



Response to Interconnect Usage Charges  
Consultative Paper Issued by TRAI on  
December 31<sup>st</sup> 2008

## Table of Contents

<b>1</b>	<b>Executive Summary .....</b>	<b>5</b>
<b>2</b>	<b>The Need to Review MTC .....</b>	<b>11</b>
2.1	IUC regulation has to be consistent with recent TRAI policies .....	11
2.2	Impetus needed to ensure sector growth continues and even increases.....	11
2.3	Since 2003, minutes of use have increased 18x; costs have reduced significantly .....	13
2.4	High MTC is a block to higher network utilisation and sector profitability .....	14
2.5	MTC as % of ARPM has increased from 11% in 2003 to 40%+ today .....	15
2.6	MTC not revised since 2003, rest of World has reduced MTC by 50%+ since .....	15
2.7	High MTC rates minimize customer benefits and cause market confusion .....	16
2.8	Analysis of ‘pay to get called’ schemes shows extent of termination margin .....	17
2.9	Key Takeaways .....	18
<b>3</b>	<b>Mechanisms to determine MTC .....</b>	<b>20</b>
3.1	Approaches used for MTC Estimation.....	20
3.2	FL-LRIC offers a CEILING value for MTC estimation.....	21
3.3	FL-LRIC model shows asymmetric MTC.....	23
3.4	Key Takeaways .....	24
<b>4</b>	<b>TRAI can choose from four options to determine MTC....</b>	<b>26</b>
4.1	<i>Option 1 - Asymmetric MTC</i> based on FL-LRIC .....	26
4.2	<i>Option 2 – Symmetric MTC</i> at floor of FL-LRIC for ease of implementation .....	28
4.3	<i>Option 3 – Zero MTC</i> based on Bill & Keep for “future proof” IUC regime .....	30
4.4	<i>Option 4 – Negative MTC</i> to maximize consumer benefit and bridge social divide.....	32
4.5	TRAI should choose from one of four options depending on key objectives .....	34
4.6	TRAI should be wary of decoy arguments that some operators may present .....	35

4.7	A marginal reduction of MTC to 15p-20p will defeat the objectives of an IUC review ..	37
4.8	Key Takeaways .....	37
<b>5</b>	<b>Other Charges .....</b>	<b>39</b>
5.1	Continue Origination Charge under Forbearance .....	39
5.2	Lower carriage charges to enhance affordability .....	39
5.3	Reduce transit charges significantly and introduce competition .....	39
5.4	Make port charges to BSNL the same as between private operators .....	42
5.5	Key Takeaways .....	42
<b>6</b>	<b>TRAI – Issues for Consultation (Q&amp;A) .....</b>	<b>43</b>
<b>7</b>	<b>Conclusion.....</b>	<b>49</b>

<b>Appendix</b> .....	<b>50</b>
<b>1 LRIC Model – Assumptions and Outputs</b> .....	<b>50</b>
1.1 Model Structure .....	50
1.2 Key elements of the FL-LRIC model .....	51
1.3 Key Assumptions.....	52
<b>2 International benchmarks show massive decline in MTC in recent years</b> .....	<b>56</b>
2.1 Declining MTC resulted in a spurt of growth for subscribers in Pakistan.....	56
2.2 Countries implement asymmetric MTC to further competition and push growth .....	57
2.3 Countries implementing Zero MTC’s have achieved High MoU’s & Penetration.....	58
<b>3 Concerns regarding COAI’s submission to TRAI</b> .....	<b>61</b>
3.1 Counter Views to White Paper on MTC.....	61
3.2 Discrepancy in the LRIC models submitted by COAI .....	66
<b>4 Gradual Decline in MTC will defeat TRAI’s pro-growth and pro-consumer objectives</b> .....	<b>69</b>
<b>5 Lowering MTCs will have a positive impact on sector profitability – <u>not</u> the reverse</b> .....	<b>70</b>
<b>6 Typical decoy arguments presented by anti-competitive operators in other markets</b> .....	<b>72</b>
<b>7 About Diamond Consultants</b> .....	<b>74</b>
<b>8 Glossary</b> .....	<b>75</b>

# 1 Executive Summary

This paper has been prepared in response to the consultation paper no: 17/2008 issued by Telecom Regulatory Authority of India (TRAI).

The Indian telecom industry has experienced remarkable growth over the past decade. With approximately 374 million telephone connections as of November 2008, the Indian telecommunications sector has grown to become the world's second largest market after China. The main factors driving and sustaining telecommunications growth have been favorable macro-economic fundamentals and demographics, favorable investment climate, strong economic growth, rising incomes and progressive and consistent policy and regulation.

**TRAI has been the leading proponent for driving growth and enhancing consumer benefit.** Over the past few months, the **Authority has recommended a number of pro-growth and pro-customer policies** including removing a cap on number of licencees, recommending MNP, policy on MVNOs, pushing for the adoption on NGN networks etc. We believe that the **TRAI recommendations on IUC have to be consistent with these recent policies; this will also ensure the full impact of the other recommendations suggested by TRAI.**

While India has seen high growth in the sector, telecom penetration in India remains very low and is in fact even lower than countries that have lower income levels than India – e.g. Pakistan, Bangladesh, Vietnam, Sri Lanka etc. What is really worrying is that despite the low base, the overall growth in the telecom sector has started to slow down even while rural penetration and tele-density continue to be low. **The Government and Regulatory authorities must take aggressive, proactive swift measures to sustain the growth in this sector. IUC is an important lever that TRAI can use to address the gaps of low penetration and drive further growth in India.**

It must be noted that **most of the countries evaluate and review termination charges every 2-3 years and nearly all countries have reduced MTC by more than 50%** over the past 4 years (and yet, many countries like in Europe are considering a further reduction of 70%). In contrast, the current MTC regime in India was setup in 2003 and is still being used.

Over the past 5 years, explosive growth of subscribers and usage has **increased network traffic to ~18x of the level of traffic in 2003.** The industry has also seen ~25% decline in price of electronic equipment year-on-year in addition to significant passive sharing, a concept that practically did not exist in 2003. Costs have also reduced significantly through allocation of spectrum beyond licenced 6.2MHz and on account of technology innovation driving more Erlangs capacity per MHz. Even if we assume a 3x to 4x increase in network coverage, these factors indicate that **the MTC should have reduced by about 5x-6x over the past 5 years.**

Despite the growth in MoUs, average network utilisation remains very low, estimated at below 15% average utilisation. Every minute which is not utilised is a minute lost, an opportunity to generate revenues gone forever. **A dynamic MTC regime can enable the industry to launch innovative off-peak usage schemes to boost utilisation. This will help the industry grow its revenues and profitability further.** The increased profitability can help further grow the sector.

MTC as a share of ARPM has increased significantly in the past 5 years – from 11% in 2003 to more than 40% of tariffs today – and **MTC has become the single most significant factor in determining retail tariff.** Further reduction in lower tariff is difficult without revising and reducing MTC. Countries in the SAARC Region, Bangladesh and Sri Lanka, show lower tariffs than in India and have naturally crossed India in terms of mobile penetration. Sri Lanka in particular is a shining example of the impact of a progressive IUC Regime, Sri Lanka has zero MTC today.

**High MTC in India results in lowering of consumer benefit and increase consumer confusion.** A direct result of the high MTC in India is the massive difference between on-net and off-net tariffs. With an increasing number of operators and allocations of numbers across different series, the consumer is unable to differentiate between on-net and off-net numbers. The situation is bound to get exacerbated with the implementation of MNP.

**The fact that MTCs are far higher than the correct cost based value is also evident from the ‘pay to get called’ schemes that some operators have launched in India.** Retail minus principles suggest that if a customer gets 10p for every incoming minute, the implied MTC considering various margins (including MVNO/co-branding margins) should be well below 10p.

Some regulators around the world have used a cost-based approach to determine the ceiling to MTC. **TRAI had used an FAC approach while setting the MTC in 2003, in which capex costs are, rightly, not considered in the calculation.** This approach can be used today and based on factors such as increased minutes and lower network costs, will show an MTC about 30% of the FAC estimate seen in 2003.

If TRAI would like to focus on incremental costs as the most economically efficient means of determining the impact of interconnection between competing operators, then TRAI could select the FL-LRIC methodology to determine MTC. It is important to note that **a FL-LRIC based model typically determines the ceiling of termination charges to be set.**

A leading global telecom advisory firm, Diamond Consultants, has independently prepared a FL-LRIC model for the Indian market based on their best practice approach. Based on Diamond’s FL-LRIC model, we note that MTC for both the new and incumbent player is well below the present level of MTC (Rs. 0.30/min). Additionally, the cost of termination is significantly different for the two operators. **Diamond’s best practice LRIC model indicates that the MTC for a new operator is Rs. 0.22/min and for an existing operator is Rs. 0.08/min.**

**As has been followed in all countries implementing asymmetric MTC, the classification of incumbent vs. new entrants should be on the basis of date of allocation of spectrum.** Thus, for India, the classification will have to be applied circle-wise to operators.

In addition to asymmetry based on new vs. incumbent, some countries, especially in Europe, have implemented **asymmetric MTC rates based on 900MHz vs. 1800MHz allocation.** While the concept of additional asymmetry based on higher costs for 1800MHz operators is valid, we believe that **TRAI and DoT will address this imbalance through other mechanisms including additional charges, spectrum re-farming etc.**

We believe that TRAI has the following options to set the MTC regime in India:

1. **Asymmetric MTC with MTC for New Operators and Incumbent Operators at Rs. 0.22/min and Rs. 0.08/min respectively:** The biggest benefit of asymmetric regime is that **it ensures that the market place is competitive, which in turn fuels growth** and provides choice to consumers. These are in line with TRAI's stated objectives of being pro-consumer and pro-competition. One disadvantage of asymmetric MTC is that globally only the strongest regulatory authorities (e.g. in Europe) have been able to withstand the pressure from incumbent operators against its implementation.
2. **Symmetric MTC with MTC = Rs. 0.08/min:** If asymmetric MTC regime is considered too difficult to implement, then TRAI could consider to set the MTC at the floor of the cost calculated for both new and incumbent operators. This can be justified under the economic principle that the Authority would like the new entrants to show, from Day 1, the same scale efficiencies that incumbent operators show. A weighted average cost calculation across operators (both new and incumbent) using the FL-LRIC approach indicates that the MTC should be Rs. 0.08/min. It is very encouraging to see that a number of new entrants have indicated their acceptance for a single low MTC; TRAI should encourage this confidence of new entrant operators to directly take on incumbents on cost and operational efficiency.

The above options are determined on cost-based analysis of MTC. **However, TRAI has to bear in mind the severe limitations of implementing a cost-based MTC regime.** A cost-plus MTC regime is totally against recent philosophy of market led pricing (as is being followed in spectrum auctions) and other regulation (e.g. tariffs determined by market forces rather than a cost plus regime; like we see in the fertilizer sector). A cost-based regime protects inefficiency by practically guaranteeing a rate of return on costs and investments. In addition, cost-plus regimes are extremely complex to administer and result in significant ambiguity – whose costs, for which technology, for what network utilization etc. become exceeding difficult questions to answer. In effect, a cost-based MTC is a cross subsidy of incumbent networks paid for by new entrant operators; a tax that implicitly offers indirect exclusivity to incumbent operators.

Therefore, TRAI should consider the following other options as well which safeguards consumer and promotes growth of telecom sector:

3. **Zero MTC (Bill and Keep):** Zero MTC under and Bill and Keep regime is one of the most pro-consumer and pro-competition moves that TRAI can make on IUC. Countries that have implemented Zero MTC under a Bill and Keep regime have shown a massive growth in penetration, much higher than we see in India today – for example, Sri Lanka and China. Bill and Keep is considered to be future ready – it can be used as technology evolves to include calls terminated on 3G, BWA, femtocells, WiFi, VoIP, NGN, fixed-mobile converged calls etc. A cost based regime will need to compute MTC for each of these cases and determine a weighted average. A Zero MTC regime will remove all controversies caused by data ambiguity and reduce the risk of subjectivity. As a result of these advantages, Bill & Keep is today the most popular form of IUC regulation being considered globally.
4. **Negative MTC:** Negative MTC is the most pro-consumer step that TRAI should actively consider. Such a regime, even if implemented for a short period of time, can bridge the social divide between rich and poor and take growth of telecom sector to the next level. Negative MTC has been implemented selectively for a short span of time, as it was in Hong Kong and it helped boost the sector growth to all sections of society. A negative MTC is similar to giving economic incentive for subscribers to join the network, and therefore, encourages people to join and use the network. A form of negative MTC is already in use in India today, where a poorer customer gives a 'missed call' to a richer customer to prompt a call back. Negative MTC will drive growth, usage and penetration in rural areas and small towns and seed the market to ensure long term growth. The end result will be higher network utilisation in smaller towns/ rural which will in turn drive sector revenue growth and profitability.

**The above options are in line with the stated objectives of TRAI and help in achieving goals of safeguarding consumer interests, ensuring financial sustainability of the operators and promoting growth of the sector.**

TRAI should choose the preferred option depending on the objectives it wants to target:

- If the key objectives of TRAI are to drive industry growth by promoting competition and by creating a level playing field, Option 1 – asymmetric MTC, is the preferred option;
- If TRAI finds it difficult to implement asymmetric MTC, Option 2 – symmetric MTC at floor LRIC value of Rs. 0.08/min, can be considered;
- If TRAI wants to implement a future proof IUC regime, promote efficiency and move away from data ambiguity of cost based mechanisms, then Option 3 – Bill and Keep, is the preferred option;
- If TRAI believes that India's and the sector's interests are best served by seeding the market for massive future growth by promoting telephony in rural India and for the economically weaker sections of society, then Option 4 – Negative MTC, should be preferred.

A dynamic MTC regime (8 paise, Zero or Negative) will help the industry enhance revenues and profitability. The operators will benefit immensely because of higher mobile penetration as well

as increase in usage by subscribers. Additionally, this will make the market more competitive and enable operators to provide innovative services to consumers.

**A dynamic MTC regime is sometimes opposed by some anti-competitive incumbent operators as they fear it will weaken their on-net offerings and reduce the effectiveness of potential collusion between them.** We would like to point out that despite Reliance being a net gainer of MTC, we are pleading for a pro-growth dynamic IUC regime because we believe that this will push further growth which will help us recover any notional loss.

**Thus, some operators may present decoys as their attempt to prevent a drastic change in MTC.** The Regulatory Authority needs to guard against some of the common myths and incorrect arguments that may be presented. For example, some operators in Europe have presented misleading econometric models that justified higher LRIC than the prevalent MTC for the sole purpose that the regulators not cause drastic reduction in MTC but rather cut MTC by 30%-40% or lesser. Their objective was to safeguard against a significant reduction in MTC. Similarly, in other cases, operators have proposed a glide path to a lower MTC regime as a mechanism to exploit on-net benefits and collusion effects for as long as possible.

Another common myth that is sometimes propagated is to argue that lower MTC will reduce industry profitability and adversely impact coverage of rural areas. Both these claims are incorrect as they ignore the fact that even for the largest incumbent, net interconnection revenues (received less paid) is less than 3% of revenues and will be made up almost immediately by greater utilisation of the network. Also, if the logic presented were true, an operator which pays more interconnection than it receives can never harbour ambitions to launch in rural areas.

**We are certain that TRAI will be wary of such decoy arguments that may be presented.** Decoy arguments will have been deemed to have succeeded if TRAI takes half measures and reduces MTCs by say 15p or lesser. **A half measure reduction to, say, 15p or higher, will only result in the sector losing revenue with no change to sector dynamics, network utilisation increase, service innovation, operator efficiency or industry growth.**

TRAI should also review Carriage Charges, Transit Charges (both intra SDCA and LDCA to SDCA), and Port Charges along with MTC. In case of carriage charges, a ceiling was fixed comparatively recently in 2006 at Rs. 0.65/min. Since then some costs have reduced though fibre coverage has expanded. Keeping these factors in mind, we suggest that the ceiling be reduced to Rs 0.55/min.

Transit charge, was fixed in 2003 at Rs. 0.20/min, and since then the costs have reduced significantly. Even though the cost of intra SDCA is much lower than cost of transit for LDCA to SDCA, charges are set almost the same by BSNL since this segment is not competitive. Therefore we recommend that **transit charges should be reduced significantly** and the Regulator should **introduce competition in this segment.**

Port charges are paid by private operators to BSNL based on number of ports provided at POI. Port charges between private operators are already zero; however BSNL typically does not

allow operators to hand over traffic at the SDCA level to avoid this charge. We therefore recommend that **port charges to BSNL should be made the same as between private operators and that it should be based on actual cost incurred.**

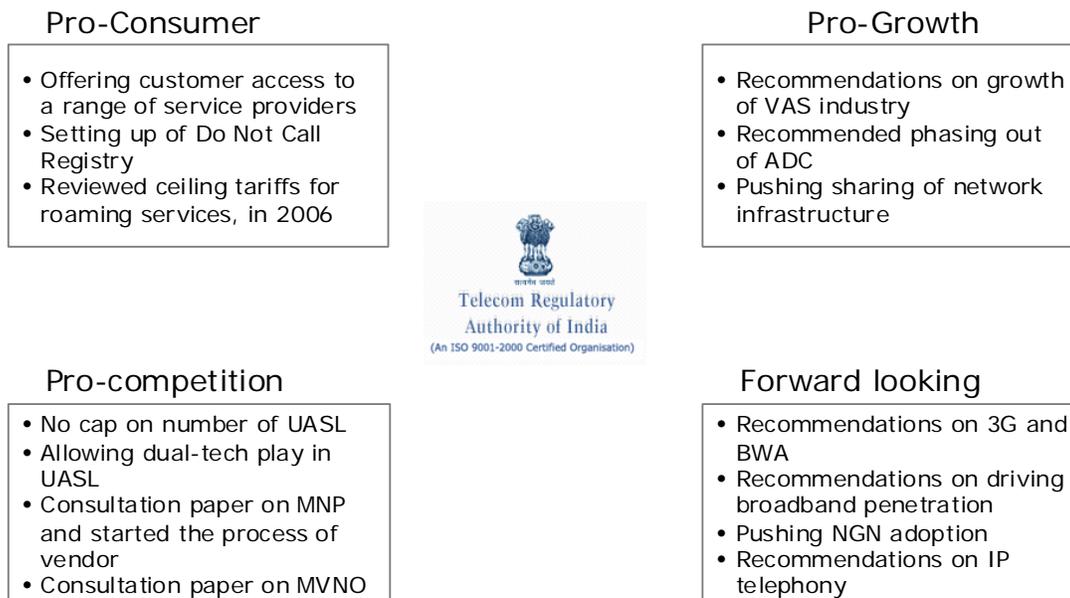
In the ensuing sections of this response, we have explained in detail the need to change the current MTC regime, provided comprehensive quantitative support (LRIC model) and showed how lowering MTC does not impact operators adversely. We have also presented our views on the specific questions in the consultative paper.

## 2 The Need to Review MTC

### 2.1 IUC regulation has to be consistent with recent TRAI policies

Over the past decade, the telecom industry has experienced remarkable growth – especially in the wireless domain. Total subscribers as on September 2008 were more than 300 million. However, **of this base only 29% of the contribution was from rural India which constitutes 70% of the total population of the country.**

TRAI has successfully taken up policies and recommendations which safeguard consumer interest and helps improve competition in the market and in addition, promotes further industry growth.



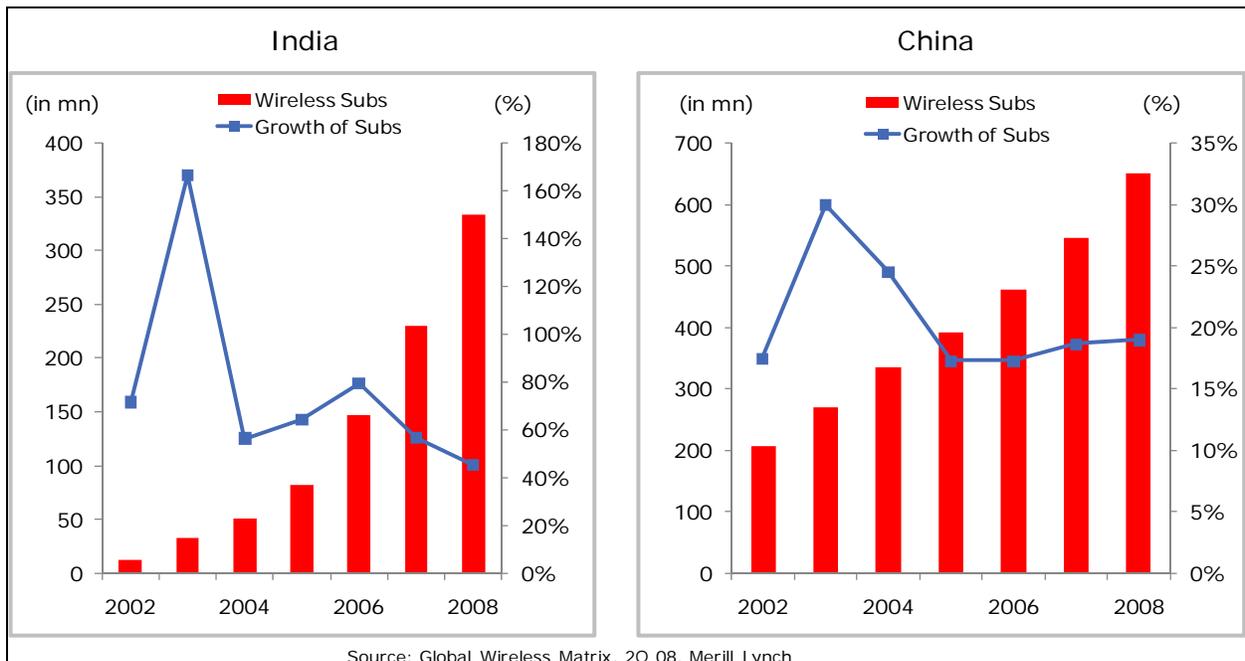
**Figure 1 Key TRAI Policies – Pro-Consumer, Pro-Competition and Pro-Growth**

**TRAI recommendations on IUC have to be consistent with these recent policies; this will also ensure the full impact of the other recommendations suggested by TRAI.**

### 2.2 Impetus needed to ensure sector growth continues and even increases

Although the past decade has been remarkable, a closer look at the numbers for growth including a quick comparison to China (probably one of the best comparisons to India in terms of size and scale) and the relatively low tele-density in rural areas show that the Regulatory Authorities and the Government must continue to act decisively and swiftly in the days ahead to ensure the next phase of growth of the wireless industry in India.

Figure 2 below compares the wireless penetration between India and China. The figure shows that the **rate of growth in India (Growth of Subs) has started to decline**. Although China has more than 600 million subscribers, its growth rate is continuing to hold steady.



**Figure 2 Growth - India vs. China**

While SIM penetration in Metro Circles is above 70%, actual citizen penetration, the real barometer of success, remains low and vast sections of the population still do not have access to mobile phones. A study of IMEI to IMSI mapping on a sample subscriber set in so-called high penetration Metro Circles will show the extent to which there are multiple SIMs rather than unique Indian users.

In addition, **it must be noted that rural teledensity in India has just reached the two digit level (12.72)**. While, teledensity in the urban areas has reached satisfactory levels rural teledensity remains a serious challenge. A similar issue is seen in urban areas at the economically challenged lower end of customers – marginal customers in urban India show significantly lower ARPUs and MoUs, especially outgoing MoUs.

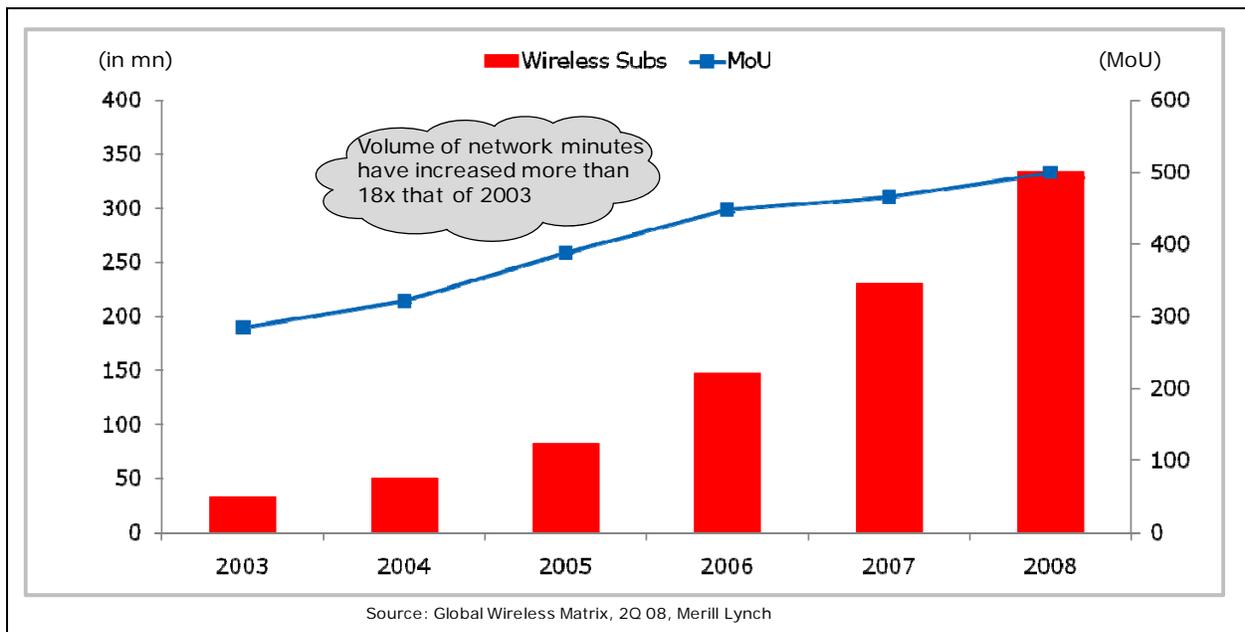
While India has seen high growth in the sector, telecom penetration in India remains very low and is in fact even lower than countries that have lower income levels than India – e.g. Pakistan,

Bangladesh, Vietnam, Sri Lanka etc. What is really worrying is that despite the low base, the overall growth in the telecom sector has started to slow down even while rural penetration and tele-density continue to be low. **The Government and Regulatory authorities must take aggressive, proactive and swift measures to sustain the growth in this sector. IUC is an important lever that TRAI can use to address the gaps of low penetration and drive further growth in India.**

The Authority needs to stop the declining growth and bring about an important structural change to the industry and ensure industry growth rates increase even further.

### 2.3 Since 2003, minutes of use have increased 18x; costs have reduced significantly

- a) **Volume of minutes:** The past 4-5 years has seen a significant change in the dynamics of the Indian telecom market. There has been an exponential growth in the wireless subscriber base which has crossed 340 million (Dec 08) and volume of traffic has also shown a similar trend. Together **there has been an 18x jump in the volume of minutes (MoU) compared to 2003 levels.**



**Figure 3 Network traffic has increased by more than 18x that of 2003**

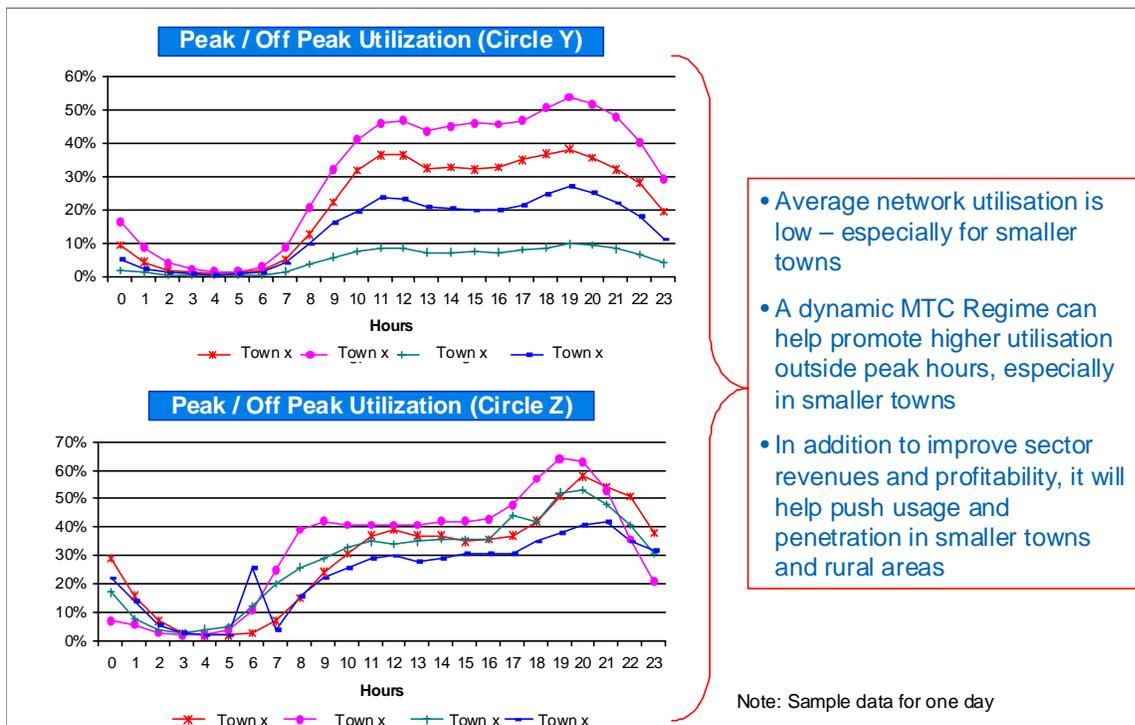
- b) **Cost Structure:** The cost structure of operators has also changed significantly over the past five years:

- Electronics costs have reduced by 15%-25% year-on-year for past five years
- Network sharing is now commonplace unlike in 2003. This has reduced capex manifold
- Operators, especially incumbent operators, have received well over their licenced spectrum of 6.2MHz, thus reducing costs of network and termination
- Capacity available per MHz has increased significantly as operators have deployed latest techniques like half-duplex, AMR, multi-sector configuration etc.

Even if we assume that network coverage of operators has increased three to five times (which is a very aggressive estimate), **these two factors combined – higher MoU and lower costs - together indicate that the cost per minute of terminating voice call should have reduced by about 5x from that in 2003.**

## 2.4 High MTC is a block to higher network utilisation and sector profitability

Despite the growth in minutes of use (MoUs), average network utilisation remains very low, estimated at below 15% average utilisation.



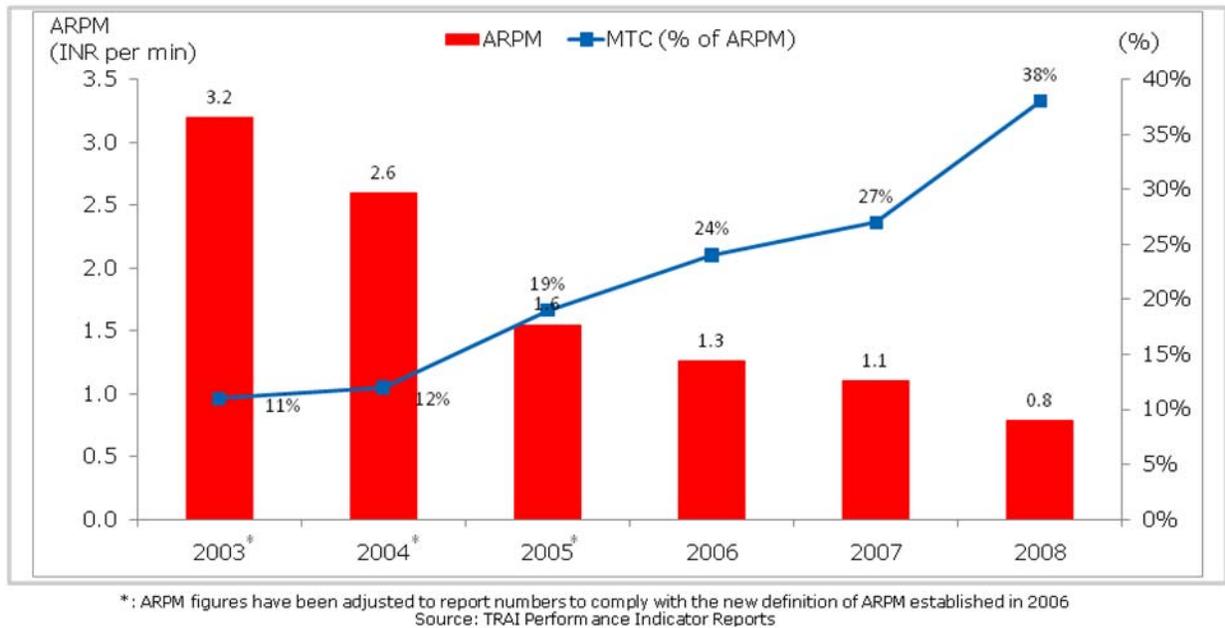
**Figure 4 Network utilisation in smaller towns can be increased by a dynamic IUC Regime**

Every minute which is not utilised is a minute lost, an opportunity to generate revenues gone forever. **A dynamic MTC regime can enable the industry to launch innovative off-peak usage schemes to boost utilisation. This will help the industry grow its revenues and profitability further.** The increased profitability can help further grow the sector.

## 2.5 MTC as % of ARPM has increased from 11% in 2003 to 40%+ today

ARPM levels of the industry have reduced over the past five years, from about Rs. 3.2/min in 2003 to Rs. 0.80/min in Sep 2008. However, the MTC has stayed at the Rs. 0.30/min level since 2003.

As shown in Figure 5, **MTC as a share of ARPM has increased significantly from 11% of ARPM to around 40% today.** The MTC has thus, become a significant portion of the tariff now.



**Figure 5 MTC as % of ARPM [source: Diamond Consultants]**

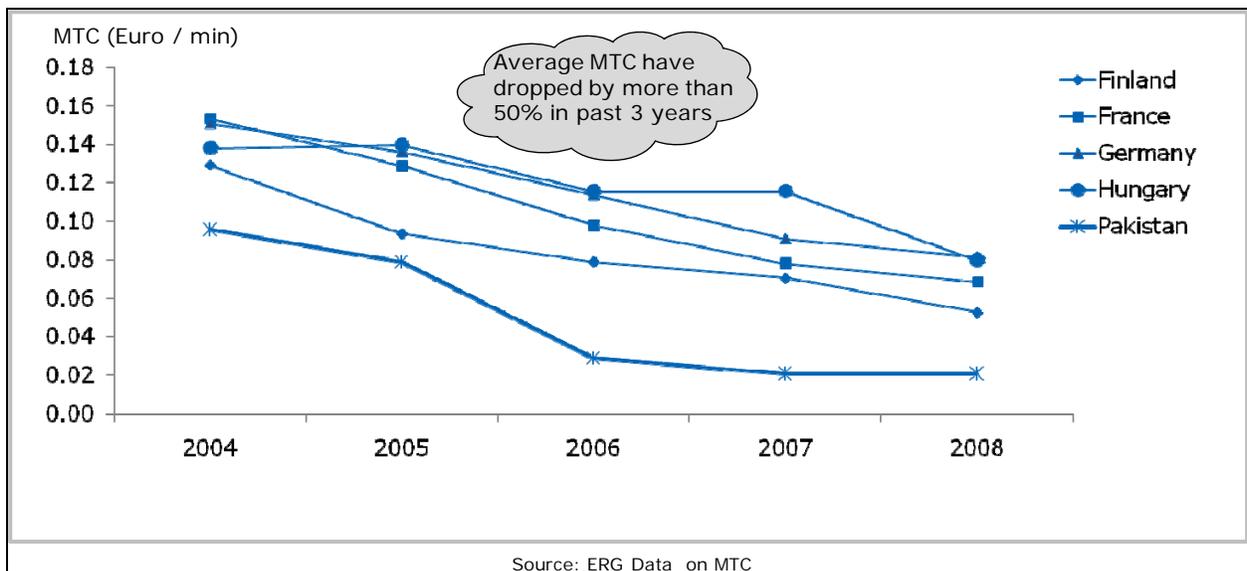
Further reduction in tariff from current levels can be possible only by reduction in MTC regime in India.

## 2.6 MTC not revised since 2003, rest of World has reduced MTC by 50%+ since

Benchmarks from other countries clearly indicate that the MTC regime is reviewed every 2-3 years. All countries globally have seen a downward trend in MTC, as is shown in the Figure 5, with average decrease of 50% over past 4 years.

Despite the significant reductions implemented in recent years, some regulators are looking to go even further and reduce MTC by a further 70%, as the EC Telecoms Commissioner has repeatedly announced.

The current level of MTC in India was set after a consultative process in 2003, and has not been modified during the previous review done in 2006.



**Figure 6 MTC in nearly all countries reduced by 50%+ in last 4 years**

Increased competition, massive growth of subscribers and reduction in tariff and increased network traffic has reduced the cost of providing terminating service. The present consultation process provides TRAI a unique opportunity to revise the charges and make key structural changes to the industry.

## 2.7 High MTC rates minimize customer benefits and cause market confusion

A direct result of the high MTC in India is the massive difference between on-net and off-net tariffs.

	Vodafone			Airtel		Reliance	
Local outgoing (Rs / min )	Talk 199 Plus	Talk 399 Roam	Talk 250 More	New India Home 299	New Roam 399	NJ125	NJR 300
<b>On-net</b>	0.30	0.50	0.30	0.50	0.50	0.50	0.15
<b>Off-net</b>	1.2	1	0.60	1	1	0.99	1
<b>Off net calls expensive by</b>	400%	200%	200%	200%	200%	200%	666%

**Figure 7 On-net Off-net tariff rates of leading operators [source: Diamond Consultants]**

High differential in on-net and off-net packages shows a number of points:

- **Reduces consumer benefit** – as the customer now can only call a select set of numbers, so consumer benefit proportion equals on-net contacts divided by total contacts
- **Causes confusion** – the customer needs to know which numbers are on-net and off-net, which is difficult
- **Above cost termination rates** – lower on-net calls implies a huge margin between termination costs and termination MTC rate

With an increasing number of operators and allocations of numbers across different series, the consumer is unable to differentiate between on-net and off-net numbers. The situation is bound to get exacerbated with the implementation of MNP.

**High MTC in India results in lowering of consumer benefit and increases customer confusion.**

## **2.8 Analysis of ‘pay to get called’ schemes shows extent of termination margin**

Some operators have launched schemes where customers get paid for receiving calls.



<b>Rates</b>	Get 1 paise every 6 seconds
<b>Rules</b>	Money can be used only to charge air-time in Virgin Mobile
<b>Process</b>	Automatic update of call balance value after every call

**Figure 8 Virgin Mobile's pay to get called scheme**

**The fact that MTCs are far higher than the correct cost based value is seen from the 'pay to get called' schemes.** Such a scheme would be impossible to launch in markets where MTC is at or below costs.

Retail minus principles suggest that if a customer gets 10p for every incoming minute, the implied MTC considering various margins (including MVNO/co-branding margins) is well below 10p.

## 2.9 Key Takeaways

- There is an urgent need for the Regulatory Authority to review the MTC regime in India as the charges have not been revised since 2003. Globally, MTC has been reduced by 50%-70% by nearly all countries within this period
- Important structural changes need to be done in the telecom industry to ensure industry growth do not stall but actually increase even further to enable even the poorest of Indians to enter the telecom era
- Volume of network minutes (MoUs) has increased to 18x of the levels of 2003. The cost of equipment has seen a fall of 25% year-on-year for past few years in addition to the sector seeing significant infrastructure sharing and greater spectrum allocation. Even if we account for a 3x-5x increase in network coverage, a top-down analysis reveals that MTCs need to be revised downwards by a factor of at least 5x
- MTC as a percentage of ARPM has increased from about 12% in 2003 to more than 40% today, and has become the single most significant factor in determining retail tariff

- High MTC rates are anti-consumer and are simply untenable as customers find it difficult to distinguish between on-net and off-net. The confusion is likely to increase manifold as many new entrants launch and MNP is introduced
- Network utilisation of the industry is low, especially in smaller towns and rural India. A dynamic IUC regime can significantly boost network utilisation, thus further pushing growth as well as increasing sector revenues and profitability

### 3 Mechanisms to determine MTC

While there are a number of approaches that have been used to determine MTC, the most popular methods used today are a cost based approach and more recently an approach called Bill & Keep, which is often referred to as the “future proof” ambiguity-free approach to determining MTC.

In recent years, the other method to determine MTC, international benchmarking, has fallen out of favour. International benchmarking is an empirical exercise which uses countries of similar characteristics to benchmark MTC's. However finding identical countries is not always possible for benchmarking which is a limitation of this approach.

#### 3.1 Approaches used for MTC Estimation

##### 3.1.1 Fully Allocated Costs (FAC)

TRAI used this approach when MTC was last reviewed in 2003. **FAC works well in the early stages of growth in a country (and India can be argued to be still in an early stage).** Countries like Brazil, Hong Kong and Pakistan have used FAC and its variations in the regulation of their MTC.

##### 3.1.2 Forward Looking – Long Run Incremental Cost (FL-LRIC)

LRIC is the incremental costs that arise in the long run with a specific increment in volume of production. An increment is the unit of output over which costs are being measured.

##### 3.1.3 Activity Based Costing (ABC)

ABC is the methodology by which costs are assigned based on the activities required to deliver a service and the resources these activities absorb.

##### 3.1.4 Bill and Keep

This approach entails levying no charges on interconnecting carriers at all. Major advantage is that **this method avoids the administrative burden of billing one another for exchanged traffic.** In case of co-existence of various technologies, Bill and Keep solves the problem of determining cost of termination for each technology and hence reduces the complexities involved. Bill and Keep is today considered the most popular IUC regime being implemented, especially as it incentivizes efficiency, migration to NGN network models and reduces network costs.

Each of these techniques offers a set of advantages and certain drawbacks as shown in the figure below.

Model	Advantages	Drawbacks
International Benchmarking	<ul style="list-style-type: none"> <li>International benchmarks are often used in lieu of a formal cost calculation process</li> <li>Method is less complex &amp; quick</li> </ul>	<ul style="list-style-type: none"> <li>Relying solely on this method has several limitations as identical international markets are not easily available</li> </ul>
Fully Allocated Cost (FAC) - Historical	<ul style="list-style-type: none"> <li>Costs are taken directly from operators' accounting records and allocated using service demand</li> <li>Data is readily available</li> </ul>	<ul style="list-style-type: none"> <li>No distinction between incremental &amp; fixed/common costs</li> <li>Historic investments affect the setting of MTC</li> <li>Accounting depreciation is assumed for the estimation of capital costs</li> </ul>
Fully Allocated Cost (FAC) – Current Cost Valuation	<ul style="list-style-type: none"> <li>Further information relating to the current value of assets is collected and analyzed</li> <li>Allows different types of depreciation (current cost accounting or annuity) to be considered</li> <li>In line with TRAI methodology of 2003</li> </ul>	<ul style="list-style-type: none"> <li>No distinction between incremental and fixed/common costs</li> <li>Historic investments affect the setting of MTC</li> </ul>
Long Run Incremental Cost Model (LRIC) – Top down	<ul style="list-style-type: none"> <li>Cost volume relationships are used to differentiate between incremental costs and fixed, common and joint costs</li> <li>Model allocates fixed/common costs to services once the incremental costs have been allocated</li> </ul>	<ul style="list-style-type: none"> <li>Includes actual costs so likely to incorporate inefficiencies</li> <li>Thus, offers a CEILING to MTC rates – actuals may be lower</li> </ul>
Forward Looking Long Run Incremental Cost Model (FL-LRIC) – Bottom Up/Hybrid	<ul style="list-style-type: none"> <li>Differentiates between incremental &amp; common costs and uses an economic depreciation methodology</li> <li>Allows for different levels of efficiency to be modeled as all the costs are built bottom up</li> <li>Hybrid model is an extension of a bottom up where in outputs from the model are compared with operators actual data</li> </ul>	<ul style="list-style-type: none"> <li>Data difficult to procure</li> <li>Modeling is time consuming and may involve several iterations</li> <li>Need to change for 3G, BWA, VoIP, femto-cell and other NGN implementation</li> </ul>

**Figure 9: Modeling Approaches**

Some regulators around the world have used a cost-based approach to determine the ceiling to MTC. **TRAI had used an FAC approach while setting the MTC in 2003, in which capex costs are not considered in the calculation.** This approach can be used today and based on factors such as increased minutes and lower network costs. The network OPEX per minute has reduced to approximately 10-12p per minute from the 2003 levels of 25-30p per minute, seeing a drop of 15% year-on-year. This indicates that the MTC should now be 30%-35% of the FAC estimate seen in 2003.

If TRAI would like to focus on incremental costs as the most economically efficient means of determining the impact of interconnection between competing operators, then TRAI could select the FL-LRIC methodology to determine MTC. It is important to note that **a FL-LRIC based model typically determines the ceiling of termination charges to be set.**

### 3.2 FL-LRIC offers a CEILING value for MTC estimation

Many regulators consider a LRIC based approach as an accurate method in setting MTC. Focusing on incremental costs for interconnection is often seen as an economically efficient means of determining the impact of interconnection between competing operators.

Forward Looking Hybrid Long Run Incremental Cost (FL-LRIC) approach offers the advantage of incorporating the costs of a hypothetical efficient operator with a real world incumbent or new entrant operator to give optimal, yet realistic results.

Therefore **LRIC determines the ceiling of termination cost**. Based on network capacity and other qualitative arguments, MTC can be set below LRIC determined termination cost.

TRAI has previously recognized in its notification (No. 409-5/2003/FN, dated 29th October 2003) that there is a need to eventually move to LRIC based MTC estimation model. An extract from TRAI's notification of 2003 is given below:

*“The Authority considered the framework used for calculating the IUC under the previous exercise, and noted that the cost basis used had been historical average costs from audited accounts of BSNL. It noted that for costing purposes, several countries had used Forward Looking Long Run Incremental Costs (FLLRIC), i.e. a methodology under which only a portion of stranded costs (or costs arising due to past high equipment prices or old technologies) is included in the calculation of costs.”*

*“The Authority noted that the difference between historical costs and forward looking costs would be large, and relying on costs based only on modern and forward looking technologies would imply a large burden from the stranded costs for BSNL. While the Authority feels that change over to FLLRIC model is imperative, it examined the implications of a sudden changeover against a gradual changeover”*

A number of countries worldwide have adopted the LRIC based approach as shown in Figure 10.

Country	Modeling Approach	Country	Modeling Approach
Australia	Total Service Long Run Incremental Cost (TELRIC)	New Zealand	Based on LRIC
Austria	Based on LRIC	Pakistan	Combination of FAC and LRIC
Belgium	Forward Looking Long Run Average Incremental Cost Model (FL – LRAIC)	Peru	Cost Based approach with separate charges per company
Bahrain	Forward Looking Long Run Average Incremental Cost Model (FL – LRAIC)	South Africa	Forward Looking LRIC
Brazil	Fully Allocated Costs (FAC)	Sweden	Based on LRIC
Columbia	Total Element Long Run Incremental Cost (TELRIC)	Taiwan	Based on LRIC
European Union	Forward Looking Long Run Average Incremental Cost Model (FL – LRAIC)	United Kingdom	Based on LRIC
Hong Kong	Fully Allocated Costs (FAC)	United Republic of Tanzania	Based on LRIC
Israel	Based on LRIC	United States of America	Total Element Long Run Incremental Cost (TELRIC)
Italy	Based on LRIC		
Malaysia	Based on LRIC		

Source: www.ictregulationtoolkit.org

**Figure 10: Modeling Approach used World Wide**

Given the above steer from TRAI, Reliance engaged Diamond Consultants, a global advisory firm specializing in the telecommunications sector, to conduct an independent study of the IUC Regime in India and to prepare an independent LRIC cost model.

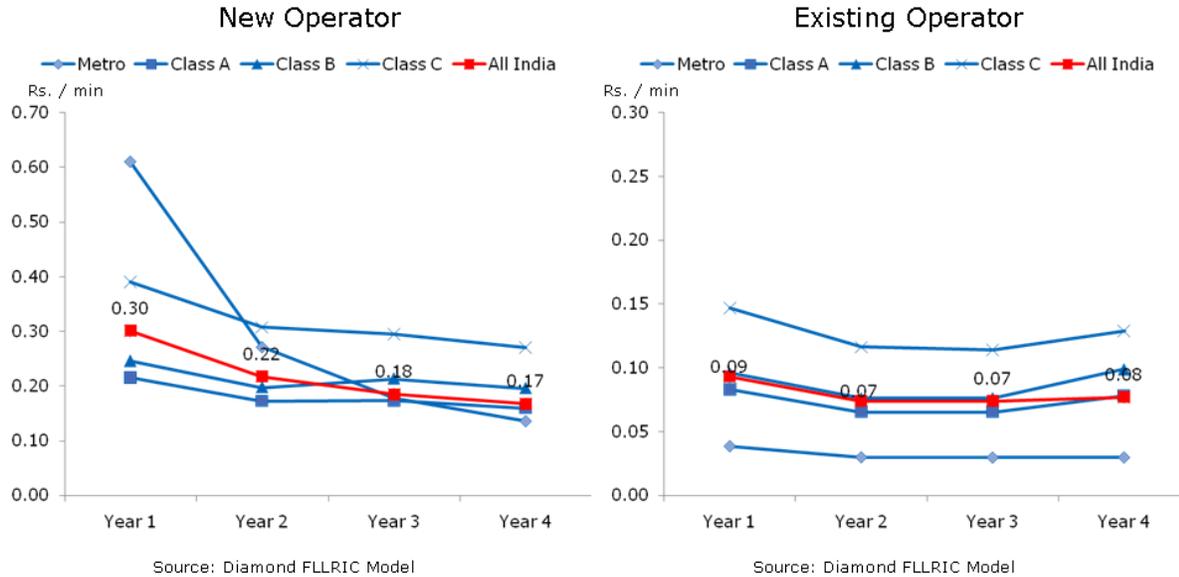
We hoped an independent study from a leading global consulting company will help explain some of the apparent inconsistencies in the LRIC model that was submitted to TRAI in November 2008; viz. (a) how can LRIC offer a higher value than existing MTC when volumes have increased and costs have fallen significantly and (b) how can a LRIC estimate be higher than a 2003 FAC calculation from TRAI.

### 3.3 FL-LRIC model shows asymmetric MTC

As mentioned above, Reliance engaged **Diamond Management & Technology Consultants to develop an independent bottom-up Forward Looking Long Run Incremental Cost (FL-LRIC) model to determine the costs of mobile termination in India.** Diamond (NASDAQ: DTPI) is a leading global management consulting firm. Diamond's Telecom practice has served clients on strategic, operational and regulatory issues across the globe spanning Asia, Africa, Europe, Latin America and North America.

The cost of termination of voice calls can arguably be different for different types of operators. The consultants commissioned to develop the FL-LRIC model have therefore, developed two scenarios to determine the cost of termination; Pan India efficient GSM New Entrant and Pan India efficient GSM Incumbent.

Please refer to the appendix section for the detailed model approach and assumptions. The FL-LRIC model for the two scenarios presents the following results:



**Figure 11: FL-LRIC Output**

Output		
	Scenario 1 New Entrant	Scenario 2 Existing Operator
Average of LRIC over FY 2010 – 2013 (Rs. / min)	0.22	0.08

Source: Diamond FLLRIC Model

**Figure 12: LRIC Model suggest Asymmetric MTC**

The above result clearly shows that:

- The cost of voice termination is lower than the current level of Rs. 0.30/min for both new (27% lower) and incumbent operators (73% lower)
- New operators have a higher cost of termination (0.22 Rs./min) than that of an incumbent (0.08 Rs./min).

Above results leads us towards **asymmetry in termination cost between new and old network** due to difference in LRIC determined MTC.

Please refer to Appendix A1 for more details.

### 3.4 Key Takeaways

- There are a number of approaches to determining MTC. Of these, cost based approach and Bill and Keep are the most popular today

- TRAI has used a FAC cost based approach in 2003 where sunk historical capex recovery is rightly not part of the calculation, as per international norm. On this FAC basis, the MTC should be reduced to 30% or lesser of current value
- Under a cost based regime, many regulators now favour LRIC as a mechanism to determine the ceiling of the possible MTC of the industry
- An independent study by global telecom advisory firm Diamond Management and Technology Consultants, based on global best practices reveals asymmetry as the best option for India. LRIC suggests a value of 22p for new entrants and 8p for incumbent operators
- As has been followed in all countries implementing asymmetric MTC, the classification of incumbent vs. new entrants should be on the basis of date of allocation of spectrum. Thus, for India, the classification will have to be applied circle-wise to operators
- LRIC offers a ceiling of the MTC estimate. MTC values lower than LRIC should be considered to push sector growth, operator efficiency and to address issues of data ambiguity
- Of these approaches, Zero MTC under Bill and Keep regime is the most popular

## 4 TRAI can choose from four options to determine MTC

The current IUC review by TRAI provides the Authority with a tremendous opportunity to enhance customer benefits, further mobile penetration in India, drive the Government's social objectives on growth and equality, promote competition and enable the industry to enhance revenues and profitability.

There are a number of steps that TRAI could consider when implementing a new regime on MTC. However, to maximize the consumer and industry benefits from a revised MTC, the steps cannot be looked at in isolation or chosen separately, but rather should be clubbed under a selected 'Option'.

We believe that there are four options/scenarios that TRAI must actively consider when taking a decision on revising MTC.

1. Asymmetric MTC
2. Symmetric MTC
3. Zero MTC
4. Negative MTC

### 4.1 *Option 1 - Asymmetric MTC* based on FL-LRIC

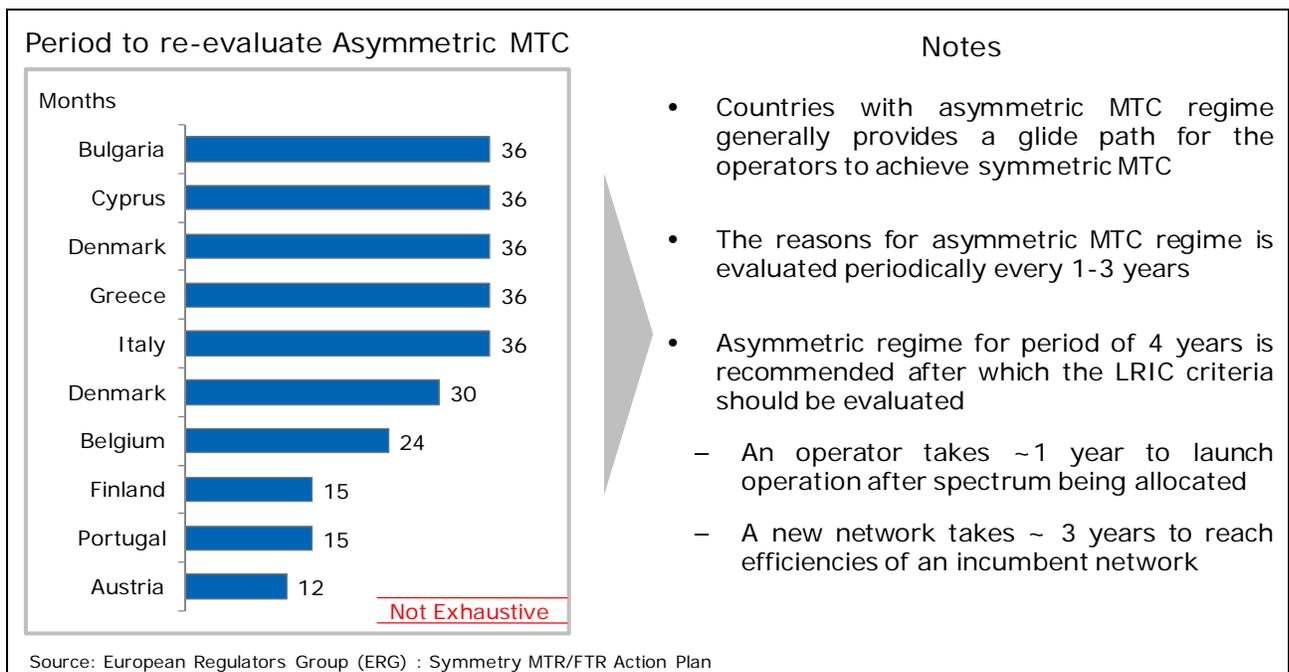
The FL-LRIC model output suggests that the cost of terminating voice calls is significantly different for a new and an incumbent operator.

Therefore, under Option 1, TRAI should implement an asymmetric MTC regime (Figure 13)

<b>MTC Regime</b>	Asymmetric MTC: New operator – Rs. 0.22/min; Incumbent – Rs. 0.08/min
<b>Potential Benefits to Operators</b>	New operators would have the opportunity to compete effectively on account of favorable treatment on MTC with incumbents having large subscriber base
<b>Potential Risks</b>	Requires a strong regulator to implement asymmetric MTC As shown in Europe, only the strongest regulators can withstand the lobbying pressure from anti-competitive incumbent operators
<b>Supporting Arguments</b>	Closest to costs of actual network Pro-competition: Asymmetric MTC regime encourages a level playing field for new and old competitors alike

**Figure: 13 Snapshot of Asymmetric MTC**

As has been followed in all countries implementing asymmetric MTC, the classification of incumbent vs. new entrants should be on the basis of date of allocation of spectrum. Thus, for India, the classification will have to be applied circle-wise to operators. There can be a glide path of four years from the date of spectrum allocation – 1 year to launch operations after spectrum allocation and 3 years to reach efficiencies of an incumbent network.



**Figure 14 Asymmetric MTC Glide Path**

**Target Market Structure:** An asymmetric regime compensates new operators to take into account lower economies of scale. Such a regime helps new operators to compete effectively with the incumbent operator, thus improving competitiveness in the market. Increased competitiveness will reduce tariffs, offer innovation in service and improve customer service. The consumers benefit as the number of service providers increase in each circle. Based on typical best practices worldwide, Diamond Consultants recommends that for a four year period from the date of spectrum allocation in a given circle, the operator be classified as a new operator.

**International Examples:** Several European countries (Spain, Italy, UK, Portugal etc.) have implemented asymmetric MTC's in favour of new operators. The asymmetry typically lasts for a transitory period (typically 3-5 years) which the regulator specifies upfront. The new operators are expected to achieve the scale required for lower costs by the end of the asymmetry period. For details refer to the Appendix.

**Advantages:** New operators would have the opportunity to compete effectively on account of favorable treatment on MTC vis-à-vis incumbents having a much larger subscriber base. Higher competition will induce lower tariffs, greater mobile penetration growth and launch of innovative services.

**Risks:** The key risk is that an asymmetric regime is not easy to implement given potential anti-competitive lobbying pressures from incumbent operators.

**Meeting TRAI objectives:** Asymmetry is a pro-consumer and pro-competition initiative. Such a regime will help increase competition and promote consumer choice in the market and is in alignment with the TRAI charter. The policy is also in line with TRAI's recent pro-competition direction when the cap on number of licenses was removed.

## **4.2 Option 2 – *Symmetric MTC* at floor of FL-LRIC for ease of implementation**

If TRAI is unable to implement asymmetric MTC, under Option 2, TRAI could consider **setting the MTC at the floor of the cost calculated for both new and incumbent operators**. A weighted average cost calculation across all operators (both new and old) using the FL-LRIC approach indicates that the weighted average cost is approximately the floor of the asymmetric number (Rs. 0.08.)

<b>MTC Regime</b>	Symmetric MTC: Rs. 0.08/min
<b>Potential Benefits to Operators</b>	<ul style="list-style-type: none"> <li>• MTC reduction would lead to greater service innovation, lower tariffs → thus increasing MoU, network utilization and industry profitability</li> </ul>
<b>Potential Risks to Operators</b>	New operators would be at a disadvantaged position as they would have to compete against scale efficiencies of incumbents from Day 1
<b>Supporting Arguments</b>	Is easier to implement than asymmetric MTC especially if incumbent operators lobby successfully against asymmetric MTC

**Figure: 15 Snapshot of Symmetric MTC**

**Target Market Structure:** Setting MTC at the floor of the asymmetric MTC value will possibly be easier for TRAI to implement, though it will be a step against new entrants. However, the floor value of MTC at 8p will promote sector growth and operator efficiency.

**International Examples:** Significant declines in MTC have spurred market growth in a number of countries – e.g. Hong Kong, Pakistan, Indonesia etc. to name a few. A steep decline in MTC in Pakistan in the last five years has resulted in unprecedented growth in wireless subscribers and penetration for the Pakistan telecom market, which has today overtaken India in terms of penetration. **Increase in penetration has been maximum in Pakistan during the time when the decline in MTC was steepest.** These case studies clearly establish a strong co-relation between declining MTC regime and increasing mobile penetration. For details refer to the Appendix 2 of the document.

**Advantages:** A key advantage of symmetric MTC is the comparative ease of implementation over asymmetric MTC, especially if there is sustained lobbying against asymmetric MTC. However, if a lower floor value of LRIC is chosen for the MTC, this has customer led sector benefits. MTC reduction would lead to lowering of tariffs, thus increasing MoU, network utilization and thus sector profitability. A lower MTC regime favors operators who are efficient and encourages new entrant operators to improve their efficiency.

**Risks:** New operators would be disadvantaged as they would have to compete against the scale benefits of incumbent operators from Day 1.

**Meeting TRAI objectives:** While asymmetric MTC does not meet the TRAI objectives of supporting competition and maintaining a level playing field, setting the MTC at the floor LRIC

value has other benefits – chiefly helping grow mobile penetration and increasing network utilization and sector profitability.

### 4.3 Option 3 – Zero MTC based on Bill & Keep for “future proof” IUC regime

There are increasingly strong drivers to mandate a zero MTC regime. This regime has been implemented in many countries (US, China, Sri Lanka etc.) and is being actively promoted in Europe. Bill & Keep has already been adopted in the NGN (Next Generation Network) context, for SMS/ mobile VAS and for Internet. Bill and Keep is regarded as a “future proof” IUC regime that works even as operators implement voice over 3G/ BWA, femto-cells, VoIP on mobile, WiFi termination, fixed mobile converged networks etc.

<b>MTC Regime</b>	MTC: Rs. 0.0/min (Bill and Keep)
<b>Potential Benefits to Operators</b>	<ul style="list-style-type: none"> <li>Regime works even as operators implement new technologies like voice over 3G/ BWA, femto-cells, WiFi hotspots, VoIP over EDGE/3G etc.</li> <li>Promotes efficiency and migration to NGN</li> </ul>
<b>Potential Risks to Operators</b>	<ul style="list-style-type: none"> <li>Potential risk of operators charging for incoming calls</li> <li>However, given the extent of competition in India, risk is low (as has been proved in China, Sri Lanka etc. despite lower competition in these markets)</li> </ul>
<b>Supporting Arguments</b>	<ul style="list-style-type: none"> <li>Ease of implementation</li> <li>No risks from data ambiguity</li> <li>Works under future technologies – 3G/ BWA, NGN, VoIP, FMC ...</li> <li>Promotes sector efficiency and is consistent with Internet protocols</li> </ul>

**Figure: 16 Snapshot of Zero MTC**

**Target Market Structure: Zero MTC regime will promote massive sector growth** and higher sector efficiency. Zero MTC is easy to implement and takes care of any technological development that the sector will increasingly see. Zero MTC will practically remove the on-net/off-net tariff barrier and operators will be able to offer more bundles, thus driving higher growth and MoU.

All operators (both incumbents and new) stand to gain by the demand elasticity benefits due to a zero MTC. In this case, the additional net-adds gained by each operator due to the growth and penetration generated from a zero MTC will more than adequately compensate to make up for the MTC value being set below cost.

**International Examples: Several countries have implemented zero MTC's and achieved great success in penetration and usage – arguably higher than what India has achieved using a traditional cost based approach.** Two countries, USA and China with a geographic scale and size similar to India have achieved very high penetration and usage through the use of a zero MTC regime. Sri Lanka is another example which has similar demographic profile and GDP per capita but has achieved nearly 60% penetration. For details refer to the Appendix 2 of the document.

**Advantages:** Zero MTC is one of the most pro-consumer and pro-competition moves that TRAI can make on IUC. Countries that have implemented Zero MTC under a Bill and Keep regime have shown a massive growth in penetration, much higher than we see in India today – for example, Sri Lanka and China. Bill and Keep is considered to be future ready – it can be used as technology evolves to include calls terminated on 3G, BWA, femtocells, WiFi, VoIP, NGN, fixed-mobile converged calls etc. A cost based regime will need to compute MTC for each of these cases and determine a weighted average. A Zero MTC regime will remove all controversies caused by data ambiguity and reduce the risk of subjectivity. As a result of these advantages, Bill & Keep is today the most popular form of IUC regulation being considered globally.

**Risks:** There is a risk that some operators may want to charge for incoming calls. However, if some operators want to charge for incoming calls in a zero MTC regime, TRAI can place this under forbearance. TRAI has worked hard to implement a highly competitive regime and consumer impact of some operators charging for incoming calls will be small; impact will be even smaller in a post MNP regime. China and Sri Lanka are clear examples where consumer impact from incoming calls was completely nullified by competitive forces. And India is more competitive than both markets.

In an attempt to confuse regulators, some operators in developed markets, especially in Europe, have offered very interesting arguments against Bill and Keep – which are both misleading and totally inapplicable to India. In Europe, there is low competition (less than 4-5 players) and practically no new entrant (the last entrants are from 2003 when the first 3G networks launched). Thus, every operators' interests are served by keeping high tariffs justified by high MTC. Regulatory bodies are large, with between 600 to 1500 full time staff (many have worked previously with incumbent operators) and large number of employed consultants. Thus, the regulatory bodies are not averse to lengthy consultations and expensive consulting studies to determine various ranges of MTC charges.

Yet, even the European regulators are beginning to question the applicability of cost based regimes. TotalTelecom: *“Regulators in the UK and Sweden are questioning whether today’s approach to reducing mobile termination rates (MTR) is tenable. They say the rise of 3G infrastructure sharing, the growth of fixed-mobile convergence and substitution, and moves to use VoIP on mobile networks all make it too complex for regulators to fairly set rates that encourage competition.”*

*“We don’t see this as a future solution for regulating mobile termination,”* says David Troeng, head of the competition department at Swedish regulator PTS. *“Operators have shared*

*infrastructure for 3G...and are starting to discuss VoIP networks...It's beginning to be extremely complicated to find out the individual costs for each operator...and it will be very complicated to charge...for interconnection [based on VoIP]."*

In the UK, Ofcom is also questioning whether there is a need to continue with the current practice of chipping away at MTR. In 2007, Ofcom ruled that charges levied by operators to connect calls to one another's networks should come down. Yet the ongoing consultation "asks whether this approach to regulation is appropriate for the future or whether there are more attractive alternatives", said Ofcom in a statement. [source: TotalTele, Issue 66, 1 Oct 2008].

**Meeting TRAI objectives:** Zero MTC is a pro-consumer, pro-growth and pro-competition initiative. **Of all MTC regimes, a zero MTC regime goes farthest in terms of promoting growth and efficiency in the sector.** It also creates enabling regulation to help the industry adopt NGN technologies and processes.

#### **4.4 Option 4 – *Negative MTC* to maximize consumer benefit and bridge social divide**

TRAI may want to consider implementing negative MTC if the objective is to bridge the digital divide between the rich urban classes and the rural and less affluent classes. In practice, there is already a Negative MTC regime in place today – through the practice of "missed calls" – where a less affluent user typically calls a more affluent user to flash their number and receive a call back.

This option goes even further than the previous options in terms of promoting consumer value and furthering the Government's social objectives.

<b>MTC Regime</b>	Negative MTC (empirically minus 5 to 10 paise per minute)
<b>Potential Benefits to Operators</b>	<ul style="list-style-type: none"> <li>• Operators could achieve high network capacity utilization on account of increased usage</li> <li>• This will drive penetration and usage in rural areas and smaller towns – the areas where current network utilisation is low</li> </ul>
<b>Potential Risks to Operators</b>	<ul style="list-style-type: none"> <li>• Operators with higher proportion of incoming MoU would be at a disadvantaged position</li> <li>• However, affluent customers could be charged to receive these calls, which they would accept (similar to the old Callback Service)</li> </ul>
<b>Supporting Arguments</b>	<ul style="list-style-type: none"> <li>• Bridge the social divide</li> <li>• Drive growth, usage and penetration in rural areas and small towns</li> <li>• Seed the market to ensure long term growth</li> <li>• Higher network utilisation in smaller towns/ rural to drive sector profitability</li> </ul>

**Figure 17: Snapshot of negative MTC**

**Target Market Structure:** Negative MTC will take growth to the next segment of consumers and will accelerate the bridging of digital divide. **Negative MTC is a means to provide economic incentive to the masses, especially in rural areas, to adopt mobile technology. Ultimately, this will generate long-term enhanced profits for the telecom sector.**

**Advantages:** While negative MTC may sound radical, the logic to implement negative MTC is very simple. Implementing negative MTC will drive usage and growth in the economically weaker sections and in rural areas and smaller towns. In these areas, network utilization today is anyway very low. This growth will seed the market – once a customer takes up mobile telephony, it is very unlikely that he or she will move away. The result of higher sector growth and network utilization will be a direct impact on productivity, employment and GDP growth in rural India in addition to enhancing long term profits for the industry.

**Risks:** Operators with higher proportion of incoming MoU would be at a disadvantaged position. However, selective charging for incoming calls can be applied. Most affluent customers would not object to receiving calls for a fee from their contacts list. A similar call back scheme was successfully applied for International calls in the 1980's and 1990's.

**Meeting TRAI objectives:** Negative MTC is the most pro-consumer and pro-growth initiative. The Option helps meet the Government's social objectives on bridging the rich-poor divide. It seeds the market for future growth and improves sector profitability through greater network utilization. Even the smallest hamlets and villages can become profitable.

#### **4.5 TRAI should choose from one of four options depending on key objectives**

There are four options from which TRAI should choose the preferred option depending on the objectives it wants to target:

- If the key objectives of TRAI are to drive industry growth by promoting competition and by creating a level playing field, Option 1 – asymmetric MTC, is the preferred option
- If TRAI finds it difficult to implement asymmetric MTC, Option 2 – symmetric MTC at floor LRIC value, can be considered
- If TRAI wants to implement a future proof IUC regime, promote efficiency and move away from data ambiguity of cost based mechanisms, then Option 3 – Bill and Keep, is the preferred option
- If TRAI believes that India's and the sector's interests are best served by promoting telephony in rural India and for the economically weaker sections of society, then Option 4 – Negative MTC, should be preferred

**However, TRAI has to bear in mind the severe limitations of implementing a cost-based MTC regime.** A cost-plus MTC regime is totally against recent philosophy of market led pricing (as is being followed in spectrum auctions) and other regulation (e.g. tariffs determined by market forces rather than a cost plus regime; like we see in the fertilizer sector). A cost-based regime protects inefficiency by practically guaranteeing a rate of return on costs and investments. In addition, cost-plus regimes are extremely complex to administer and result in significant ambiguity – whose costs, for which technology, for what network utilization etc. become exceeding difficult questions to answer. In effect, a cost-based MTC is a cross subsidy of incumbent networks paid for by new entrant operators; a tax that implicitly offers indirect exclusivity to incumbent operators.

Issue	Implication	Solved by cost based	Solved by Bill & Keep
<b>TRAI's market led policy</b>	<ul style="list-style-type: none"> <li>The Government and TRAI are adopting market led approaches – e.g. spectrum value determined not by a cost plus regime but an auction</li> <li>A cost plus regime does not work well in competitive markets</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Ability to influence tariff reduction</b>	<ul style="list-style-type: none"> <li>Cost based MTC will always present a floor to tariffs – even in the off-peak hour</li> <li>Bill &amp; Keep offers greatest flexibility on tariffs – and offers a way to boost network utilisation (and thus sector profitability)</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Complexity and legal issues</b>	<ul style="list-style-type: none"> <li>Cost based MTC is subject to criticism of data ambiguity and subjectivity</li> <li>Bill and Keep has no such limitation</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Pro-competition</b>	<ul style="list-style-type: none"> <li>Cost based MTCs is in effect a tax by incumbents paid for by new entrants</li> <li>The most competitive markets – e.g. data/ Internet/VAS – work on Bill &amp; Keep and have shown the fastest growth rates</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Network utilisation</b>	<ul style="list-style-type: none"> <li>While cost based MTC is the floor, Bill &amp; Keep allows operators to sell off-peak at lowest marginal cost. Greater usage boosts network utilisation and helps sector growth and profitability</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Promote efficiency</b>	<ul style="list-style-type: none"> <li>By, in effect, guaranteeing a rate of return, cost led MTC does far lesser to promote efficiency compared to Bill &amp; Keep</li> </ul>	<b>No</b>	<b>Yes</b>
<b>MNP; number confusion on on-net calls</b>	<ul style="list-style-type: none"> <li>Differentials between on-net and off-net tariffs will remain in cost based MTC – unless brought down to a low number (say sub 5p)</li> <li>Confusion regarding differentials will increase manifold in the post MNP era</li> </ul>	<b>No</b>	<b>Yes</b>
<b>Future ready</b>	<ul style="list-style-type: none"> <li>Cost based MTC will need to be computed for every technology change – voice over 3G, BWA, femto-cell, FMC, voice over WiFi etc. The move to new technologies and NGN will continue to add further complexity to a cost based MTC regime</li> </ul>	<b>No</b>	<b>Yes</b>

**Figure 18: Comparing Bill & Keep to Cost based MTC**

#### **4.6 TRAI should be wary of decoy arguments that some operators may present**

**A dynamic MTC regime could possibly be opposed by some anti-competitive incumbent operators as they fear it will weaken their on-net offerings and reduce effectiveness of collusive activities.**

Several such incidents can be observed in other countries where operators have argued for raising MTC. For example, **Deutsche Telecom** had voiced **against cost based in their response to methodology to determine MTC**. They had argued that **a cost based approach will underestimate MTC**. However, German Regulators rightly decided to go ahead with LRIC approach to determine MTC. Similarly, **O2** asked the Regulators to **include network externalities in determining MTC**. They argued that wider geographic coverage needed a higher MTC regime. Please refer to Section 6 in Appendix for details.

The incumbent operators have demanded a mark-up above the true cost of MTC under the pretext that a mark-up on MTC will help them expand network in rural areas. This argument is

heavily flawed as the additional revenue that the MTC mark up can provide the incumbents is miniscule (less than 3% of revenues) and the CAPEX required for rural expansion requires a much larger amount. If the logic presented but the incumbents were true, an operator which pays more interconnection than it receives can never harbor ambitions to launch in rural areas. Moreover, USO fund and the recent measures around coverage norms provide adequate incentives to MNOs to rollout networks to rural areas. Hence relying on solely on MTC mark-up for network expansion is unjustified.

Typical reasons for a mark-up above cost	Rationale Used to Justify Mark-Ups	Counter View
	<ul style="list-style-type: none"> <li>MNOs are able to use the MTC mark-up above cost to partially offset the costs of rolling out networks to rural and other areas</li> <li>A higher MTC results in incoming interconnect revenues for rural / low income customers which helps the MNO recover the costs of the network expansion</li> </ul>	<ul style="list-style-type: none"> <li>✗ India has achieved ~70% population coverage by mobile networks – hence a subsidy to increase network coverage may not be relevant anymore</li> <li>✗ The USO fund and the recent measures around coverage norms provide adequate incentives to MNOs to rollout networks to rural areas</li> </ul>
	<ul style="list-style-type: none"> <li>MNOs are able to use the MTC mark-up above cost to offer attractive rates to marginal rural customers and also offer subsidies on handsets to enable them to sign up</li> <li>Every additional subscriber joining the network increases the value of the network – hence existing subscribers are happy to pay the mark-up</li> </ul>	<ul style="list-style-type: none"> <li>✗ Most handsets are not subsidized explicitly in India and hence form the most significant cost for new subscribers</li> <li>✗ The MTC mark-up does not help address this key issue of handset purchase and hence is not an effective argument</li> </ul>

**Figure 19 : Flawed Arguments to Justify MTC Mark-up [source: Diamond Consultants]**

Some operators could also present decoys in their attempt to prevent a drastic change in MTC. They can achieve this by inflating the MTC derived by LRIC model for the sole purpose of preventing a drastic reduction in MTC and settling for a modest cut MTC of 30%-40% or lesser. Their objective was to safeguard against a significant reduction in MTC.

Inflated MTC derived by LRIC model can be achieved by making some unrealistic assumptions

- **Lower sharing of passive infrastructure.** Reality is that an efficient new entrant would like to go for 100% passive infrastructure sharing, reducing the CAPEX significantly
- **Unrealistic call mix** (much higher off-net outgoing call). In a practical scenario the new operator will have substantial chunk of customers with lower ARPU and hence ratio of outgoing vs. incoming calls will not be so high. This is major factor affecting MTC
- **Higher equipment costs** – Equipment costs are falling every year and hence unrealistically higher equipment costs can increase MTC

In view of these, Regulator should scrutinize the models carefully to find out if assumptions are robust and that MTC is not inflated.

Similarly, in other cases, operators have proposed a glide path to a lower MTC regime as a mechanism to exploit on-net benefits and collusion effects for as long as possible. A half measure reduction to say 15p to 20p will only result in the sector losing revenue with no change to sector dynamics, network utilization, service innovation, operator efficiency or industry growth.

We are certain that TRAI will be wary of such decoy arguments that may be presented.

#### **4.7 A marginal reduction of MTC to 15p-20p will defeat the objectives of an IUC review**

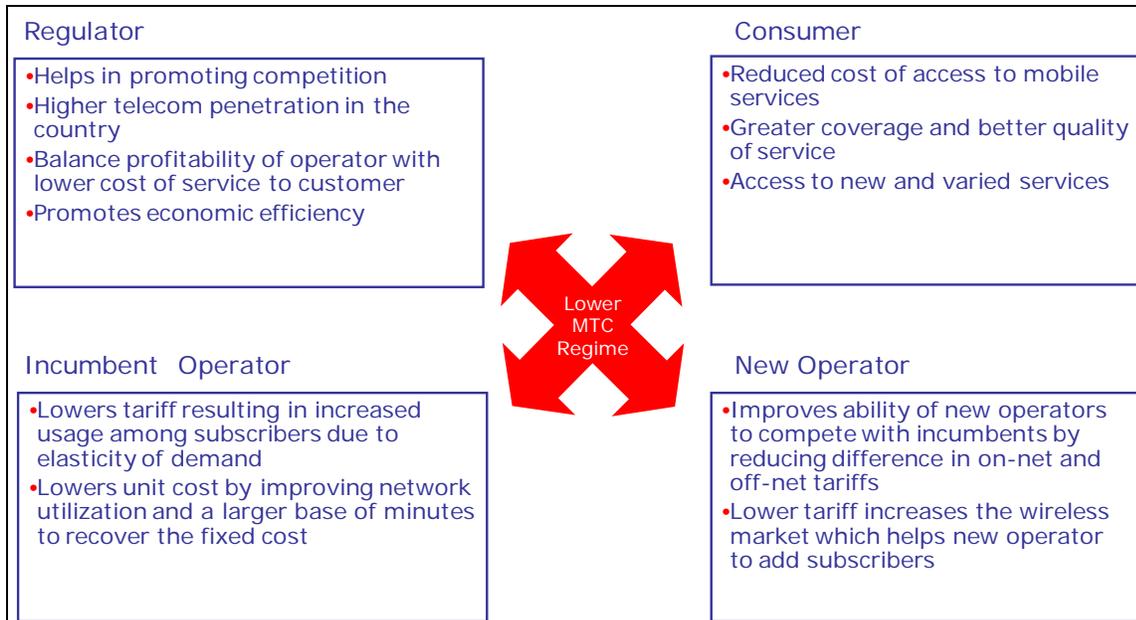
In case the Regulatory Authority decides to reduce the MTC to Rs. 0.20 or Rs. 0.15 then the purpose of MTC reduction is defeated. Marginal decline does not benefit consumers, does not induce growth and does not provide an opportunity to new players in the market.

- **No or marginal reduction in retail tariff:** A marginal reduction in MTC will have no or very low impact on retail tariff. At MTC = 20p, it will still remain a significant portion of ARPM (30%) and operators will not be able to reduce tariff to the level envisaged by the Regulatory Authority
- **Marginal impact on demand:** Due to marginal reduction in retail tariffs, there will be almost no impact on the mobile penetration or usage among the subscribers, in case the MTC is only marginally reduced.
- **Marginal impact on network utilization:** Since demand/mobile traffic remains largely unchanged, mobile networks will still remain under utilized and operators will not be able to improve their operational efficiency

Therefore a **sub-optimal reduction in MTC will only result in the sector losing revenue with no change in retail tariff, demand, sector dynamics, network utilization increase, service innovation, operator efficiency or industry growth.** Therefore TRAI should not fall for decoy arguments from incumbent operators (who will suggest an increase in MTC in the hope that TRAI will reduce MTC marginally to say 15p-20p), but rather push for the implementation of a dynamic MTC regime.

#### **4.8 Key Takeaways**

- A dynamic MTC regime is good for the consumer, telecom sector and individual operators – both incumbent and new entrant



**Figure 20 Lower MTC benefits all stakeholders**

- There are four options from which TRAI should choose the preferred option depending on the objectives it wants to target
- If the key objectives are to drive industry growth by promoting competition and by creating a level playing field, Option 1 – asymmetric MTC, is the preferred option
- If TRAI finds it difficult to implement asymmetric MTC, Option 2 – symmetric MTC at floor LRIC value, can be considered
- If TRAI wants to implement a future proof IUC regime, promote efficiency and move away from data ambiguity of cost based mechanisms, then Option 3 – Bill and Keep, is the preferred option
- If TRAI believes that India's and the sector's interests are best served by promoting telephony in rural India and for the economically weaker sections of society, then Option 4 – Negative MTC, should be preferred
- A dynamic MTC regime is in alignment with TRAI objectives of pro-consumer, pro-growth and pro-competition
- A cosmetic change to say 15p-20p or a gradual change in termination cost will not help TRAI achieve any of its objectives on IUC and will be a step that squarely plays into the decoy arguments strategy that some incumbent operators may deploy

## 5 Other Charges

### 5.1 Continue Origination Charge under Forbearance

Currently origination charge is under forbearance. Keeping origination charge under forbearance provides flexibility with respect to setting tariff to operators. The policy adopted by the Authority has worked well and we recommend that the policy be continued.

### 5.2 Lower carriage charges to enhance affordability

Currently the ceiling for carriage charges is Rs. 0.65/min. The ceiling was dropped in the 2006 review from the previous ceiling value of Rs. 1.10/min. The consultative paper indicated that TRAI based on data from the various NLDOs believes that the cost varies from Rs. 0.16/min to Rs. 0.72/min.

In addition, TRAI also indicated that it has taken stock of various carriage charge rates offered by the NLDOs to the access providers. These data showed that carriage charge offered by NLDOs to access providers generally varies from about Rs. 0.34 per minute to Rs. 0.60 per minute depending on traffic commitment period, volume of traffic committed, indicative share of traffic being routed etc.

Though ceiling has been fixed at Rs. 0.65/min, **cost on high traffic density route is lower than this**, and therefore weighted average cost of carriage comes out to be below Rs. 0.65/min.

**Hence on account of lower costs, we recommend lowering the ceiling to Rs. 0.55/min.** A lower drop than this may not be justified as the carriage charges have been revised very significantly fairly recently, in 2006.

### 5.3 Reduce transit charges significantly and introduce competition

The current charge of 0.20/min is based on cost data from 2003 and the charge from LDCA to SDCA should be based on actual cost incurred. Private operators continue to be constrained by BSNL to handover their traffic to BSNL at Level-II TAX and pay the transit charge of Rs 0.20/min. This makes this segment non competitive and is clearly not in the best interest of the consumer.

**This carriage portion should be considered as part of the termination** and no charges should be payable for termination of calls. We therefore, believe that the Authority must either ensure increased competition in this segment by allowing access providers to use private NLDOs for their intra circle long distance calls or revise the cost for transit charge to a value that is based on the actual cost incurred as opposed to the current value of Rs. 0.20/min.

It is not the cellular subscribers alone who bear the cost, even when the BSNL NLD POIs are congested then NLD and ILD carriers are required to handover the traffic at a different POI for which BSNL charges Rs.0.19 per minute as a transit carriage charge. **The prevailing transit carriage charges do not protect the consumer interest and end up enriching the incumbent operator.**

In case of **intra SDCA** transiting, since there is no or **little distance element involved in transit of a call**, the charges for transit should be much lower than the LDCA to SDCA carriage charges. Yet, while LDCA- SDCA charge is 20 paisa per minute, the transit charge was fixed only marginally lower at 19 paisa per minute by BSNL.

Therefore we recommend that **transit charges** (both from LDCA to SDCA, and intra SDCA) **should be reduced** from the current level of Rs. 0.20/min to the amount actually incurred by the operator.

Further details are summarized below:

#### **1. Carriage Charges within LDCA to SDCA**

- The carriage charges for carrying the cellular originated call LDCA to SDCA were fixed at Rs 0.20 per minute by the Authority vide their regulation dated 29th Oct 2003. The Authority had mentioned the following :
- *“ Traffic handover for or from Cellular Mobile Networks shall normally take place at Level II tax POIs and a carriage charge of Rs 0.20 per minute would be applicable. If handover is at any other TAX level, the relevant carriage charges must be paid.”*
- Carriage charge of Rs 0.20 per minute was fixed when the upper most limit for carriage charges for 500+ Km was Rs 1.10 per min. However while the carriage charges were revised down from Rs 1.10 per minute to Rs 0.65 per min during IUC review in 2006; the carriage charges for LDCA to SDCA remained intact. Logically, these charges should have also been brought down in the same ratio.

#### **2. Transit charges for terminating the calls into BSNL Cellone**

- **The Authority should also review and decide the justification for imposing transit charges**

which is a result of a delay by BSNL in providing the requisite POI or enhancing the POI capacity. TRAI had reviewed the IUC regime in 2003, and had issued a regulation on 29th October 2003. On transit charges, the Authority had directed the following in Schedule II of the regulation

- Transit charges for Intra SDCA calls will be under forbearance, subject to following condition:

*“Direct Interconnection between Access Providers is mandatory. For exceptional cases of Intra SDCA transit, operators may decide the charges through mutual negotiation. However, this should be lower than Rs 0.20 per minute.”*

- Before the above mentioned regulation, the transit charges being levied at that time by BSNL were Rs 0.20 per minute. These charges were being paid to BSNL since there was no direct interconnection between BSNL’s mobile service and private operator switch. Therefore, calls to BSNL mobile service were being handed over to BSNL’S PSTN (Fixed) network which used to transit the call to its cellular network. Since the direction from TRAI on transit charges was forbearance and had only mandated that these charges should be less than Rs 0.20 per minute; BSNL dropped these charges only marginally from Rs 0.20 to Rs 0.19 per minute, when this regulation was implemented in February 2004.
- **Since there is no distance or little distance element involved in transit of a call, the charges for transit should have been much lower than the LDCA to SDCA carriage charges. Yet, while the LDCA- SDCA charge was 20 paise per minute, the transit charge was fixed only marginally lower at 19 paise per minute by BSNL.**
- Further, there was no chance for any operator to negotiate the charges with BSNL as BSNL was the dominant player and determined what price it was going to charge for transit; since there was no other way to connect to BSNL mobile service till March 2006, when direct interconnection with BSNL was established. These charges continue to be same since five years down. In the Explanatory memorandum, under Para 65 of the IUC regulation dated 29th October 2003; the Authority had said that it will intervene if there is a regulatory concern in this regard.

## 5.4 Make port charges to BSNL the same as between private operators

Currently **Port Charge** is the only IUC component which is **not based on principle of causation**, and the complete cost is recovered from the interconnection seeker, although both the interconnection seeker and provider use the facility. The port charges like other components of interconnection should also be based on the usage by the respective interconnecting parties. The existing regime is highly in favour of the incumbent operator. The complete port related charges are borne by the new service provider, although the existing operator also uses the same facility.

Although there is a separate regulation for port charges but it is part and parcel of the IUC regime. To bring the port charges in line with the interconnection charging principle, it is pertinent to review the port charges.

**Port charges between private operators are already zero.** BSNL is the only entity that currently imposes port charges. **The cost incurred by BSNL is substantially lower than the current level of port charges.** We recommend that the Regulatory authority review the charges being imposed by BSNL and eliminate or revise downward these charges based on actual additional cost incurred (as opposed to historical costs).

## 5.5 Key Takeaways

The table below has the recommendations for Carrier, Transit, Origination and Port Charges:

Elements of IUC	Recommended Approach to TRAI	Rationale for Recommended Approach
<ul style="list-style-type: none"> <li>Carrier Charge</li> </ul>	<ul style="list-style-type: none"> <li>Drop current ceiling of Rs 0.65/min to Rs 0.55/min</li> </ul>	<ul style="list-style-type: none"> <li>This is a ceiling rate. This is a negotiable market and operators can negotiate and agree to commercial terms lower than the ceiling.</li> <li>Carrier charges were recently reviewed (2006) and the ceiling was changed from Rs. 1.10 / min to 0.65 p / min.</li> </ul>
<ul style="list-style-type: none"> <li>Transit Charge</li> </ul>	<ul style="list-style-type: none"> <li>Reduce transit charges from the current Rs 0.20/min to the amount actually incurred by the operator</li> </ul>	<ul style="list-style-type: none"> <li>The current charge of 0.20 / min is based on cost data from 2003.</li> <li>This segment is non competitive and the charge from LDCA to SDCA should be based on actual cost incurred.</li> </ul>
<ul style="list-style-type: none"> <li>Origination Charge</li> </ul>	<ul style="list-style-type: none"> <li>Continue under forbearance</li> </ul>	<ul style="list-style-type: none"> <li>There are no key issues surrounding Origination charge .</li> <li>Keeping origination charge under forbearance provides flexibility with respect to setting tariff to operators</li> </ul>
<ul style="list-style-type: none"> <li>Port Charge</li> </ul>	<ul style="list-style-type: none"> <li>Reduce port charges based on actual cost incurred by BSNL (should be significantly lower than the current tariff structure)</li> </ul>	<ul style="list-style-type: none"> <li>Port charges are paid by private operators to BSNL based on number of ports provided at POI. This segment is non-competitive and typically BSNL does not allow operators to hand over traffic at the SDCA level to avoid this charge.</li> <li>Port charges should be based on actual cost incurred which have substantially reduced since the time the current tariff was set.</li> </ul>

**Figure 21: Recommended IUC Changes**

## 6 TRAI – Issues for Consultation (Q&A)

### Q1. What components of Interconnect Usage Charge (IUC) should be reviewed?

*Response:* Termination, Carriage, Transit and Port Charges. Please refer to Section 4 and 5 of the document for detailed explanation.

**Q2. In view of the details provided in the paper, please give your opinion whether TRAI should continue with the existing methodology of fully allocated cost with appropriate assignments for termination charge or changeover to LRIC or its variant. Please provide full justification.**

*Response:* There are a number of best practice approaches to determine the termination charges. However, irrespective of whether we apply FAC or LRIC, the calculation offers far lower MTC than is seen today.

**However, TRAI has to bear in mind the severe limitations of implementing a cost-based MTC regime.** A cost-plus MTC regime is totally against recent philosophy of market led pricing (as is being followed in spectrum auctions) and other regulation (e.g. tariffs determined by market forces rather than a cost plus regime; like we see in the fertilizer sector). A cost-based regime protects inefficiency by practically guaranteeing a rate of return on costs and investments. In addition, cost-plus regimes are extremely complex to administer and result in significant ambiguity – whose costs, for which technology, for what network utilization etc. become exceeding difficult questions to answer. In effect, a cost-based MTC is a cross subsidy of incumbent networks paid for by new entrant operators; a tax that implicitly offers indirect exclusivity to incumbent operators.

Bill and Keep and Negative MTC are two options that TRAI should consider for implementation right-away. Please refer to Section 4 of the document for detailed explanation.

**Q3. Should termination charge be strictly ‘cost-based’ or should the principle of ‘cost-oriented’ be applied taking into account other affecting factors? Give reasons in support of your answer.**

*Response:* We believe TRAI can take one of four approaches – asymmetric charges based on LRIC, symmetric charge based on floor of LRIC, Zero MTC and Negative MTC. Two of these approaches are cost based, the other two offer benefits beyond what a cost based methodology can offer. TRAI should bear in mind the severe limitations of a cost based MTC Regime. In our

view, a Bill and Keep Regime offers the best long term solution and addresses all the objectives that TRAI and the Government is looking to achieve.

For details, please refer to Section 4 of the document.

**Q4. In the absence of cost data for value added services, how should the revenue of such services be taken into account for determination of termination charge?**

*Response:* Cost-based methodology is a widely accepted approach for the determination of termination charge; therefore revenue should not be accounted for determining the termination charge. We believe that Bill & Keep is a more optimal approach to account for VAS termination.

**Q5. Are asymmetric termination charges justified? If yes, which of the following should be the basis?**

**a) Existing service providers vs. new entrant**

**b) Urban lines vs. rural lines**

**c) Mobile termination charge vs. fixed termination charge**

**Give justifications for your answer.**

*Response:* If TRAI implements a cost based MTC, we believe that asymmetric termination charges are justified between existing and new service providers. Please refer to sections 3.3, 4.1 and Appendix 2 in the document to understand the rationale for asymmetric termination charges between existing service providers vs. new entrant.

Asymmetric termination charges on the basis of urban lines vs. rural lines may be justified (based on cost analysis); however implementation of the same is complicated. Therefore we do not recommend introducing asymmetry based on urban lines vs. rural lines. If the cost of providing termination services in rural areas is found to be high, USO fund and other subsidies specially designed for providing rural coverage can be used to lower the cost.

Fixed vs. mobile asymmetry may also be justified based on the cost analysis. A detailed study on fixed termination cost needs to be carried out in order to determine the cost of termination. Based on if the cost of fixed termination is higher or lower than mobile termination, asymmetry may be introduced.

In addition to asymmetry based on new vs. incumbent, some countries, especially in Europe, have implemented asymmetric MTC rates based on 900MHz vs. 1800MHz allocation. While the concept of additional asymmetry based on higher costs for 1800MHz operators is valid, we believe that TRAI and DoT will address this imbalance through other mechanisms including additional charges, spectrum farming etc.

**Q6. Should the existing practice of applying the same principles and methodology for calculation of fixed and mobile termination be continued? If not then what should be the methodology for fixed and mobile termination charges? Give full justification.**

*Response:* We believe that cost based FL-LRIC approach can be used for calculation of fixed termination. However other approaches as shown in Section 4 can also be used.

Fixed telephony, both wired and wireless, requires additional regulatory support to prevent further decline. Reliance will support the Government, BSNL and the Authority to implement the necessary IUC related steps to stem this decline.

While Bill and Keep is likely the best regime for mobile interconnection, TRAI may want to consider a cost based regime for fixed telephony (wireline, fixed wireless and PCO) due to the basic differences with mobility. Unlike the mobility segment, fixed is still a virtual monopoly. While mobility has been showing growth, fixed segment is in decline. Thus, TRAI has the justification to consider a different regime for fixed termination (cost based) as opposed to mobile termination (Bill and Keep).

**Q7. Explain in detail the impact of the proposals being submitted by you for mobile and fixed termination charge on tariff and why?**

*Response:* We have offered four options to TRAI, depending on the objectives it wants to achieve:

- If the key objectives are to drive industry growth by promoting competition and by creating a level playing field, Option 1 – asymmetric MTC, is the preferred option
- If TRAI finds it difficult to implement asymmetric MTC, Option 2 – symmetric MTC at floor LRIC value, can be considered
- If TRAI wants to implement a future proof IUC regime, promote efficiency and move away from data ambiguity of cost based mechanisms, then Option 3 – Bill and Keep, is the preferred option
- If TRAI believes that India's and the sector's interests are best served by promoting telephony in rural India and for the economically weaker sections of society, then Option 4 – Negative MTC, should be preferred
- A dynamic MTC regime is in alignment with TRAI objectives of pro-consumer, pro-growth and pro-competition
- A cosmetic change to say 15p-20p or a gradual change in termination cost will not help TRAI achieve any of its objectives on MTC and will be a step that squarely plays into the decoy arguments strategy that some incumbent operators may deploy

**Q8. Are asymmetric domestic and international termination charges justified? If yes, then whether international termination charge should be fixed higher/lower than domestic, should be on reciprocal basis with other countries or left under forbearance? Give justifications.**

*Response:* We believe that any asymmetry should be introduced only if the cost structure is different. In case of domestic and international termination, we believe that the cost of termination is same and hence there is no need of introducing asymmetry.

Additionally, there is the risk of call bypass which we would want to avoid in every circumstance.

However, if TRAI, BSNL and other operators strongly prefer additional termination charges for international calls, this could be analysed further.

**Q9. What should be the ceiling of carriage charge for long distance calls?**

- a) Maintain at the same level
- b) Increased/ decreased on the basis of current data
- c) Higher ceiling for remote/ rural areas and one ceiling for rest

**Please give sufficient reasons with data in support of your answer.**

*Response:* Ceiling of the carriage charge should be reduced to Rs. 0.55/min. For details, please refer to section 5.2 of the document.

**Q10. Which of the following options should be the TAX transit charges for intra SDCA transiting?**

- a) Maintained at the same level
- b) Left to forbearance
- c) Increase/ decrease on the basis of current data
- d) Please give sufficient reasons with data in support of your answer.

*Response:* Cost based approach should be used to determine TAX transit charges for intra SDCA transiting. Current data of the cost structure to provide the service should be analyzed to come up with the transit charge. Please refer to section 5.2 of the document for detailed explanation.

**Q11. What should be the transit/ carriage charge from LDCA to SDCA?**

- a) No need to specify separately
- b) Under forbearance
- c) Increase/ decrease on the basis of current data

**Please give sufficient reasons with data in support of your answer.**

*Response:* We believe that the transit charge from LDCA to SDCA should be reduced. Please refer to section 5.2 of the document for detailed explanation.

**Q12. India is preparing for launch of 3G mobile services. Which of the following option would you consider best? Give reasons, practicality and method of implementation of your choice.**

- a) 3G termination charge same as 2G termination charge
- b) Forbearance of 3G termination charge
- c) Higher or lower 3G termination charge?
- d) Should be considered at a later stage?

*Response:* If a cost based approach is used in determining termination charge, than additional analysis may be needed for 3G networks. In this scenario, the termination charge for 3G mobile voice could be higher, lower, or same as termination charge for 2G mobile services. However, segregating 2G and 3G voice will be difficult and a weighted average may need to be deployed which will result in data ambiguity.

The 3G auction has not been held yet and there is not much clarity around auctioning and grant of 3G spectrum. However, we believe that interconnection charges for 3G mobile services should be clarified prior to the actual 3G auction.

A move to Bill and Keep will solve the complexity around determining termination charges for 3G. As has been discussed in Section 4, this option is future proof.

**Q13. New developments like WiMax, HSPA, FMC, NGN and further advancements in access technologies are expected to complicate the termination scenario further. What should be done in the current review to take care of these future developments?**

*Response:* Though good for the consumers and for the growth and progress of telecommunication in India, new developments in access technologies like WiMax, HSPA, FMC, and NGN and co-existence with 2G (GSM and CDMA) and 3G, pose significant complication in regulating and administering termination charges under a cost based MTC regime.

Therefore, the Authority may want to consider introducing Bill & Keep regime to reduce the complication and ambiguity of new technologies. Bill & Keep is internationally becoming the favourite approach to deal with the complexity of evolving technology.

## 7 Conclusion

It is quite clear, that the Indian Telecom industry is at the cusp of the next stage of growth and the necessary impetus for this growth must come collectively from the operators and the Regulator. The Authority can kick start this phase as it has done repeatedly over the past decade, by implementing a future ready dynamic MTC regime. This will directly result in increased competition, lower tariffs, additional penetration and overall growth and profitability of the industry.

There is plenty of evidence to show that telephones have a high correlation with GDP. According to Diamond Consultants, if a country has a one per cent higher mobile phone subscription rate than another, its GDP per capita will be about \$200 higher. Surveys and studies have repeatedly shown that access to information and communication technologies allows the benefits of information availability, business opportunities and social connections that translate into brighter education and economic opportunities.

A significant reduction in MTC will benefit both consumers and operators. It will be consistent with the Regulator's fundamental operating tenets – “pro-consumer”, “pro-growth” and “pro-competition”.

Slight reduction in MTC to say 15p or 20 p will not be sufficient to take sector growth to the next level nor will it be significant to induce usage.

We urge the Authority to not let this golden opportunity of using IUC to fuel the next phase of telecom growth in India slip. TRAI must act decisively and implement a dynamic IUC regime.

TRAI should choose the preferred option depending on the objectives it wants to target:

- If the key objectives are to drive industry growth by promoting competition and by creating a level playing field, Option 1 – asymmetric MTC, is the preferred option
- If TRAI finds it difficult to implement asymmetric MTC, Option 2 – symmetric MTC at floor LRIC value, can be considered
- If TRAI wants to implement a future proof IUC regime, promote efficiency and move away from data ambiguity of cost based mechanisms, then Option 3 – Bill and Keep, is the preferred option
- If TRAI believes that India's and the sector's interests are best served by promoting telephony in rural India and for the economically weaker sections of society, then Option 4 – Negative MTC, should be preferred

Of these options, in our view, Bill and Keep offers the strongest long-term and pro-growth reasons for implementation.

## Appendix

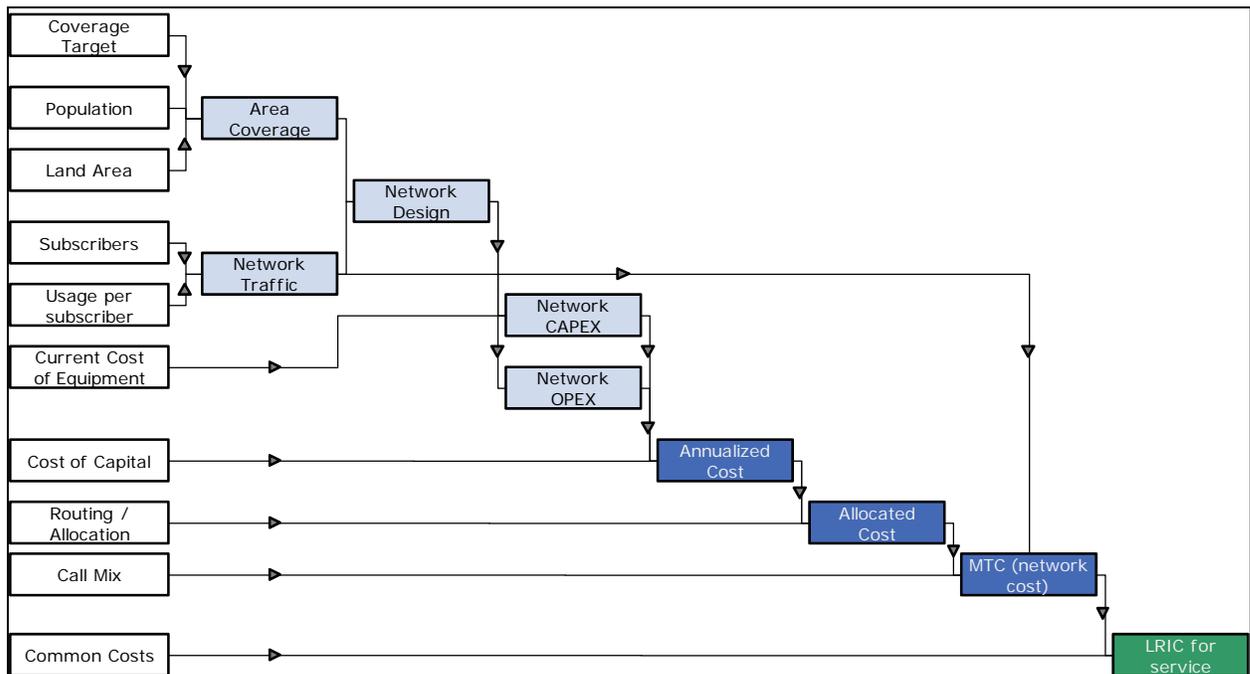
### 1 LRIC Model – Assumptions and Outputs

#### 1.1 Model Structure

The most widely used measure of cost of termination for Regulatory purposes is the long-run average incremental cost (known as LRAIC or LRIC). LRIC is used because it best resembles the actual economic cost that an operator incurs in providing termination in a competitive market and allows the operator to recover the full cost of its network.

As part of developing this response, Reliance commissioned Diamond Management & Technology Consultants, Inc. (NASDAQ:DTPI) to develop a bottom-up Forward Looking Long Run Incremental Cost (FL-LRIC) model to determine the costs of mobile termination in India. Diamond developed the FL-LRIC model for both a hypothetical efficient incumbent pan-India operator and a hypothetical efficient new pan-India operator.

Figure 21 illustrates the high level approach used to calculate MTC using the LRIC approach.



**Figure 22: LRIC Approach**

## 1.2 Key elements of the FL-LRIC model

### Network Design

The model structure was based around established GSM network design algorithms. These are, for the most part, quite standardized and can be constructed in isolation with a reasonable degree of confidence in the results. An engineering model was used to calculate the networks that would be required to support the given level of demand in India, given the technology chosen.

### Services

The purpose of the FLLRIC model is to produce the costs of different services that are provided on a mobile network, specifically voice and SMS termination. Costs are allocated onto services on the principle of 'cost-causality', meaning that a given cost is allocated onto services to the extent that each service causes that cost to be incurred. The key to this allocation is a table of routing factors. Figure 23 below shows the major routing factors used in the GSM network model with a simplified set of services

Service	Passive Network	BTS	BSC	MSC	GMSC	HLR	Transmission	SMSC	GSN
Off-net Incoming Voice Minute	1	1	1	1.43	1	1	1	0	0
Off-net Outgoing Voice Minute	1	1	1	1	1	0	1	0	0
On-net Voice Minute	2	2	2	2.43	1	1	1	0	0
SMS	0.0004	0.0004	0.0004	0.43	0	0	0	1	0
Data	12.54	12.54	12.54	0	0	0	0	0	1

Source: A study of mobile termination charges, Analysys, July 2004; Diamond FLLRIC Model

**Figure 23: Service Routing Table**

### Depreciation

The FL-LRIC results presented in this report are calculated using economic depreciation to annualize capital expenditure. This is a more complex method than conventional straight-line accounting depreciation, based on historical cost. Economic depreciation is favored for Regulatory purposes since it more accurately matches the costs of assets to the revenues they support. It is worth pointing out that both types of depreciation recover exactly the same costs in present value terms, the only difference being in the timing of that cost recovery.

### Directly Allocated Cost Items

The FLLRIC model considers a set of cost items which can be directly allocated to the list of services under consideration. These are:

- a) Transmission
  - i) BTS
  - ii) BSC
  - iii) Fiber links and Microwave
- b) Core Network
  - i) MSC
  - ii) GMSC
  - iii) HLR
- c) Passive Network
  - i) GBT
  - ii) RTT
- d) Passive Network OPEX
- e) Active Network OPEX

### **Common Cost**

In addition to those cost elements considered explicitly in the model, there is an allowance for overheads. These overheads are defined as those costs which support both wholesale and retail activities but cannot be entirely allocated to either wholesale or retail services. They include a proportion of the following costs

- a) Core administrative functions
- b) Finance and legal functions
- c) Central office fixtures and fittings

These common costs are factored into the service cost using Equal Proportionate Mark-up (EPMU) approach. This is in line with all Regulators who have adopted a LRIC approach thus far.

### **Cost of Capital**

The FLLRIC model uses Capital Asset Pricing Model (CAPM) to compute the Weighted Average Cost of Capital (WACC) for the operator.

## **1.3 Key Assumptions**

The strength of a bottom-up LRIC model is that it can model an efficient or hypothetical operator. It does not have to depend on data from operators, as industry benchmarks, common network design rules and averages of operator data can be used. However, such a model requires extensive data, not all of which is easily available and as such, assumptions are often required. Some of the key assumptions made in our FLLRIC model are:

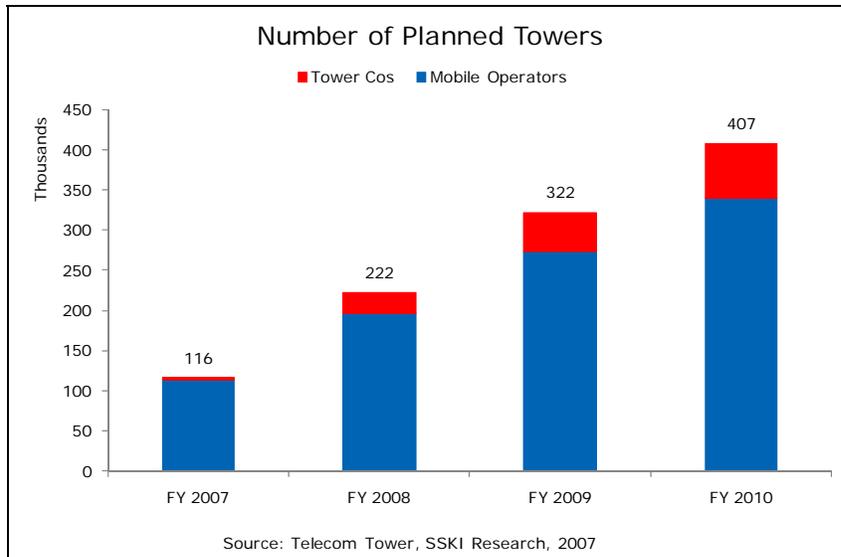
**1. Allocated Spectrum:** The operators will be allotted spectrum based on the subscriber-linked criteria. However, as there is spectrum scarcity in some of the circles in India, new entrants may not get additional spectrum in some circles. Figure 24 below, illustrates the spectrum allocation pattern assumed in the model. We have assumed that the new operator will get spectrum only in the 1800 MHz spectrum.

Hypothetical Existing Operator						Hypothetical New Operator					
		FY 2009	FY 2010	FY 2011	FY 2012	FY 2013		FY 2010	FY 2011	FY 2012	FY 2013
Metro							Metro				
	Chennai	8.0	8.0	8.0	8.0	8.0		4.4	4.4	4.4	6.2
	Delhi	8.0	8.0	8.0	8.0	8.0		4.4	4.4	4.4	4.4
	Kolkata	8.0	8.0	8.0	8.0	8.0		4.4	4.4	6.2	6.2
	Mumbai	8.0	8.0	8.0	8.0	8.0		4.4	4.4	4.4	4.4
Class A							Class A				
	Andhra Pradesh	8.0	8.0	8.0	8.0	8.0		4.4	6.2	6.2	6.2
	Gujarat	8.0	8.0	8.0	8.0	8.0		4.4	4.4	4.4	6.2
	Karnataka	8.0	8.0	8.0	8.0	8.0		4.4	4.4	6.2	6.2
	Maharashtra	8.0	8.0	8.0	8.0	8.0		4.4	6.2	6.2	6.2
	Tamil Nadu	8.0	8.0	8.0	8.0	8.0		4.4	6.2	6.2	6.2
Class B							Class B				
	Haryana	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	4.4
	Kerala	6.2	6.2	6.2	6.2	6.2		4.4	4.4	6.2	6.2
	Madhya Pradesh	6.2	6.2	6.2	6.2	6.2		4.4	4.4	6.2	6.2
	Punjab	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	4.4
	Rajasthan	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
	Uttar Pradesh (East)	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
	Uttar Pradesh (West)	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
	West Bengal	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
Class C							Class C				
	Assam	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
	Bihar	6.2	6.2	6.2	6.2	6.2		4.4	6.2	6.2	6.2
	Himachal Pradesh	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	4.4
	Jammu and Kashmir	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	4.4
	North East	6.2	6.2	6.2	6.2	6.2		4.4	4.4	4.4	6.2
	Orissa	6.2	6.2	6.2	6.2	6.2		4.4	4.4	6.2	6.2

Source: Diamond FLLRIC Model

**Figure 24: Allocated Spectrum**

**2. Passive Network Sharing:** The policy thrust to achieve a target of 500 million wireless connections by 2010 and intense competition has made infrastructure sharing a necessity rather than advantage for an operator. Stated plans of major tower companies suggest erection of ~291,000 towers over FY07-10. Figure 25 below, illustrates the projected growth of towers in India.



**Figure 25: Growth of Towers in India**

We have assumed that an efficient new operator will rent towers to set up their base stations and provide coverage. Additionally, we have seen that several of the incumbent operators have hived off their tower infrastructure business. Therefore, we have assumed that an efficient existing player will also be using shared infrastructure for towers and transmissions.

**3. Market Share:** The market share for the hypothetical operator is determined as follows in the two scenarios

Scenario 1: Hypothetical New Entrant – We have assumed that the new entrant will be able to capture fair share of gross-adds of subscribers in the market by FY 2013. As the operator ramps up its operations, it will capture close to 100% of fair share. The fair share is calculated based on the effective number of operators in the market

Scenario 2: Hypothetical Existing Operator – As new players enter the market, the incumbent's share of gross-adds will gradually decline. We have assumed that the incumbent will be capture only fair share of gross-adds in the market by FY 2013.

**4. Call Mix:** The call mix for the hypothetical operator is determined as follows in the two scenarios (Figure 26):

Scenario 1: Hypothetical New Entrant – As the subscriber base of the new operator increases, the share of on-net calls increases for the new entrant. We have assumed that the share of on-net calls will increase from 2% at the beginning to 8% by FY 2013

Scenario 2: Hypothetical Existing Operator – Incumbent operators promote on-net voice calls and are typically priced lower. Therefore the share of on-net calls increases for an incumbent as well.

Hypothetical Existing Operator					Hypothetical New Operator				
	FY 2010	FY 2011	FY 2012	FY 2013		FY 2010	FY 2011	FY 2012	FY 2013
Off-net Incoming Voice Minute	23%	22%	21%	20%	Off-net Incoming Voice Minute	54%	53%	52%	51%
Off-net Outgoing Voice Minute	22%	21%	20%	20%	Off-net Outgoing Voice Minute	44%	43%	42%	41%
On-net Voice Minute	55%	57%	58%	60%	On-net Voice Minute	2%	4%	6%	8%

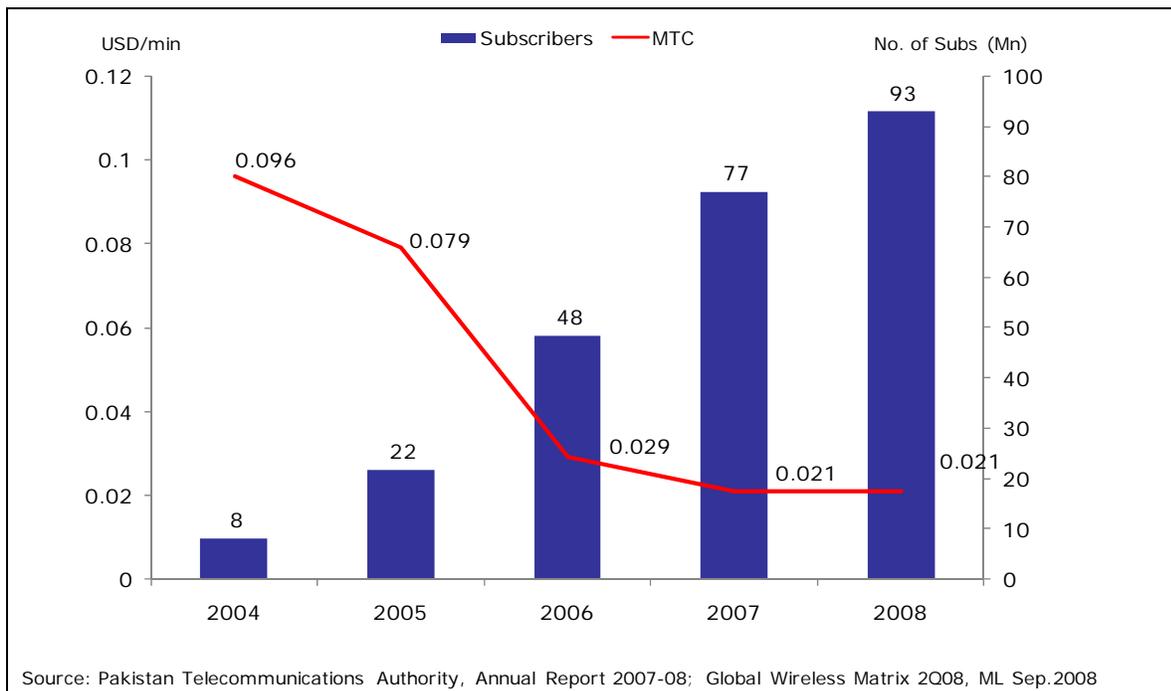
Source: Diamond FLLRIC Model

**Figure 26: Call Mix**

## 2 International benchmarks show massive decline in MTC in recent years

This Appendix shows that most of the countries evaluate and review termination charges every 2-3 years and nearly ALL countries have reduced MTC by more than 50% over the past 4 years (and yet, many countries like in Europe are considering a further reduction of 70%). The current MTC regime in India was setup in 2003 and is still being used.

### 2.1 Declining MTC resulted in a spurt of growth for subscribers in Pakistan



**Figure 27: Reduction in MTC in Pakistan and Growth in Subscriber Base**

The Pakistan telecom market has seen a drastic reduction in MTC over the last 4 -5 years. From 0.096 USD/min in 2004, the MTC has declined to 0.021 USD/min in 2008. This amounts more than 75% reduction in MTC in a span of 4 years.

As seen from the above figure this **period has also coincided with exponential growth for the Pakistan wireless subscriber base**. Starting at a meager 8 million in 2004 the figure today stands close to 100 million subscribers.

In the same period a corresponding rise in penetration to 60% has taken Pakistan's penetration ahead of India.

***Key Takeaway: A steep decline in MTC in Pakistan in the last 5 years has resulted in unprecedented growth in wireless subscribers and penetration for the Pakistan telecom market, which has today overtaken India in terms of penetration.***

## **2.2 Countries implement asymmetric MTC to further competition and push growth**

Asymmetric MTC has been used effectively in several European markets to for a variety of reasons. The most common reasons are to compensate operators for exogenous factors resulting in higher efficient cost of operations, and to compensate late entrants to take into account lower economies of scale.

Most countries however define a transitory period of asymmetry after which the rates move to symmetry. In the tables below we see a set of countries that have set asymmetric rates for a period of 2 -3 years to operators

Portugal (Euros)							Greece (Euros)				
	Jul-08	Oct-08	Jan-09	Apr-09	Jul-09	Oct-09	Jan-08	Jan-09	Jan-10	Jan-11	
TMN	0.08	0.075	0.07	0.065	0.065	0.065	Cosmote	0.0989	0.0786	0.0624	0.0495
Vodafone	0.08	0.075	0.07	0.065	0.065	0.065	Vodafone	0.0991	0.0786	0.0624	0.0495
Optimus	0.096	0.09	0.084	0.0078	0.072	0.065	Wind	0.1041	0.0786	0.0624	0.0495

Spain (Euros)							Italy (Euros)				
	Mar-07	Sep-07	Mar-08	Sep-08	Mar-09	Sep-09	Jul-08	Jul-09	Jul-10	Jul-11	
Telefonica (Movistar)	0.1114	0.1031	0.0948	0.0866	0.0783	0.07	TIM	0.0885	0.077	0.066	0.059
Vodafone	0.1135	0.1048	0.0961	0.0874	0.0787	0.07	Vodafone	0.0885	0.077	0.066	0.059
Orange	0.1213	0.111	0.1008	0.0905	0.0803	0.07	Wind	0.0951	0.087	0.072	0.059
Xfera	NA	NA	0.1436	0.1305	0.1173	0.1041	Hutch 3	0.13	0.11	0.09	0.07

Source: European Regulators Group (ERG) : Symmetry MTR/FTR Action Plan ■ Operator receiving higher MTC

**Figure 28: Countries with Asymmetric MTC's and Glide Paths to Symmetry**

The Portuguese Regulator after a detailed analysis decided to introduce an asymmetric glide path for 5 quarters while moving termination rates for the 3 operators to cost levels. Optimus was given a higher MTC as a result of traffic imbalances as compared to other larger operators.

In September 2006 the Spanish Regulator established the glide path for MTC's for the 3 incumbent players Movistar, Vodafone and Orange to achieve a symmetric termination of 0.07 €/min by late 2009. Xfera the latest to enter the Spanish market (2006) was allowed higher MTC's to compensate for its lack of economies of scale. Post 2009 the Regulator will have to reevaluate the future course of action for Xfera.

The Italian Regulator has allowed Wind and Hutch 3G to charge higher MTC's as compared to the incumbent operators TIM and Vodafone. The Regulator has established a 3 year glide path wherein the MTC's would gradually move to symmetry for all operators.

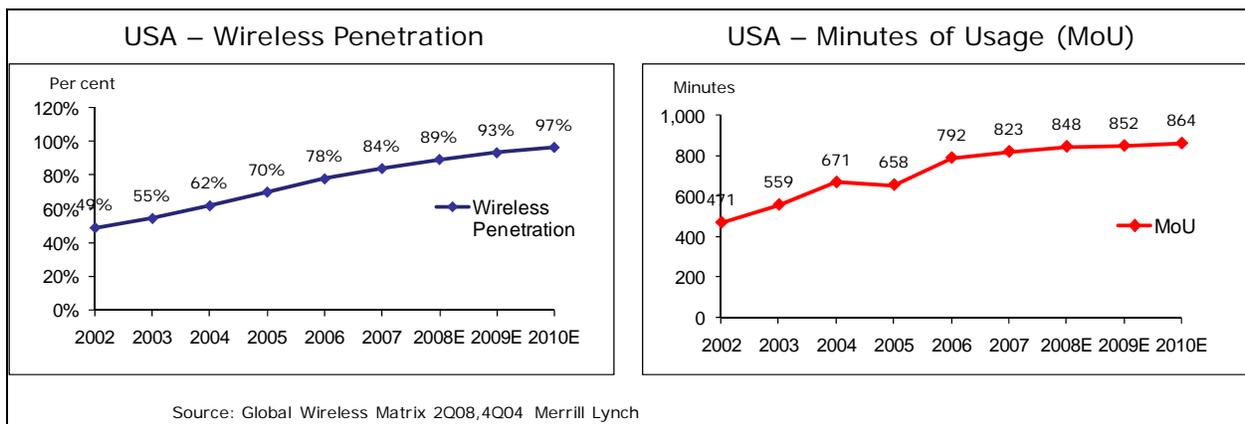
**Key Takeaway: Several countries have implemented asymmetric MTC's in favour of new operators with higher efficient costs. The asymmetry typically lasts for a transitory period which the regulator specifies upfront. The new operators are expected to achieve the scale required for lower costs by the end of the asymmetry period.**

## 2.3 Countries implementing Zero MTC's have achieved High MoU's & Penetration

Several countries have implemented zero MTC regimes in their telecom markets successfully. These are countries that have the Receiving Party Pays (RPP) system for interconnection. The world's largest market China and the 3<sup>rd</sup> largest market USA have had MTC = 0 since inception.

## USA

The US is characterized by one of the highest MoU's across the world as a result of innovative tariff plans which encourage higher usage of phones. The country which was relatively slow on subscriber growth initially has also seen a high growth in penetration in the last 5 years and is expected to cross the 100% penetration mark by 2010.

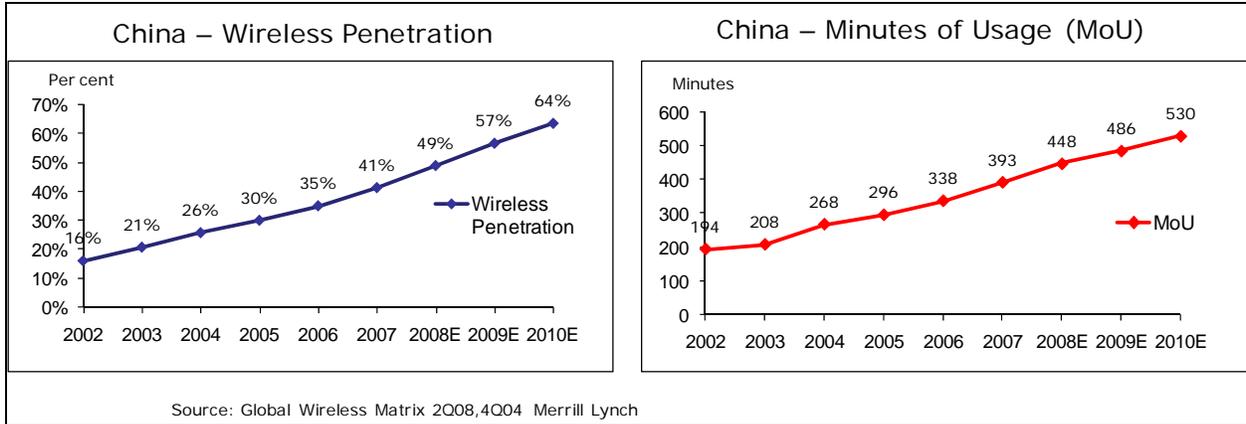


**Figure 29: Wireless Penetration and Minutes of Usage (MoU) in USA**

## China

In the past five years, as one of its 'pillar industries', China's telecom service industry has grown at a faster rate than the country's GDP. Revenue from basic telecom service contributes approximately 2.1% of the GDP, while value-added telecom services contribute a further 3.2% to total GDP.

By the end of 2007, China has achieved a mobile penetration close to 50%, following a record level of subscriber additions during the year. This robust growth was due to an expanding rural market and the increasing number of people who have acquired more than one mobile phone.



**Figure 30: Wireless Penetration and Minutes of Usage (MoU) in China**

**Key Takeaway:** *Several countries have implemented zero MTC's and achieved great success in penetration and usage. As seen above 2 countries, USA and China with a geographic scale and size similar to India have achieved very high penetration and usage through the use of a zero MTC regime.*

### 3 Concerns regarding COAI’s submission to TRAI

A number of discrepancies in the submission made by COAI have been highlighted to us. These are summarized in this section.

#### 3.1 Counter Views to White Paper on MTC

Upon review of COAI submissions, namely, “White Paper on Mobile Termination Charge, Oct. 23, 2008” and “White Paper on Asymmetrical Pricing for Mobile Termination Charges, Dec. 2, 2008”, several points may be highlighted that are in conflict with available trends and statistics in the pertinent telecommunications markets.

	COAI View	Counter View
Key Issues	<ul style="list-style-type: none"> <li>MTC has been increased in Brazil in the recent past</li> <li>Increased MTC is deployed as a tool to incentivize operators to roll-out network in semi-urban and rural areas of Brazil</li> </ul>	<ul style="list-style-type: none"> <li>MTC has been declining in Brazil as in all of countries in Latin America</li> <li>Telecom coverage in India stands at ~70% already, therefore MTC increment is not a right lever to increase coverage ; subsidies provided by USO fund work better</li> </ul>
	<ul style="list-style-type: none"> <li>Higher termination leads to rapid penetration</li> </ul>	<ul style="list-style-type: none"> <li>There are several case studies of countries that have achieved rapid increase in penetration aided by a declining MTC regime</li> </ul>
	<ul style="list-style-type: none"> <li>UK, Greece, Italy use a network externality mark-up above cost to calculate MTC</li> </ul>	<ul style="list-style-type: none"> <li>Though these countries mark-up MTC above cost, they have been declining MTC gradually</li> </ul>

Source: TRAI consultation paper on IUC - Dec 2008

**Figure 31: Counterviews to COAI Submission on MTC [source: Diamond Consultants]**

#### 3.1.1 Counter arguments to COAI submission:

- COAI viewpoint to justify mark-up above cost for calculating MTC in Indian context:**
  - MTC above cost can be used to achieve specific policy objectives like bridging the rural-urban divide by rolling out networks to rural and other areas. MTC marked-up

above cost results in incoming interconnect revenues for rural/ low income subscribers which helps MNOs recover costs of network expansion.

- **Counter argument:**

- India has achieved ~70% population coverage by mobile networks – hence a subsidy to increase network coverage may not be relevant anymore. The USO fund and the recent measures around coverage norms provide adequate incentives to MNOs to rollout networks to rural areas.

- **COAI viewpoint to justify mark-up above cost for calculating MTC in Indian context:**

- MTC above cost incentivizes MNOs to offer attractive rates to marginal rural customers and also offer subsidies on handsets to enable them to sign up. Since every additional subscriber increases the value of the network, marking-up MTC by way of network externality charge proves beneficial in cases of countries with low penetration.

- **Counter argument:**

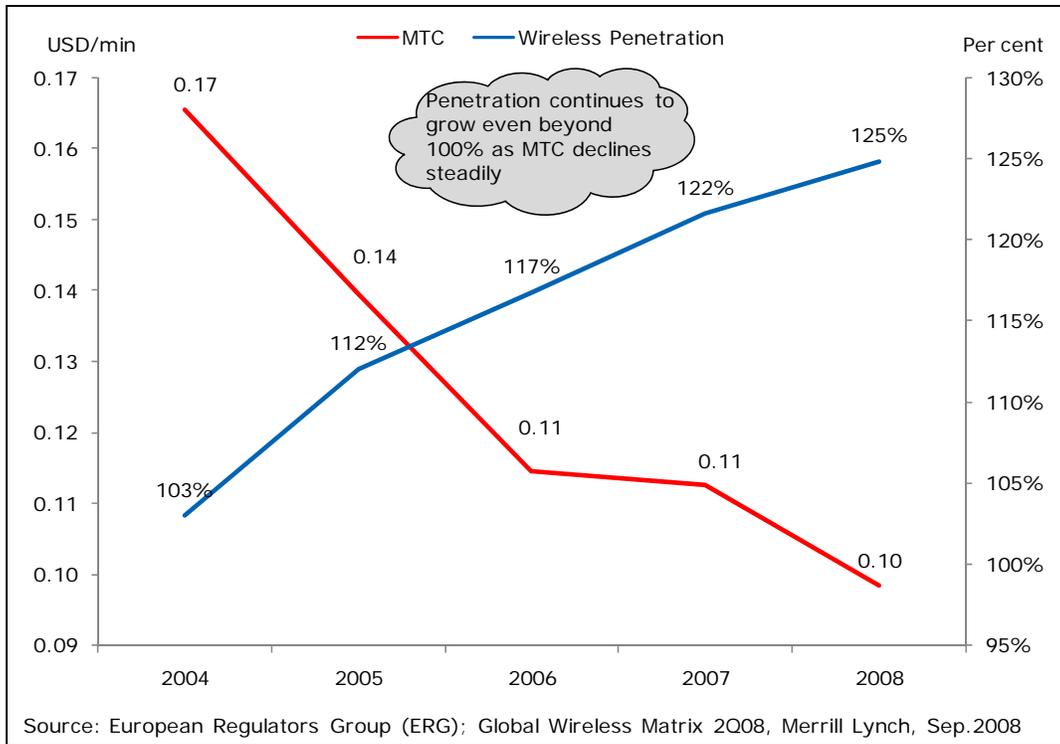
- Most handsets are not subsidized explicitly in India and hence form the most significant cost for new subscribers. The MTC mark-up does not help address this key issue of handset purchase and hence is not an effective argument.

The counter arguments to COAI's justification for mark-up above cost for calculating MTC is summarized in the exhibit below -

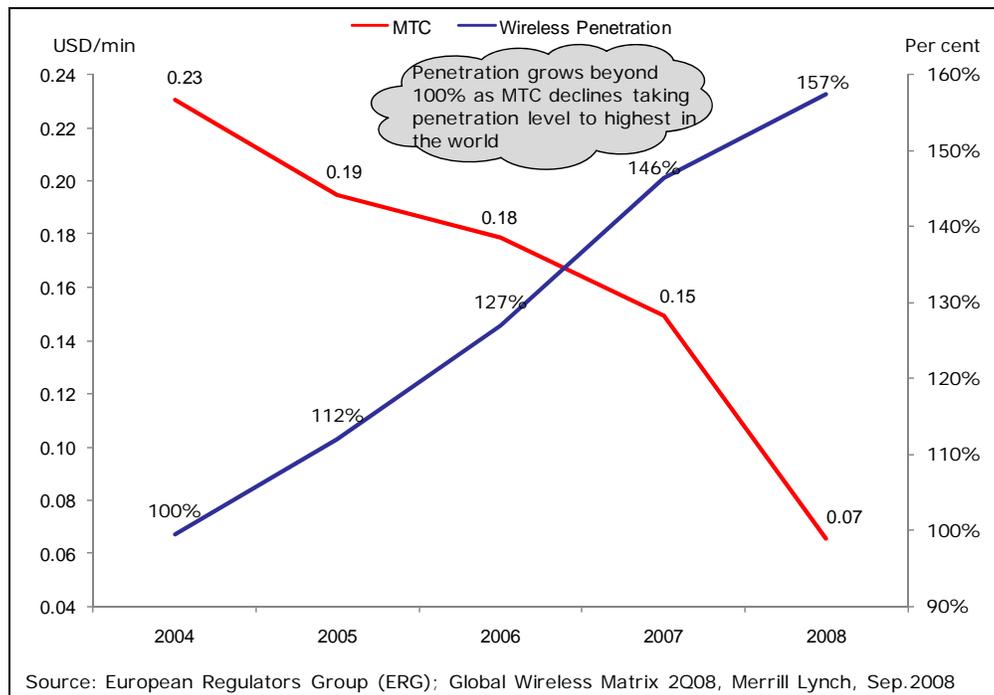
Typical reasons for a mark-up above cost	Rationale used by COAI to justify mark-ups	Counter view for Indian market
<p>Subsidize Network Expansion to Rural Areas</p>	<ul style="list-style-type: none"> <li>MNOs are able to use the MTC mark-up above cost to partially offset the costs of rolling out networks to rural and other areas</li> <li>A higher MTC results in incoming interconnect revenues for rural / low income customers which helps the MNO recover the costs of the network expansion</li> </ul>	<ul style="list-style-type: none"> <li>✗ India has achieved ~70% population coverage by mobile networks – hence a subsidy to increase network coverage may not be relevant anymore</li> <li>✗ The USO fund and the recent measures around coverage norms provide adequate incentives to MNOs to rollout networks to rural areas</li> </ul>
<p>Subsidize Acquisition of New Subscribers</p>	<ul style="list-style-type: none"> <li>MNOs are able to use the MTC mark-up above cost to offer attractive rates to marginal rural customers and also offer subsidies on handsets to enable them to sign up</li> <li>Every additional subscriber joining the network increases the value of the network – hence existing subscribers are willing to pay the mark-up</li> </ul>	<ul style="list-style-type: none"> <li>✗ Most handsets are not subsidized explicitly in India and hence form the most significant cost for new subscribers</li> <li>✗ The MTC mark-up does not help address this key issue of handset purchase and hence is not an effective argument</li> </ul>

**Figure 32: Counter Arguments to COAI’s Justification for Mark-Up Above Cost for Calculating MTC [source: Diamond Consultants]**

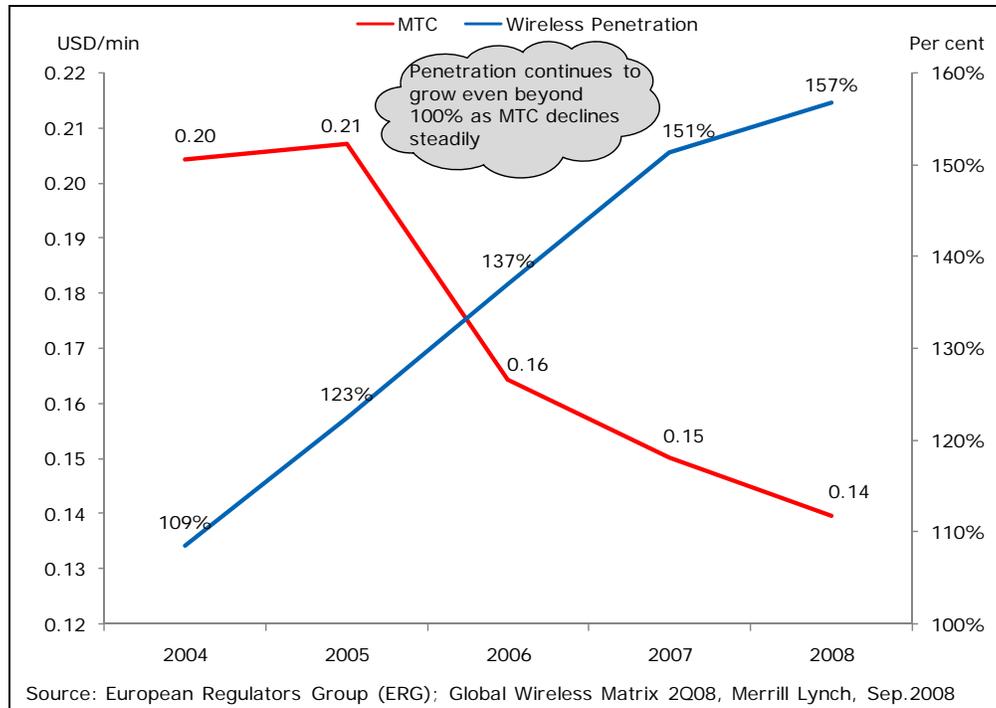
- COAI viewpoint:** The paper highlights the role of mark-up by way of network externality charge in arriving at MTC with a view to achieving policy objectives. Examples of countries cited in this regard are United Kingdom, Greece, Italy and Israel.
- Clarification:** The COAI argument fails to highlight the MTC trend followed in UK, Greece and Italy. Even as these three countries include network externality charge in marking up MTC, they have simultaneously followed a regime of lowering MTC gradually. As depicted below, penetration continued to grow even beyond 100% in all of these three countries as MTC declined steadily.



**Figure 33: Case Study - United Kingdom**



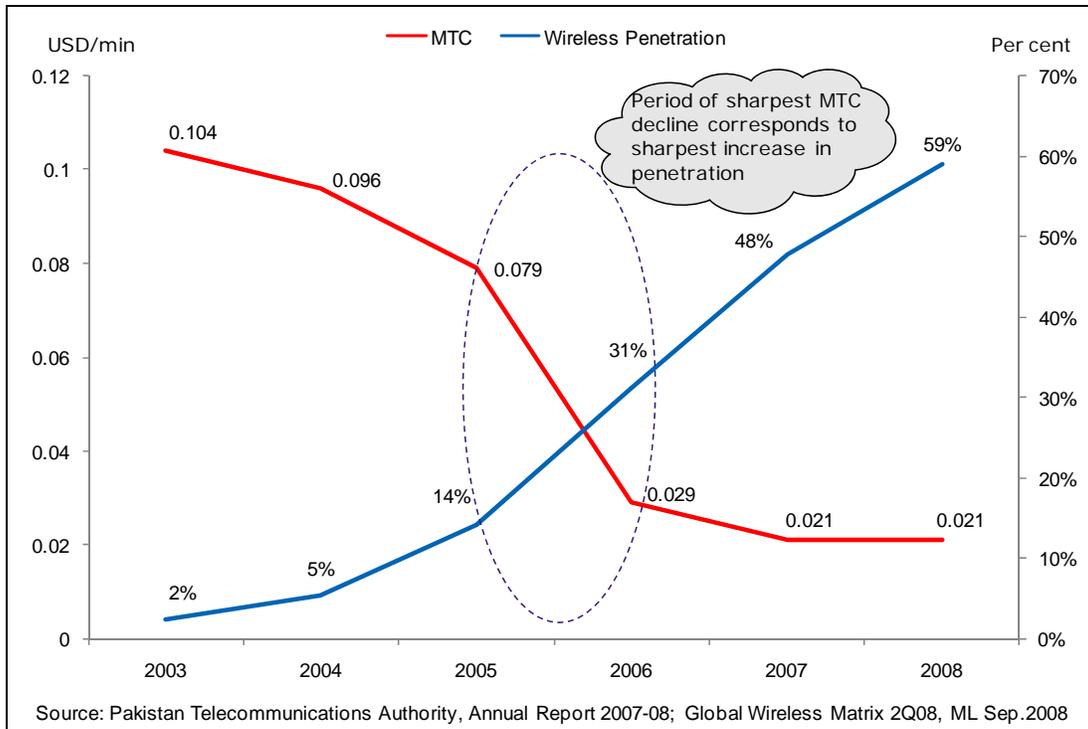
**Figure 34: Case Study - Greece**



**Figure 35: Case Study - Italy**

- **COAI viewpoint:** The paper argues in favour of an increasing MTC regime with a view to achieving rapid increase in mobile penetration.
- **Counter view: Case Studies to highlight strong correlation between declining MTC regime and increasing penetration** - During 1999-2000, the telecom market in India and Pakistan were characterized by extremely low mobile penetration levels. However, Pakistan has far surpassed India since then by achieving a rapid growth in wireless penetration and is poised to cross the 60% mark by end of FY2009.

Figure below highlights the strong correlation between a declining MTC regime and steep increase in wireless penetration achieved in Pakistan. MTC decreased by 80% from 2000 to 2007 in Pakistan from USD 0.104/min to USD 0.021/min. It should be noted that the period in which MTC declined most sharply (2004-2007) also corresponds to the period that experienced maximum growth in wireless penetration in Pakistan.



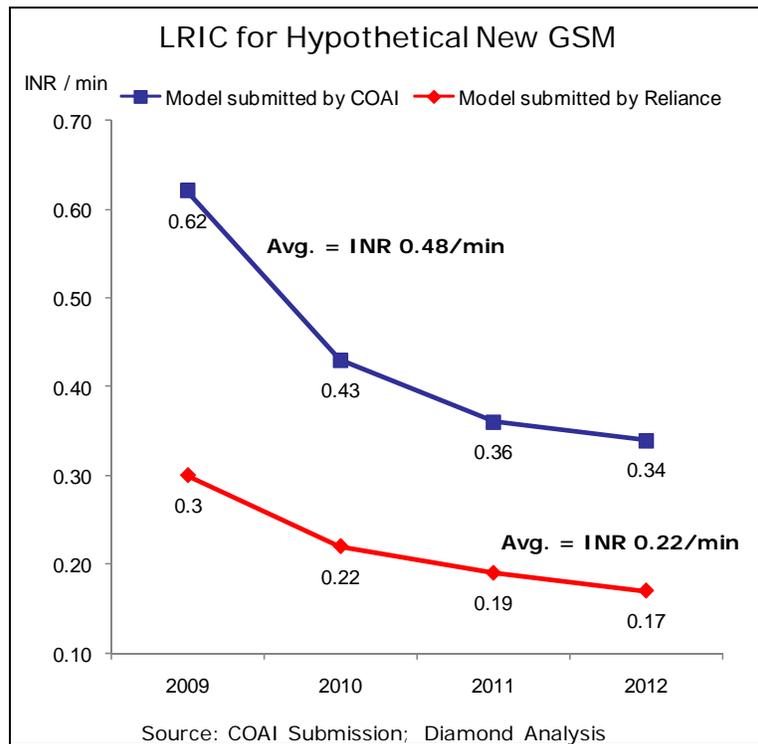
**Figure 36: Case Study - Pakistan**

Bangladesh has also depicted a similar trend vis-à-vis India under a low MTC regime. While the wireless penetration level in Bangladesh was 3.9% in 2004, it rapidly increased to 31.9% in 2008 and surpassed that of India which stood at 29.3% in 2008. There are several other instances of countries with initial wireless penetration levels similar to those in India but achieved rapid growth rate in penetration and surpassed India on account of a declining MTC regime. Few countries falling in this category are Peru, Mexico, Colombia, and Argentina.

- **COAI viewpoint:** The paper argues that an increasing MTC regime in Brazil has been deployed as a tool to incentivize operators to roll-out their network in semi-urban and rural areas.
- **Clarification:** However, research suggests that Brazil has achieved a rapid increase in penetration from 20% in 2002 to 78% in 2008 in the wake of a declining MTC regime being implemented in all of countries in Latin America.

### 3.2 Discrepancy in the LRIC models submitted by COAI

As shown in the figure below, there exists a significant difference between MTC for a new GSM operator as calculated by COAI (INR 0.48/min) and that based on Diamond's analysis (INR 0.22/min) using FL-LRIC approach.



**Figure 37: Difference in MTC for New GSM Operator Calculated by COAI vs. Reliance**

The difference in calculation of MTC for new GSM operator based on FL-LRIC model arises on account of differences in assumptions behind the model as depicted in the exhibit below:

### Difference in assumptions

	COAI	Diamond
Infrastructure Sharing	<ul style="list-style-type: none"> <li>Assumes 30% of passive infrastructure is owned by the new operator</li> </ul>	<ul style="list-style-type: none"> <li>Assumes &gt; 90% passive infrastructure for new operators today</li> </ul>
Call Mix	<ul style="list-style-type: none"> <li>Highly tilted call mix toward outgoing calls (75%)</li> </ul>	<ul style="list-style-type: none"> <li>Fair distribution of incoming and outgoing call (51:49)</li> </ul>
Depreciation	<ul style="list-style-type: none"> <li>Tilted annuity model leading to front-loaded depreciation</li> </ul>	<ul style="list-style-type: none"> <li>Economic depreciation, considering true economic value of the asset</li> </ul>
Industry Benchmark	<ul style="list-style-type: none"> <li>FAR Higher equipment cost and lower MoU assumptions</li> </ul>	<ul style="list-style-type: none"> <li>Industry benchmarks for equipment cost and MoU</li> </ul>

**Figure 38: Differences in Assumptions**

## 4 Gradual Decline in MTC will defeat TRAI's pro-growth and pro-consumer objectives

In case of India, **an immediate implementation of a dynamic MTC regime will result in significantly better results than implementation of a glide path for MTC reduction** on account of the following reasons.

To derive value of these positive effects of MTC reduction on the overall telecom market, it is essential the reduction in MTC is steep and this should be preferred choice for TRAI:

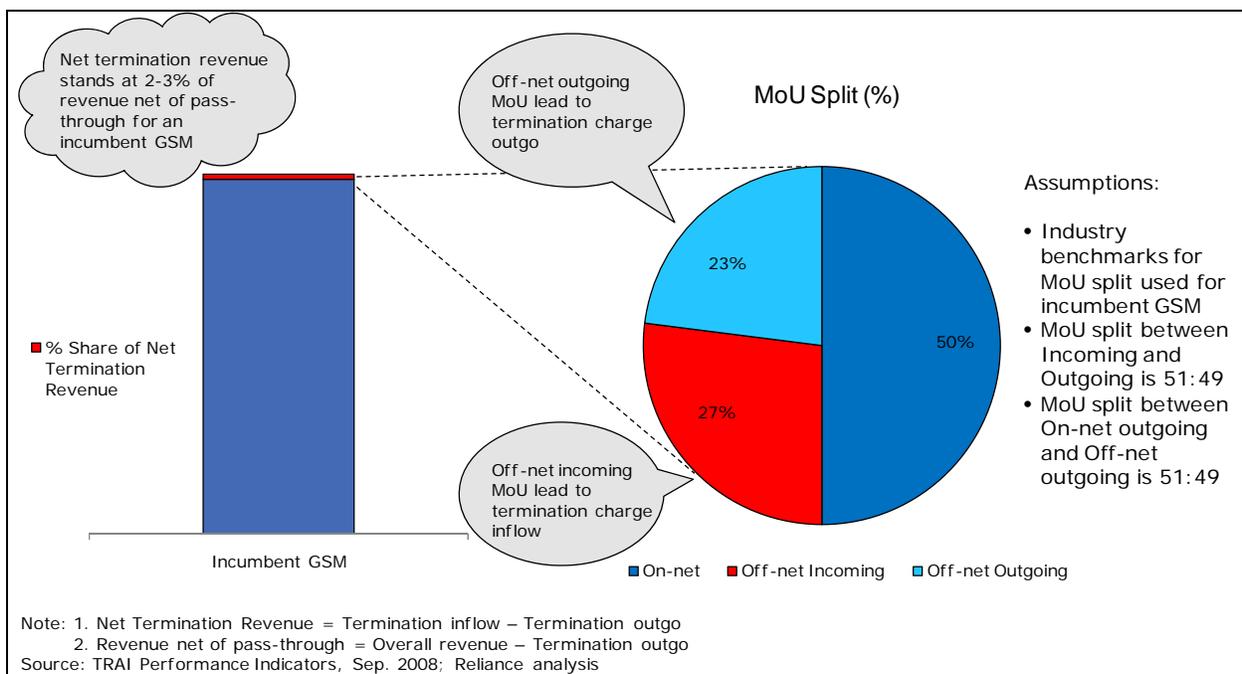
- There **exists a significant gap between existing MTC and output from cost-based FL-LRIC model for an existing GSM operator**. To encourage fair competition in the market and bridge this gap in the earnest, a quick reduction in MTC should be achieved through a single steep cut as against a glide path.
- The MTC regime in India has not been changed in the last five years, which represents a significant duration of time with regard to advancement in technology and subsequent changes in cost structures of mobile operators. International experience shows that termination charges are reviewed at least once every three years to keep pace with rapid changes in technology and cost structures of operators. **Regulators in other countries have decreased MTC over the past years at regular intervals, typically by as much as 50%-70%. However, such reductions in MTC have not happened in India in the last 5 years**. Therefore, TRAI should directly set a lower MTC (8 paise) if it follows LRIC or move straight to zero or negative MTC. This would serve the Indian telecom market much better than providing a glide path.
- **Except for some of the incumbent large mobile operators, every operator has asked for a reduced MTC**. This indicates that a lower MTC regime is needed by the different operators. A token reduction in MTC will not result in any meaningful reduction in tariff and hamper competition in the market.

## 5 Lowering MTCs will have a positive impact on sector profitability – not the reverse

Reducing MTC from its current levels will not have a negative impact on operator revenues and profitability. This is a decoy argument that some operators may present to TRAI.

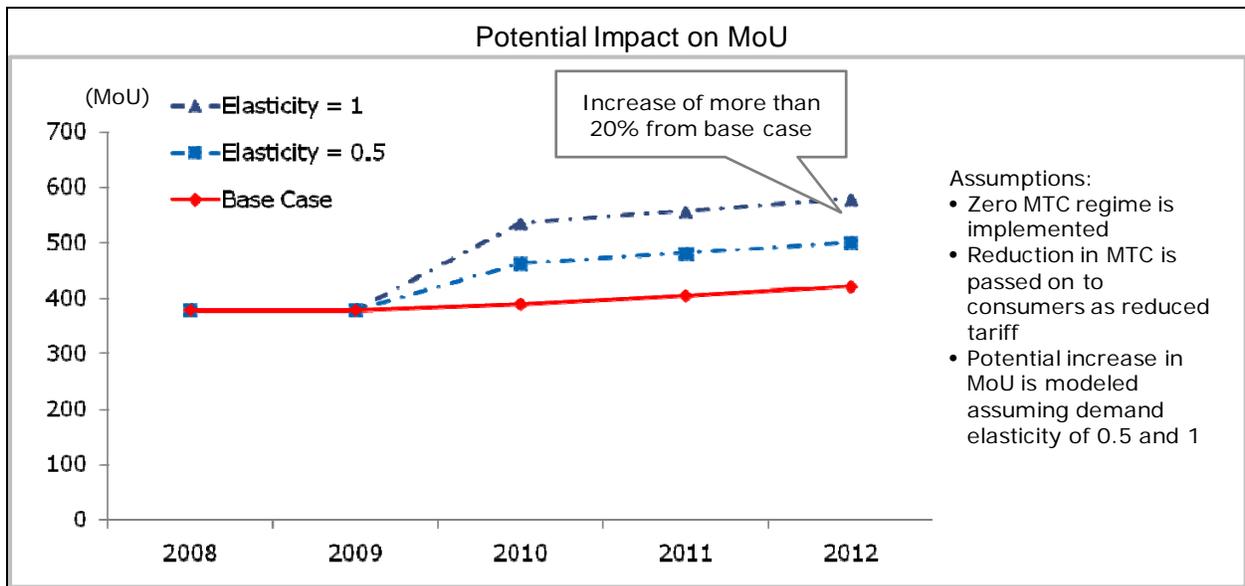
The impact will be positive for the operators:

- Based on current traffic patterns, incumbents and market leader mobile operators are net gainers from IUC as their call mix is favorable to off-net incoming. However the quantum of net earnings from IUC is comparatively small, less than 3% of their annual revenue. Thus, the net impact on their top-line will be small because of lowering MTC will be small.



**Figure 39: Estimate of MTC as % of revenues for incumbent operators [source: Diamond Consultants]**

- In addition, an operator will benefit by a lower MTC regime which will result in further reduction in call rates. This will increase usage because of demand elasticity. The operators should, therefore, have a net positive impact on their revenue.



**Figure 40: MoU will increase with reduction in tariff [source: Diamond Consultants]**

- Better network utilisation because of higher usage will further reduce the cost per minute of terminating a voice call. This will enable operators to recover their cost even in a lower MTC regime.
- Network utilization will improve significantly, especially in rural areas and smaller towns. This will grow sector profitability very significantly.

## 6 Typical decoy arguments presented by anti-competitive operators in other markets

Some strong incumbents in other markets, especially European markets, have argued for higher termination cost. **Deutsche Telecom**, for example, voiced **against cost based approach for determining MTC as it can underestimate MTC.**

*“Practical problems should lead to an even more cautious use of cost orientated regulation. In practice the relevant costs cannot be calculated precisely and objectively but are always mainly result of subjective judgments. In consequence there is a risk of errors that lead to unwanted market outcomes.”*

It goes to saying that: *“LRIC based pricing does generally not provide for the recovery of:*

- a) The opportunity costs of developing unsuccessful services or internally developed inputs, including transaction costs such as search and bargaining costs and*
- b) The installation costs of shifting to new technology.”*

*Deutsche Telecom believes that “cost orientated price regulation is a mainly static concept. It interferes heavily with the business decisions of the regulated operator and always contains the risk of welfare reducing errors. The high informational requirements and the subjective elements of calculating costs can hardly provide for reliable and time consistent prices. Therefore access and interconnection regulation should in general be more in line with economic principles as well as light-handed.”*

Regulators in Germany, however, decided to go ahead with LRIC approach for determining MTC.

Similarly, in UK, **O2** quoted against cost oriented approach and **asked for network externalities to be included in determining MTC.**

*“Mobile networks provide coverage, which is the ability to make a single call from any point of the network. The cost of coverage is unrelated to traffic volumes or customer numbers and so introduces a further cost driver that is not present in fixed markets. Cost models should reflect this. In addition, mobile networks invariably have assets that are deployed efficiently but which become stranded. This is a feature of competition between rival infrastructures and the need to provide wide geographic coverage.”*

O2 was against the principle of exclusion of any non relevant costs in determining MTC.

**Vodafone** in its submission to Oftel, vociferously pitched for **higher markups/common costs in determining MTC.** They argued that **non-network costs such as marketing and**

**acquisition costs should also be considered while determining MTC, which effectively increases MTC substantially.**

*“Network externalities, being mark ups above cost to reflect the welfare gains which accrue to callers as a result of additional subscription to the network, are not strictly derived from LRIC cost modeling. However they are fundamental to the appropriate derivation of prices and have proven a complex and controversial topic in recent debates on mobile price setting. If network externalities are to be excluded from these guidelines then they will require proper consideration elsewhere. More generally, and as noted above, the ERG will need to consider carefully whether these guidelines are to consider the development of prices as well as the quantification of costs. In our view the guidelines cannot be meaningful without doing so.”*

Similar tactics can be used by large Indian incumbents, in order to increase the MTC. Regulator should be wary of the same.

## 7 About Diamond Consultants

As part of developing this response, Reliance commissioned Diamond Management & Technology Consultants to develop a bottom-up Forward Looking Long Run Incremental Cost (FL-LRIC) model to determine the costs of mobile termination in India.

Diamond (NASDAQ: DTPI) is a premier global management consulting firm that helps leading organizations develop and implement growth strategies, improve operations, and capitalize on technology. Diamond is headquartered in Chicago, with offices in Washington, D.C., New York, Hartford, London and Mumbai. Diamond's Telecom practice has served clients on strategic, operational and Regulatory issues across the globe spanning Asia, Africa, Europe, Latin America and North America.

Diamond's Telecom practice has served clients on strategic, operational and Regulatory issues across the globe spanning Asia, Africa, Europe, Latin America and North America.

### **Contact:**

Diamond Management & Technology Consultants, India  
P&G Plaza, Cardinal Gracias Road  
Chakala, Andheri (E)  
Mumbai – 400 099  
Phone: +91 22 2839 4600  
[www.diamondconsultants.com](http://www.diamondconsultants.com)

## 8 Glossary

<b>Acronym</b>	<b>Full-form</b>
ABC	Activity Based Costing
ARPU	Average Revenue Per User
AUSPI	Association of Unified Telecom Service Providers of India
BSNL	Bharat Sanchar Nigam Limited
BWA	Broadband Wireless Access
CAPEX	Capital Expenditure
COAI	Cellular Operators Association of India
CPP	Calling Party Pays
EBITDA	Earnings Before Interest Tax Depreciation and Amortization
FAC	Fully Allocated Costing
FLLRIC	Forward Looking Long Run Incremental Cost
FTC	Fixed Termination Charges
GDP	Gross Domestic Product
GMSC	Gateway Mobile Switching Center
IUC	Interconnect Usage Charges
LDCA	Long Distance Charging Area
LRIC	Long Run Incremental Cost
MNP	Mobile Number Portability
MOU	Minutes of Usage
MSC	Mobile Switching Centre
MTC	Mobile Termination Charges
MTNL	Mahanagar Telephone Nigam Limited
MVNO	Mobile Virtual Network Operator
NGN	Next Generation Networks
OPEX	Operational Expenditure
PCO	Public Call Office
POI	Point of Interconnection
QoS	Quality of Service
SDCA	Short Distance Charging Area

<b>SDCC</b>	Short Distance Charging Center
<b>SMS</b>	Short Messaging Service
<b>TRAI</b>	Telecom Regulatory Authority of India
<b>USO</b>	Universal Service Obligation
<b>VoIP</b>	Voice Over Internet Protocol
<b>WACC</b>	Weighted Average Cost of Capital