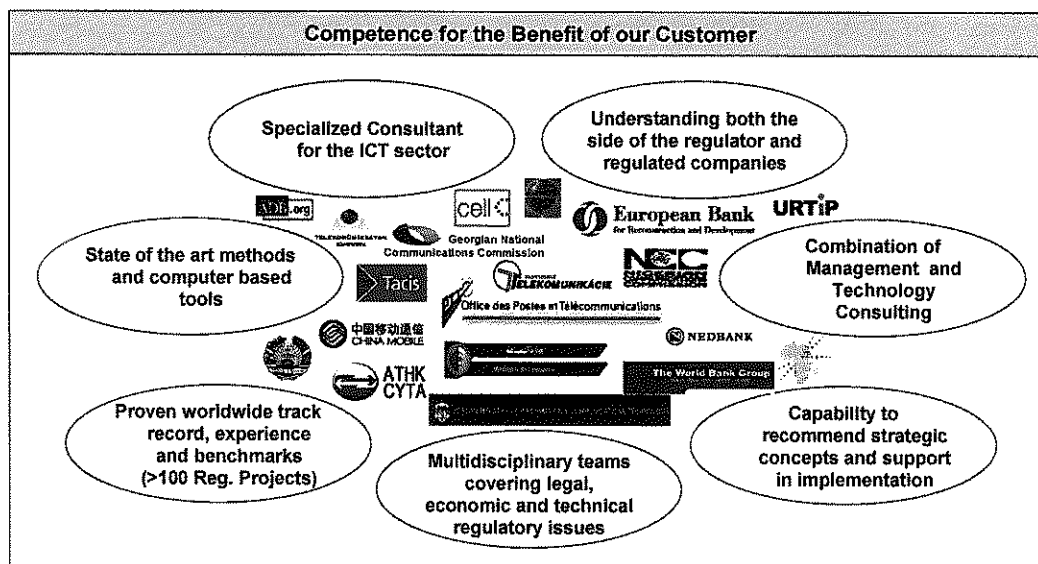
A BAK system is technology neutral, provides incentives to switch from legacy technology to all IP networks with lower unit costs, lower overall retail price level and more efficient utilization of networks, which will ultimately result in higher consumer welfare.

We believe that taken the already very low level of IUCs into account the operators in India can afford a switching from cost based IUCs to a BAK regime without major harm to their profitability. If the TRAI feels, that there should be a transition path from one to the other system we would recommend to first switch to a pure LRIC based IUC system and switch to BAK in a second step.

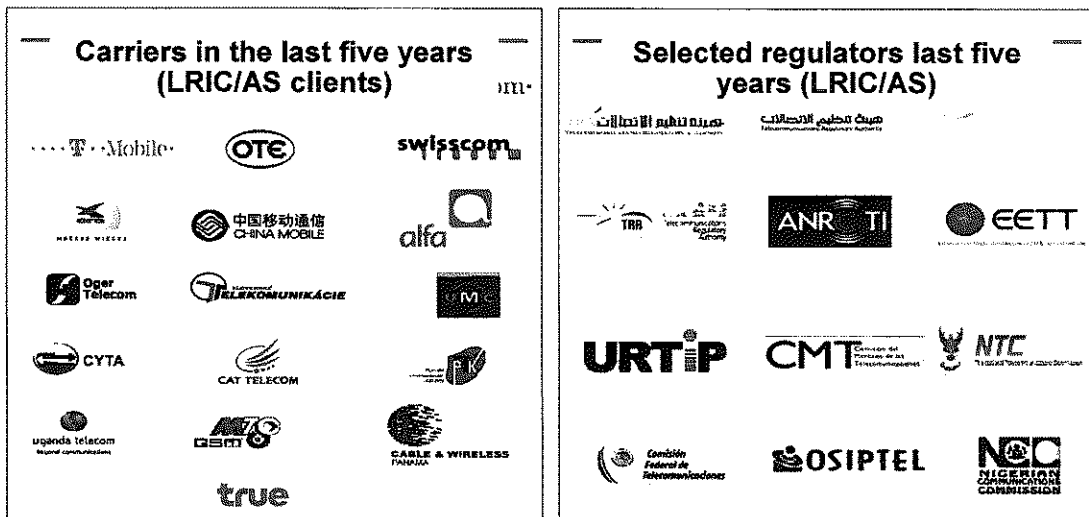
6 Detecon at a glance

Detecon International is one of the leading Management Consulting is a globally present consulting company, specialized on ICT topics and combining classical management consulting with outstanding technological expertise We are a subsidiary of Europe's largest carrier, Deutsche Telekom. With more than 1000 consultants in 13 offices world wide we produce a turnover of about €165m per annum.

Among our clients are major industrial producers and service providers, but 85% of the value is created by Telcos and Regulatory Authorities. Detecon is able to provide interdisciplinary and highly qualified teams of regulatory consultants specialized in all the services to be rendered.



Detecon also provided consulting services on accounting separation and LRIC modeling for over 10 years and has become a trusted advisor for many clients in this field.



For more information please follow

www.detecon.com

7 Abbreviations

BAK	Bill and Keep
BULRIC	Bottom-Up LRIC
CCA	Current Cost Accounting
CPNP	Calling Party Network Pays, i.e. the network operator initiating the call pays for the entire call
CPP	Calling Party Pays
FAC	Fully Allocated Costs
HCA	Historic Cost Accounting
IP	Internet Protocol
KPIs	Key Performance Indicators
LECs	Local Exchange Carriers
LRIC	Long Run Incremental Costs
LTE	Long-Term Evolution
MHz	Mega Hertz
MNOs	Mobile Network Operators
MTR	Mobile Termination Rates, i.e mobile interconnection usage charges
NGA	Next Generation Access networks, i.e. primarily IP packet based access networks
NGN	Next Generation Networks, i.e. primarily IP packet based networks
NRA	National Regulatory Authority
PSTN	Public Switched Telephony Networks
SIM	Subscriber Identity Module
TRAI	Telecom Regulatory Authority of India
VoIP	Voice over IP
WACC	Weighted average cost of capital