

Consultation Paper No. 4/2011



Telecom Regulatory Authority of India

Consultation Paper
on
Review of Interconnection Usage Charges
27th April 2011

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Preface

The Indian telecom sector is marked by the presence of multiple service providers in terms of access, National Long Distance and International Long Distance operations. In a multi-operator, multi- service scenario, Interconnection Usage Charges (IUC) regime is an essential requirement to allow subscribers of one service provider to communicate with the subscribers of other service providers. Provision of Interconnection involves cost for which service providers need to be fairly compensated. The IUC regime not only determines the revenue accruals for the service providers but also how this revenue is distributed among various service providers. The IUC regime is, therefore, an activity of significance. Several factors like increasing competition, massive growth of subscribers, changes in retail tariff and in the cost of providing services, and adoption of new technologies by the service providers necessitate periodical review of the IUC Regime.

The aim of this Consultation Paper is to obtain comments of the service providers on all related issues. Any expression of opinion in this paper should not be treated as view of the Authority, which will be finalised after receiving comments of the stakeholders. Stakeholders are requested to furnish their written comments by 18th May, 2011. Counter-comments, if any, may be sent by 25th May, 2011.


Dr. J.S. Sarma
Chairman, TRAI

Stakeholders are requested to furnish their written comments to the Advisor (I&FN), TRAI by 18th May, 2011. Counter-comments, if any, may be sent by 25th May, 2011. Comments and counter-comments would be posted on TRAI's website www.trai.gov.in. The comments and counter-comments may also be sent by e-mail to jafn@traigov.in or traigov@gmail.com. For any clarification / information, Shri Arvind Kumar, Advisor (I&FN) may be contacted at Tel. No. +91-11-23220209 Fax: +91-11-23230056.

Chapter I

Introduction to Interconnection and Interconnection Usage Charges

A- Telecom Growth and Economy

- 1.1 A competitive, vibrant and efficient telecommunications sector is an essential ingredient for economic development of a country. Besides the direct impact on national output and employment it has a wide range of indirect benefits. Telecommunication services contribute to the growth of the economy through greater flexibility and productivity gains to businesses by way of improved logistics and network externality effects. They improve the coverage of basic public services like health and education. They are an important means of deliverance of the rural population from the perennial woes of under-development and exclusion.
- 1.2 Over the last decade and particularly over the last five years, India has registered an impressive growth in the telecommunications sector. Having crossed 826 million telephone connections in February 2011, over 95% of this being through wireless, India today has the world's second largest network which is growing at a rate which is unmatched by any other country in the world. With the connections now growing at a faster pace in rural areas as compared to urban, it is expected that as India crosses the 1 billion mark, the rural tele-density will grow from the current value of 32.95% to 40%. The Interconnection Usage Charges (IUC) Regime has been an important driver for this growth and is also crucial in facilitating competition in the sector. At the inception of IUC regime in 2003, the number of connections as 53.9 million while in February 2011, it increased to 826 million. The wireless connections have grown at a Compound Annual Growth Rate (CAGR) of 73.6% per annum since 2000. The revenues have grown from about US\$ 10 billion to US\$ 30 billion at CAGR of 16%. The traffic has also grown manifold.

B- What is interconnection and why is it necessary?

1.3 Interconnection allows subscribers, services and networks of one service provider to be accessed by subscribers, services and networks of the other service providers. If networks are efficiently interconnected, subscribers of one network are able to seamlessly communicate with those of another network or access the services offered by other networks. Without interconnection the market would develop as discrete islands and economic benefits associated with market expansion and liberalization would be limited. It is essential for competition to develop to allow the subscribers of one network to communicate with those of another network. In a broader sense the term interconnection refers to the commercial and technical arrangement under which service providers connect their equipment, networks and services to enable their customers to have access to the customers, services and networks of other service providers. Interconnection is the lifeline of telecommunications. It is one of the foundations of viable competition which in turn is the main driver for growth and innovation in telecommunications markets. This holds true for all service markets from traditional telephony to IP and multimedia services. Good interconnection arrangements would promote efficient infrastructure development, providing incentives for operators to build networks and use parts of other networks. Conversely, inappropriate interconnection requirements act as barriers to competitive entry, undermining investment in new infrastructure and depriving the public of innovative and attractive service options.

1.4 Telecommunications networks are intrinsically different from other infrastructure like roads and power because of the network externalities involved. The value of the network to the users increases as more customers join the network. Interconnection with other networks increases this value further by increasing the number of people the subscribers of this network can call and the range of services they can access. With increasing competition comes plurality of operators and services and the importance of interconnection further increases. If a subscriber of network A requires to call subscriber of Network B then A has to have interconnection with B as B has

monopoly over termination of calls on his subscribers' equipment. If Network B is in another circle then an National Long Distance (NLD) operator might be involved in carrying the call and both A and B should be connected to NLD for this call to mature. If a service provider is offering innovative service like Intelligent Network (IN) based Services, content and application services then subscribers of another service provider can make use of these if this service provider allows interconnection to the service provider who not have these services. This is beneficial to both the service providers and usually would happen through mutual negotiations. In certain situations, it may not happen and it is here that regulations can play an enabling role. With technological developments, the range of services that depend on interconnection has increased. Efficient interconnection has become an essential input to all types of voice calls, data services, Internet, messaging, broadband and a wide range of applications, content services, e-commerce and m-commerce. Inadequate interconnection arrangements not only impose unnecessary costs and technical problems on operators - they also result in delays, inconvenience and additional costs for businesses, consumers and, ultimately, for national economies.

C- What are interconnection usage charges?

- 1.5 IUC are wholesale charges payable by one telecom operator to the other for use of the latter's network for originating, terminating or transiting/carrying a call. These charges are usually based on cost and indicate a fair compensation for use of one service provider's network resources by another service provider. The IUC concept as evolved by Telecom Regulatory Authority of India (TRAI) has so far proved to be a suitable approach to interconnect pricing in a competitive, multi-operator environment. It has given service providers sufficient flexibility in fixing tariffs for its customers.
- 1.6 Interconnection charges often account for a very significant part of the costs of new telecommunications operators. This is particularly the case with new

entrants that do not own end-to-end networks. The level and structure of interconnection charges are, therefore, major determinants of the viability of operators in a competitive telecommunications market. Over the years, a variety of approaches have been used to calculate interconnection charges and generally to determine the financial terms of interconnection. The IUC regime consists of Origination, Transit, Carriage and Termination charges. These charges are explained in detail in the next chapter.

D- Significance of IUC

- 1.7 Competition is the key to growth and innovation in today's telecommunications market. Interconnection in turn is a key ingredient for the viability of competition. With the liberalization of telecommunications markets across the world, the issue of interconnection has become perhaps the most important practical issue facing policy-makers and regulators as well as incumbent operators and new entrants. Effective interconnection arrangements have become the key to the operations of an increasingly wide range of services.
- 1.8 New entrants in telecommunications markets have little to offer in negotiations to remove these barriers to competition. There is a consensus among telecommunications experts and policy makers that decisive and informed guidance by regulators is required to pave the way for effective interconnection arrangements.
- 1.9 Globally interconnection charges are generally designed following either the paradigm of (1) revenue sharing or (2) interconnection usage charges. Revenue sharing means that the telecommunications operators involved in exchange of traffic have agreed to share the revenues, on a percentage basis or some other agreed basis. They thus share the risk of billing disputes and bad debts. On the other hand, interconnection usage charges imply setting charges to compensate explicitly one operator for the costs imposed on him by the other operator's use of his network to originate or terminate a call.

The operator paying the interconnection usage charge "owns" the call and takes the risk of disputed and unpaid charges.

- 1.10 Governments and regulators need to be pragmatic about interconnection regulation for a number of reasons. The regulator must have enough resources to assess competing claims about cost, as there may be costly dispute resolution processes. As regimes increase in complexity, operators and potential entrants are more likely to focus on arbitrage opportunities than ways to offer consumers genuinely new services. There is no guarantee that detailed cost estimation approaches will be accurate. It is therefore necessary that regulators decide the costing methodology and approach used based on the development of telecommunications in the country.

E- Regulatory interventions by TRAI

- 1.11 The Authority under section 11 (1) (b) (ii) , (iii) and (iv) notified the first Interconnection Usage Charges (IUC) Regulation on 24th January 2003 which contained inter alia charges for origination, transit and termination of calls in a multi-operator environment. Though this regulation was amended vide regulation dated 29.10.2003, 23.02.2006 and 09.03.2009 for IUC, the framework remained the same.
- 1.12 IUC Regulation dated 24th January 2003: The framework of Interconnection Usage Charges was established by the Telecom Regulatory Authority of India through "The Telecommunication Interconnection Usage Charges (IUC) Regulation, 2003" (1 of 2003) dated 24th January 2003 implemented from 1st May 2003. This IUC Regulation introduced the regime of calling party pays (CPP). The originating, carriage and termination charges were based on the type of network in which call originated or terminated and distance travelled in a service provider's network. In case of the cellular network, the charges were also based on whether the destination network was in a metro or a non-metro city. The termination charge then varied from Re 0.15 (15 paisa) to Re 0.50 (50 paisa) and carriage charges were from Re 0.20 (20 paisa) to Rs 1.10 depending on the distance.

- 1.13 IUC Regulation dated 29th October 2003: For improving and streamlining the IUC regime the Authority notified the "The Telecommunication Interconnection Usage Charges Regulation, 2003" (4 of 2003) dated the 29th October 2003. This was well accepted by the industry and has been instrumental in growth of the industry and reduction in tariffs. This is today the principal IUC Regulation.
- 1.14 IUC Regulation dated 23rd February 2006: In the amendment dated 23rd February 2006, implemented from 1st March 2006, a ceiling was put on carriage charges while other IUC components remained unchanged. The change in the carriage charges provided a strong basis to the operators to reduce the long distance tariffs as well as to pave the way towards more and more usage of the long distance networks.
- 1.15 IUC Regulation dated 9th March 2009: The revised IUC regime was notified on 9th March 2009 and became effective on 1st April 2009. Wide ranging consultations were done on the issues of components of IUC to be reviewed, methodology of cost, asymmetry of charges and termination charges for 3G. The termination charge for local and national long distance voice calls to fixed wire-line, wireless in local loop (fixed), wireless in local loop (mobile), cellular mobile telephone service (both 2G and 3G) were uniformly fixed at the rate of Re. 0.20 (20 paisa) per minute and the termination charge for incoming international long distance voice calls to such fixed wire-line, wireless in local loop and cellular mobile telephone services (both 2G and 3G) were fixed at the rate of Re. 0.40 (40 paisa) per minute. The carriage charge was retained as a ceiling of Re. 0.65 (65 paisa). On the basis of the cost data submitted by service providers the Authority also prescribed Re. 0.15 (15 paisa) per minute transit- carriage charge from level-II Trunk Automatic Exchange (TAX) to Short Distance Charging Area (SDCA). It also prescribe that intra-SDCA and TAX transit charges should be lower than Re. 0.15 (15 paisa) per minute. IUC for SMS continued to be under forbearance; however, it was mandated that these charges should be transparent, reciprocal and non-discriminatory.

F- Need for review of IUC

- 1.16 TRAI had understood the need for establishing an Interconnection Usage Charges regime quite early in the path to liberalization. Establishment of IUC as well as its timely review are activities of far reaching consequence for the telecommunication sector. It is an important tool for implementing policy and to give desired direction and impetus to growth of services. It would not be incorrect to say that the IUC regime determines not only the revenue accruals but also how this revenue is distributed among service providers, various networks and services. Though IUC prescribes the wholesale inter-operator tariff and not directly the retail tariff for customers yet it has bearing on the retail tariff as well. Timely review of IUC regime is important to align charges with current cost of telecom network and Minutes of Usage. Alignment of interconnection usage charges with current cost allows service providers to offer innovative tariff plans to consumers. A number of important developments like starting of service by new service providers, introduction of per second pulse rate in various plan by many service providers have taken place during period since last regime was introduced. To support operational efficiency in all the segments for coping up with changing nature of contents, changing nature of technologies, recent competition in tariff for voice calls and Court orders on the subject, it has become necessary to have a re-look at the present IUC regime.
- 1.17 To further understand from service providers the requirement for a review of the IUC, TRAI started a pre-consultation process through issue of a letter dated 24.12.2010. During the pre consultation, some of the service providers submitted that convergence of telecom and the Internet requires additional steps to be taken to move from low termination rate to zero termination rate. They submitted that convergence means that telecom and Internet services are becoming direct substitutes for each other. With Wi-Max, High Speed Packet Access (HSPA), Fixed Mobile Convergence (FMC) and Next Generation Network (NGN) available on access devices, it would be possible for subscribers to connect to each other the Internet cloud. In this situation it

would be unsustainable to have different interconnection arrangements for competing services. It is increasingly being realized that in converged networks, interconnection is an important tool for the facilitation of competition in services, content delivery and facilities. In these networks use of Internet Protocol based packet switched services are bound to affect the kind of interconnection products that would be required. These products would include new network products in both the access and the core network. Challenging issues were also raised in pre-consultation regarding the kind of service products relevant for the provision of voice telephony (including mobile, fixed and VoIP), Internet access, broadcasting services etc. and interconnection products that will become relevant in Next Generation Networks (NGN).

- 1.18 During the pre consultation some service providers have submitted that regulation of 3G mobile termination charges will reduce their incentives to invest in 3G mobile technologies. Other parties submitted that 3G mobile voice services would be no different from 2G service and therefore 3G termination charges should be same as 2G termination charges for voice calls. They argue that since narrow band voice service is either offered through 3G network or 2G Network , it would have the same value for the consumer; therefore termination charge should be same for both and should not be dependent on the network per se. As a few of the service providers have also started service on 3G network, it is necessary to understand the view of service providers on whether there is need to prescribe separate interconnection charges for any other service provided by 3G network.
- 1.19 Some of new service providers have also questioned the higher termination and carriage charge for SMS by existing service providers. They opined that by higher termination or carriage charges, incumbent service providers are making competitors services more costly. According to many stakeholders SMS tariff does not appear to be as competitive as that for voice call. There may be a huge difference in cost of providing these two services however tariff for both these services are almost in the same range. These

stakeholders also raised the question of cross subsidy between these two services. It has also been pointed out by some of the service providers that due to different SMS bundled tariff plans offered by the operators, and also because of SMS being increasingly used as a means of advertisements, the SMS traffic imbalance across operators is increasing. There is a possibility that such imbalance could impact the networks receiving the large proportion of SMS traffic and may justify regulatory intervention.

G- Steps taken so far for Review

1.20 As indicated above, TRAI issued a pre-consultation paper on 24.12.2010, and requested the service providers to furnish the following information by 10.01.2011. Questions posed in pre-consultation were as follows:

- (i) What should be the framework of Interconnection Usage Charges that meets the requirement of today as well as takes care of future developments like deployment of Wi-Max, High Speed Packet Access (HSPA), Fixed Mobile Convergence (FMC) and Next Generation Network (NGN)?
- (ii) What components of IUC for voice, SMS and any other value added services should be reviewed? What should be the level of charge for each component that requires review? Please give detailed justification/ reasons to support your viewpoint.
- (iii) Which of the following approach/ methodology should be used for estimating Interconnection Usage Charges:
 - (a) Existing Fully Allocated Cost methodology used by TRAI or any variation in it;
 - (b) FLRIC or any other variant;
 - (c) Bill and Keep;
 - (d) Left to forbearance all components of Interconnection Usage Charges;
 - (e) Any other methodology.

- (iv) Explain the approach/ costing methodology adopted, provide the model, if any, developed for estimating the level of each component with all calculation sheets. Give justification for adopting the proposed approach/ methodology. Also provide details of revenue, minutes of usage (MOU) (off-net/ on-net), CAPEX and OPEX corresponding to each network element, cables etc. separately for your network.
- (v) Provide cost and revenue corresponding to each service like voice service, SMS, GPRS, EDGE, roaming services and any other value added services. Also provide cost and revenue for interconnecting services like terminating call, originating call, terminating SMS and originating SMS. All cost and revenue data may be cross referenced with the accounting separation report submitted to TRAI.
- (vi) Justification as to why the model proposed by you should be used for determination of Interconnection Usage Charges for voice calls, SMSs and any other value added services.

1.21 Some of the service providers requested for extension of time on the ground that the requisite information is complex and elaborate and collection/ compilation of data would require more time. The Authority extended the last date of submission up to 20.01.2011. Responses have been received from 10 service providers and 2 service providers associations. The inputs provided by these service providers and associations have been taken into consideration while drafting this consultation paper. Full text of responses are available on the TRAI's website www.trai.gov.in.

Chapter II

Description of IUC Components

2.1 IUC are wholesale charges payable by one telecom operator to the other for use of the latter's network for originating, terminating or transiting/carrying a call. These charges are usually based on cost and indicate a fair compensation for use of one service providers' network resources by another service provider. The IUC regime consists of origination charge, termination charge, carriage charge and transit charge. During the pre-consultation the service providers were unanimous about review of all components of Interconnection Usage Charges. A brief description of each of these components proposed to be reviewed is as follows:

A- Termination Charges

2.2 These are the charges payable by the originating service provider, whose subscriber originates the call, to the terminating service provider, in whose network the call terminates. The way these charges are recovered depends on the method of payment of call by mobile subscribers. If the mobile subscriber has to pay for both outgoing and incoming calls (Mobile Party Pays or MPP regime) then the terminating operator recovers the cost of interconnection from his own subscriber and therefore termination charge may not exist. If the calling party, whether fixed or mobile, pays for calls (Calling Party Pays or CPP regime) then the calling party's service provider usually pays a termination charge to the terminating service provider to cover the interconnection/network usage cost.

2.3 There is no uniform treatment of mobile termination charges among countries. Some countries only regulate mobile termination charges for fixed-to-mobile calls. In other countries, mobile networks are required to apply a single regulated termination charge regardless of where the call originates.

- 2.4 The termination charges could be symmetric irrespective of demography or the network they originate in. A regulator may, however, choose to have asymmetric termination charges if the situation so warrants. This asymmetry could be based on rural-urban, fixed-mobile or any other criteria that may be relevant.
- 2.5 In India, the concept of termination charges came into existence with the implementation of IUC regulation dated 24th January 2003, i.e. from 1.5.2003. This IUC regulation introduced Calling Party Pays (CPP) regime in India. The 24th January 2003 regulation prescribed the termination charges which differed on the basis of network in which the call originated or terminated and for cellular network, the charges also differed on the basis of destination i.e. metro and non-metro network, such termination charges varies from Re 0.14 (14 paisa) to Re 0.50 (50 paisa) per minute. On 29th October 2003, a revised regulation was issued; superseding the earlier regulation dated 24th January 2003. This regulation prescribed a uniform termination charge of Re 0.30 (30 paisa) per minute for all types of calls. At present the IUC regulation dated 29th October 2003 is the principal regulation. The termination charges were also reviewed in 2005 vide consultation paper of 17th March 2005; however after detailed consultation process, the Authority decided to keep termination charges at same level and the reasons for such decision were given in the explanatory memorandum accompanying the regulation.
- 2.6 In the consultation paper dated 31st December 2008, the issue of termination charges was again reviewed and the amendment to IUC regulation was notified on 9th March 2009. This amendment became effective on 1st April 2009 and is the prevailing regulation. The termination charge for all types of domestic voice calls is Re 0.20 (20 paisa) per minute and for international calls Re 0.40 (40 paisa) per minute. Termination charges for 3G voice calls were also kept same as those for 2G voice calls.

B- Transit charge

2.7 When the two telecommunication networks are not directly connected, an intermediate network is used through which the calls are transmitted to the terminating network. Such intermediate network is known as the transit network and the charges to be paid to the transit network to cover the interconnection/network usage cost are transit charges. Generally, direct connectivity among various service providers is preferred and in such a case no transit charges will be applicable. However, for exceptional situations where direct connectivity may not be possible or due to emergency breakdown etc., and for overflow traffic, traffic can be routed through an alternate route through another transit switch. In such a case the service providers may mutually negotiate the transit charges but this should be lower than Rs. 0.15 (15 paisa) per minute.

2.8 The principal regulation dated 29th October 2003 prescribed forbearance for transit charges for intra SDCA calls subject to the condition that these should be lower than Re 0.20 (20 paisa) per minute. A special case of transit / carriage is intra-circle mobile to fixed line traffic, handed over by mobile service provider at Level-II Tax of Bharat Sanchar Nigam Limited (BSNL) and carried to SDCA by BSNL. This was prescribed in 29th October 2003 regulation at the rate of Re. 0.20 (20 paisa) per minute. The transit charges were reviewed in the consultation paper dated 31st December 2008 and the revised charges were prescribed through the amendment to IUC regulation dated 9th March 2009. The effective transit charges as on date are as follows:

(1) Trunk Automatic Exchange (TAX) transit charges: Trunk Automatic Exchange transit charge is less than Re.0.15 (15 paisa) per minute. Subject to the said limit, these charges may be decided by the concerned service providers through mutual commercial arrangement.

(2) Transit Carriage Charge from Level II Trunk Automatic Exchange (TAX) to SDCA: Transit carriage charge for carriage of intra-circle traffic handed over from Cellular Mobile networks to Fixed Network, from Level II

Trunk Automatic Exchange (TAX) of LDCA in which the call is to be terminated, to SDCA, is Re. 0.15 (15 paisa) per minute, irrespective of distance.

C- Carriage Charges

- 2.9 In India the access providers are licensed on the basis of circles or service areas. Access provider can carry long distance intra-circle calls only. However, inter circle traffic should be routed through a National Long Distance Operator (NLDO). The charges to be paid to the carriage network to cover the interconnection/network usage cost are carriage charges.
- 2.10 The carriage charges for long distance calls within India, as specified in the principal regulation dated 29th October 2003, have Re. 0.20, Re. 0.65, Re. 0.90, Rs. 1.10 per minute for the slabs of 0 to 50 Kms, 50+ to 200 Kms, 200+ to 500 Kms and above 500 Kms respectively. On the above specified carriage charges, the service providers were allowed to negotiate a spot value within +/- 10% of the long distance calls carriage charge beyond 50 Kms. The Authority reviewed the carriage charges in its 23rd February 2006 Regulation. The change in the carriage charges provided a strong basis to the operators to reduce the long distance tariffs as well as to pave the way towards more and more usage of the long distance networks. The Regime notified under the 23rd February 2006 Regulation was followed by announcement of the One India scheme by BSNL. Subsequently for Subscriber Trunk Dial (STD) calls between Delhi and Mumbai, local call rate for fixed line subscribers were offered by Mahanagar Telephone Nigam Limited (MTNL). Some of the private service providers also offered similar tariff plans. The carriage charges were again reviewed in the consultation process started in December 2008. After careful consideration of the circumstances in entirety, the Authority has decided in the IUC regulation dated 9th March 2009 to retain the ceiling of Re. 0.65 per minute on carriage charge.

D- Origination Charges

2.11 The Authority has decided that the originating network must pay from the tariffs the carriage and termination charge for the calls and retain the residual towards the expenses of originating the call. The origination charge was therefore not specified. As the other components of the calls, carriage and termination were fixed, keeping the origination under forbearance has provided flexibility in tariff and also ensured that access networks do not pass on the burden of their own tariff decisions to other networks involved in completing the call.

E- Interconnection Usage Charges (IUC) for SMS

2.12 The complexion of exchange of Short Message Service (SMS) among the networks of different service providers has changed from purely social Person to Person (P2P) to largely Application to Person (A2P). If SMS related inter-operator traffic was balanced then IUC for SMS would have been a non-issue. Non-uniform subscriber bases of mobile service providers are not the only reason for SMS traffic imbalance among them. Many service providers offer bundled plans where the SMS charges effectively become close to zero leading to higher flow of traffic from customers subscribing to these plans. Popularity of applications and content services like ringtones, wallpapers, voting, songs etc which involve exchange of information through SMS may also lead to imbalance of SMS traffic. Some service providers offer attractive bulk SMS rates to advertisers that may cause heavy traffic to other operators' networks. Whatever the cause, there is a possibility that such imbalance could impact the networks receiving the large proportion of SMS traffic and may justify regulatory intervention. In addition inter-service area and international SMS flow requires carriage on the Common Channel Signalling System 7 (CCS7) signalling channels. Though the signalling requirement of voice calls has priority over SMS data transfer, the fact remains that the CCS7 signalling resources of NLDOs/ILDOs are used and they may expect some revenue from SMS data transfer over its network.

- 2.13 The framework of Interconnection Usage Charges was established by TRAI through "The Telecommunication Interconnection Usage Charges (IUC) Regulation, 2003 (1 of 2003) dated the 24th January 2003. At that time the volume of SMS in India and consequent revenue generation on this account, was not high enough to warrant detailed calculations of the costs involved. It was, therefore, considered appropriate to leave the SMS termination charges to forbearance. On the other hand, voice traffic was on the upswing and high potential of voice revenues presented an urgent need for a regime that would allow full play to growth of these services. The focus was appropriately on voice related charges.
- 2.14 The regulation of January 2003 was superseded by The Telecommunication Interconnection Usage Charges Regulation, 2003 (4 of 2003) dated 29.10.2003 which became effective from 1st February 2004. Though this regulation carried on the focus on voice related interconnection charges, TRAI did foresee that the importance of SMS as a service would grow and while keeping the IUC for SMS under forbearance, mentioned that IUC for SMS may be re-visited in the near future.
- 2.15 In the consultations carried out in 2006, TRAI inter-alia asked the opinion of the stakeholders on requirement of regulating termination charge for SMS, method of regulating termination charge on SMS, its effect on retail tariff and also comments on premium rate services. After deliberations TRAI decided that the forbearance on IUC should continue for the present. The relevant Para of the decision is as follows:
- Para 3 (i): *"The forbearance on IUC for SMS should continue for the present."*
- 2.16 During the review of the IUC regulation in 2008-09 some of the service providers showed concern on the growing trend of charging IUC for SMS from new entrants and for usage of CCS7 links for carrying SMSs. They also said that these charges were not cost based. TRAI noted that, by and large, the

arrangement prevalent at the time was Bill and Keep. TRAI, therefore, decided to continue with the policy of forbearance in the matter of IUC for SMS with a proviso that SMS termination charges, if any, should be transparent, reciprocal and non-discriminatory. Reporting requirement with respect to the rate of IUC for SMS and total amount of such charges received from other operators was introduced. The relevant Schedule IV of the regulation is reproduced below:

“Schedule IV

INTERCONNECT USAGE CHARGE (IUC) FOR SHORT MESSAGE SERVICE (SMS)

Interconnect Usage Charge (IUC) for Short Message Service (SMS) - Interconnect Usage Charge (IUC) for Short Message Service (SMS) shall be under forbearance:

“Provided that such charges shall be transparent, reciprocal and non-discriminatory.”

- 2.17 Approaches for determination of IUC charges are discussed in the next chapter.

Chapter III

Approaches for determination of IUC

A- General Principles of IUC determination

- 3.1 The purpose of an IUC regime is to ensure that all service providers are able to gain access, on reasonable terms and conditions, to the interconnection facilities and services necessary to provide efficient service to their own customers. This allows dependent activities to flourish, thus creating a more robust market environment, one that is able to offer consumers more choice and value-for-money. Excessive prices can provide dominant firms with revenues which they can use for predatory pricing or cross-subsidising related services in an effort to drive competitors out of the market. The incumbents want to protect their market share while new competitors need to establish profitable market presence. The outcome of the interconnection pricing decisions goes a long way toward determining how successful different operators will be in achieving those goals. The objective would be to establish an interconnection regime that is as economically neutral as possible. This way the success or failure of the competing service providers would depend on their own business decisions and fairness of the interconnection policy would not be questioned.

B- Approaches for Inter-operator settlement

- 3.2 During the pre-consultation process, service providers were unanimous in their opinion that Interconnection Usage Charges for inter-operator settlement should be regulated and that regulator should determine the interconnection usages charges regime.
- 3.3 An important question that arises relates to the time period for which the interconnection usage charges regime established by the regulator should remain valid. While this question was not asked during the pre consultation

process and no opinion was received in this regard from service providers, it stands to reason that time period of validity should be long enough to provide a measure of stability to the operational and network expansion plans of the service providers and at the same time not so long as to fall out of step with the rapid changes in technology and market structure in the telecommunications sector. So far, reviews of the IUC regime in India have taken place at intervals of approximately 3 years.

3.4 From a survey of literature and regulatory experience from around the world, it is noted that broadly, there could be the following approaches for regulating Interconnection Usage Charges:

(1) Cost oriented or cost based;

(2) Bill and Keep;

(3) Retail based;

(4) Revenue share;

(1) Cost oriented or cost based

3.5 In this approach, interconnection usage charges are cost oriented or cost based. Cost based interconnection charges have a strong economic rationale; however there is no single, simple way to measure interconnection cost. It is one thing to say that charges for interconnection services be “cost-based” but the real implications are quite complex. There are fixed and variable costs; there are dedicated, shared and common costs. In order to apply cost theories to the practical task of designing interconnection rules and policies, the key is to find a way of measuring the costs of actual network connections.

(2) Bill and Keep or Sender Keeps All

3.6 In this method, the service providers do not pay any termination charges to each other. This approach implies levying no charges on interconnecting carriers at all. Each carrier “bills” its own customers for outgoing traffic that it

“sends” to the other network, and “keeps” all the revenue that results. One view is that this method could avoid controversies caused by data ambiguity, reduce the risk of subjectivity and be a future-proof IUC.

(3) Retail Minus based

- 3.7 Interconnection charges can also be based directly on a carrier retail collection rates. In this method interconnection rates are determined by subtracting avoidable-cost from the retail rate.

(4) Revenue share

- 3.8 Revenue sharing is also sometimes used in place of paying explicit interconnection charges, for example, where long distance operators interconnect with local access network. The carrier’s interconnection agreement may call for the long distance carrier to pay the local carrier a specified percentage of the revenue generated by each long distance call.
- 3.9 During the pre consultation of the present exercise, two schools of thought emerged on the question of approach to be used for establishing the interconnection usage charges regime. Some of the service providers were of the view that a cost based regime should be used for determination of interconnection usage charges. Supporters of cost based regime submitted that service providers need to be fairly compensated for their investment and operational expenses. Other service providers are in favour of “Bill-and-keep” (BAK). They have submitted that in the BAK model, carriers avoid the administrative burden of billing one another for exchanged traffic. They are of the view that in this method a service provider cannot transfer the cost of his network to interconnecting service providers. The method also has low regulatory cost. Supporters of Bill- and- Keep claim that zero MTC under the bill-and-keep regime is pro-consumer and pro-competition. They have submitted that the current regime distorts competition in favour of large operators by enabling them to sustain on-net/off-net prices differentials that harm the small operator and lead to traffic imbalances. They have further submitted that the concern in the minds of consumers is likely to increase

with implementation of MNP as the consumer would not be aware whether a call to a ported subscriber is on-net or off-net. Consumers are extremely concerned about the tariff plans for on-net and off-net calls and are often questioning the operators on the significant differences. Lower on-net tariffs imply a huge margin between termination cost and present mobile termination charge. In on-net calls there is double usage of network for origination as well as termination but retail tariffs for on-net calls are 1/5 of the retail tariffs of off-net calls. This makes a very strong case for significant reduction of termination charge. These service providers have further stated that the BAK regime is the most attractive framework for Interconnection Usage Charges for future deployment of technologies like Wi-Max, High Speed Packet Access (HSPA), Fixed-Mobile Convergence (FMC) and Next Generation Network (NGN) and BAK is considered to be future ready.

- 3.10 Details of international practices may be seen in the Annexure to this consultation paper. Internationally, cost based/ cost oriented approach is prevalent for voice services and Bill and Keep for Short Message Services (SMS). However, in some countries like U.S.A, Hong Kong and Singapore, the Bill and Keep regime is also prevalent for voice services. Mobile termination charge in Egypt has been determined on the basis of the retail minus method.

Question 3.1 Do you agree that the IUC regime determined through this consultative process should be applicable for 3 years? If not please indicate your preferred time period with justification.

Question 3.2 Keeping in view the time period indicated by you in question 3.1, which of the following approaches would be most appropriate for the Indian telecom sector?

- (a) Cost oriented or cost based;**
- (b) Bill and Keep;**

Please provide justification in support of your answer. In case you feel that the approach should vary according to service, please explain why?

Question 3.3 In case your answer to question 3.2 above favours the cost oriented approach, would it be appropriate to permit Bill and Keep between service providers who have symmetric traffic?

C- Costing Methodologies

3.11 During the pre consultation paper, service providers were divided on adopting the methodology. Some of the service providers and one of the associations favoured the FAC method used by TRAI in earlier regulations. However, another association held the view that Interconnect pricing should be based on a robust cost based model, which includes all costs and justifies investment for expansion of service. The cost model/ approach adopted should be in line with international best practices. The two most commonly followed international practices or methodologies for determination of cost based IUC charge are Fully Allocated Costs (FAC) and Long Run Incremental Cost (LRIC). Fully Allocated Costs (FAC) involves the allocation of all historical costs incurred to date between individual services based on a set of criteria such as relative capacity utilisation, minutes of use or proportionate revenues generated. On the other hand, the Long Run Incremental Costs (LRIC) approach involves determining the incremental costs of providing an additional unit of a service over current levels and over a defined future period of time. Thus, it considers costs that are both forward-looking and incremental, which would generate credible charges that reflect real economic costs for providing interconnection. The Association further submitted that in view of the fact that FL-LRIC builds in efficiency and leads to lowest cost based termination charge, many countries are gradually moving towards the Forward Looking Long Run Incremental Cost (FL-LRIC) model. According to them the approach of developing a Hybrid FL-LRIC model for a hypothetical

efficient operator is an international best practice. However, irrespective of the approach adopted, it is very critical that the cost model should take into account all the internationally accepted cost elements which are taken into consideration while preparing a cost based model for determination of termination charge.

(1) Fully Allocated Cost

- 3.12 In this method, shared and common costs are assigned to individual services or service elements. This method has the advantage of simplicity and also ensures that cost corresponding to each network element on the basis of work done has been taken into account. This method is generally used with top-down costing methodology. However, this may also be used with bottom-up methodology. It uses accounting data submitted by service providers in their balance sheet, profit & loss account and accounting separation report. There is no single correct way of assigning costs. One way is to allocate according to the relative capacity utilized and another by minutes of use. In some cases the proportionate revenues generated by different services are used as an allocation factor.
- 3.13 Allocation of cost for different network elements and activity become one of the major decisions. Cost should be allocated or attributed to different services, network elements and product/ network services on some important criteria like reasonableness, practicability, prevailing tariff in the market, state of market, causation principle, consistency, objectivity etc. The goal of economic efficiency is generally achieved by establishing charges that are as close to cost as possible, and that are specifically based upon cost causation. That is, when certain costs stem from the activities of a given carrier or customer, they should be recovered through charges levied on that carrier or customer. Moreover, the relationship between cost and charges should be direct. Traffic sensitive costs should be recovered through traffic sensitive charges and non-traffic sensitive costs should be recovered through fixed or

flat charges. Under a pure efficiency policy these references should be reflected in the interconnection usage charges.

(2) Forward Looking Long Run Incremental Cost (FL-LRIC)

- 3.14 The Forward Looking Long Run Incremental Cost (FL-LRIC) is a method in which the cost of services is computed using an optimized model of the network and service production technologies. The incremental cost that arises in the long run with a specific increment in volume of production, LRIC, is generally calculated by estimating costs using current technology and best available performance standards. When a cost study is based on the “costs of an efficient firm”, it usually refers to LRIC-type methodology. This method requires a team of experts who are well versed with the network planning and costing. The forward looking element implies performing the network design considering both present and future forecast of customer demand. The long run concept implies that the time frame is sufficiently large so that all cost can be presumed to be variable, even the capital investment cost related to network capacity. Another important element of LRIC method is that the increment has to be defined in such a way that the output can be used to demonstrate that charges are cost oriented.
- 3.15 Some experts feel that to decide the cost level of pricing of interconnection the best approach would be one based on forward looking cost of supplying the relevant facility and services such as long run incremental cost (LRIC) or one of its variants. In the last exercise, the service providers supporting this contention argued that the many international regulators are moving towards LRIC model as this approach gives ability to incorporate operational efficiency and prospective market development. One of its variants i.e. hybrid FL-LRIC has also been proposed by some of the stakeholders in the last exercise. The hybrid aspect involves calculation based on both top-down and bottom-up approach and then reconciling the results. This is to take care of the possibility of incorrect network design and various assumptions in modelling a

bottom-up approach for the network. Forward-looking cost analysis attempts to identify costs that will be incurred during some real or theoretical future period. Incremental cost, meanwhile, is the extra cost added to an existing base of costs required to provide a defined additional increment of a given service.

3.16 The following table shows details of accounting models used in France, Italy, Spain, U.K. and Germany including operator activities, pricing and cost orientation.

Table 3.1: Accounting models used by Regulators

| Country | Markets/ activities | Pricing rules set by NRA | Where cost orientation, methodology mandated by NRA | | |
|---------|--|------------------------------------|--|----------------------|---|
| | | | Cost base | Cost standard | If LRIC, bottom- up (BU) top- down (TD) or reconciliation of the two models |
| France | Interconnection | Cost orientation | Current | LRAIC | Reconciliation |
| | LLU | Cost orientation | Economic current costs | LRAIC | Reconciliation |
| | Wholesale Broadband Access (at regional level) | Reasonably efficient entrance test | -- | -- | -- |
| | Wholesale Line Rental | Retail minus (12.5%) | -- | -- | -- |
| Italy | Interconnection | Cost orientation | Historic (access network) Current (transport network) | Fully Allocated Cost | -- |
| | LLU | | | | |
| | Bitstream access (cost orientation of bitstream access services at DLAM and parent switch levels only) | | | | |
| | Wholesale leased lines | | | | |
| | Fixed call termination by Alt. Network Ope. | Cost orientation | Research under way | LRAIC | Bottom-up |
| | Wholesale Line Rental | Retail minus | -- | -- | -- |

| | | | | | |
|---|--|--|---|-------------------------|----------------------|
| Spain | Retail access | Cost orientation | Historic and current costs (Telefonica has to provide both) | Multi-standard approach | Not yet application. |
| | Call origination provided at a fixed location WLR | | | | |
| | Call termination provided at a fixed location | | | | |
| | Local Loop Unbundling | | | | |
| | Wholesale broadband access | | | | |
| | Wholesale terminating segments of 'traditional' leased lines excluding leased lines with Ethernet interfaces | | | | |
| | Retail calls markets | | | | |
| | Retail market for a minimum set of leased lines | | | | |
| | Transit services | | | | |
| | Wholesale trunk segments of leased lines | | | | |
| Wholesale terminating segments of leased lines with Ethernet interfaces | Retail minus: Prices must allow competitors to replicate Telefonica's retail offers | -- | -- | -- | |
| UK | Fixed interconnection, terminating and trunk leased lines | Cost orientation | Current | FAC and LRIC | Top-down |
| | LLU and WLR | Price cap <ul style="list-style-type: none"> • Ceiling for rental charge for fully unbundled loop based on FAC • Ceiling for other charges based on LRIC plus mark-up for common costs | Current | FAC and LRIC | Top-down |

| | | | | | |
|----------------|--|---|---|-------|----------------|
| | WBA | Price squeeze test | -- | -- | -- |
| Germany | Interconnection | Cost orientation (based on the costs of an efficient operator). | Forward-looking costing based on current costs. | LRAIC | Reconciliation |
| | LLU | | | | |
| | IP-bitstream (sub-regional wholesale conveyance) | | | | |

Source: Regulatory Accounting Guide, ITU, March 2009.

D- Costing methodology and Data used by TRAI in the previous IUC Regulations

3.17 The methodology used by TRAI in January 2003 IUC Regulation and the currently prevailing October 2003 Regulation and its subsequent amendments have been described in detail in these regulations. The important points are given below.

3.18 During the formulation of the first regulation in January 2003, estimation was attempted using bottom-up method based on the proxy model. Subsequently BSNL costs became available but when compared with the expenditure incurred by BSNL these were found to be high and could not be reconciled even after discussions. The Balance Sheet and Annual Report provided an alternate source of data and top-down approach was decided to be used. Capital Expenditure (CAPEX), Operational Expenditure (OPEX) and depreciation as derived from the audited BSNL figures were used for determining various charges. Overall CAPEX and OPEX were allocated to different parts of the network in the proportion as done by BSNL for cost data in Reference Interconnect Offer Schedules. Data on minutes of use attributable to various network elements were taken from the submissions of BSNL. Recovery of CAPEX was proposed through rental and OPEX through call charges. *The rental component* of Basic Services was derived on the basis of CAPEX for the network segment up to the short Distance Charging Centre (SDCC) Tandem plus an average revenue share of licence fee and spectrum charge. Local call charges were calculated on the basis of OPEX of the same

segment distributed on the basis of average Minutes of Usage (MOU). IUC for Transit was based on the sum of CAPEX and OPEX of the segment used for carriage of a call. The termination charge was forward looking as they were based on the estimated growth rate for one year. For mobile termination charges, the costs were based on OPEX data of 25 circles/metros cellular operators as taken from Audited Annual account. Components not eligible like bad debts, closure of paging division, loss/profit on sale of fixed assets were taken out. License fee and spectrum charge based on revenues were added separately. OPEX per line was derived on the basis of estimated MOU per subscriber per month. Only 50% of the Marketing and Advertisement costs were taken towards call minutes while the rest were allocated against other sources of revenues like VAS, rentals and share from long distance calls.

- 3.19 IUC regulation dated 29th October 2003 also used Fully Allocated Cost (FAC) and top down model. Historical average costs from audited accounts of BSNL were used for Fixed Termination Charge (FTC) and of all mobile service providers were used for Mobile Termination Charge (MTC). Data was taken from annual reports, balance sheets, P&L accounts etc. of the service providers. The cost components not related to call carriage were removed from the operational costs. Marketing expenses were not allowed and Value Added Services (VAS) revenues were fully deducted as they were considered as an important revenue source for recovering cost.
- 3.20 In the February 2006 Regulation fixed and mobile termination charges were kept at the same level as in 2003 and for the carriage charges, the Authority decided to put a ceiling of Rs. 0.65 per minute and moved away from the regime of slab based specified carriage charges introduced in 2003. While prescribing ceiling in 23rd February 2006 Regulation the Authority had provided mark up of 25% on the weighted average cost of carriage of NLDOs operational at that time.

- 3.21 In the 9th March 2009 regulation also, the same basic principles and methodologies were used, however for the cost data, the Authority relied on the Proforma B of the Accounting Separation Regulation, 2004 as the source of reliable data of the industry. Treatment of each cost head/item of the Proforma were transparently provided in the explanatory memorandum to the said regulation. In this review the total VAS revenue was not deducted from the total OPEX. The proportion of VAS revenue to the total revenue was used to take the appropriate percentage of total relevant OPEX as deductible for VAS. As the VAS revenue was about 10% of the total revenue therefore only 10% of the OPEX was deducted to account for VAS. The mobile termination charges were estimated using the total relevant OPEX of the wireless industry divided by the total number of minutes handled by the wireless network in the same period. For calculating FTC, as BSNL had the largest share in the wire-line business (~78%), the data of BSNL wire-line network was taken as the key input with suitable normalizations. Regarding carriage charges, ceiling as prescribed in 23rd February 2006 regulation was decided to be retained.
- 3.22 For the present exercise, during the pre consultation , TRAI had asked the service providers to furnish cost data and appropriate model to calculate termination charge. Hardly any service providers furnished the required data. One of the major service providers submitted that Accounting Separation data submitted may be used for calculating terminations charge. Similarly, one of the major service provider submitted that they would be submitting data during the consultation process. Another major service provider has also stated they would be submitting data in due course of time. However, even after reminders the service provider has not submitted any data. In the absence of current cost data of the network elements and any specific model suggested by the service providers, fully allocated historical cost data submitted by various service providers in their audited Accounting Separation Reports, published document or any other information submitted to TRAI, may have to be used in the calculation of IUC. In case any service provider proposes an alternate solution, it would be necessary for such service

provider to furnish all the required data for working out the proposed solution. In case the service provider fails to furnish the required data for the proposed solution, the suggestion would not be acted upon by TRAI.

Question 3.4 If the cost-oriented or cost based approach is used for Interconnection Usage Charges, do you agree that fully allocated cost can be used with historical cost data submitted by various service providers in their audited Accounting Separation reports, published documents or any other information submitted to TRAI? If not, please give your alternate solution with explanation, required data and proper justification.

3.23 In case it is decided that Interconnection Usage charges should be cost based/ cost oriented then the following aspects require further examination:

E- Domestic Termination Charge

(1) Inclusion of CAPEX

3.24 During the pre-consultation process, service providers have expectedly championed conflicting opinions on fixing the termination charges. While some supported TRAI's existing methodology of taking relevant OPEX only for interconnection charges, others suggested BAK. Some of the service providers, who are in favour of cost based approach, are of the view that CAPEX must also be taken into account for estimating termination charges.

3.25 The Accounting Separation Reports submitted by the various service providers do not provide uniform break-up of different network elements used for providing mobile or fixed services. Some service providers have not provided segregated information on the network elements involved in mobile and fixed call termination. Some of the service providers have segregated the mobile network elements into Core Network and Dedicated Network, others have segregated these into Radio Network, Other Network and Dedicated network

elements like SMS, GPRS and other VAS, and only a few have provided a detailed break up of network elements down to the level of Base Transceiver Station (BTS), Base Station Controller (BSC), Microwave (M/W), Optical Fibre Cable (OFC), Mobile Switching Center (MSC), Operational Support System (OSS), and network elements dedicated to VAS. This makes it difficult to segregate the costs of individual network elements involved in mobile call termination. Experts suggest that telecommunications costs are primarily of two types:

- Non-traffic-sensitive (NTS) costs, which depend on lines and/or trunks; and
- Traffic-sensitive (TS) costs, which depend on minutes of use (MOU) and/or call attempts.

It is reasonable to assume that the cost of only those network elements which are involved in call termination should be considered for costing of a call termination charge. The cost of network elements that are not involved in call termination should be ignored.

3.26 The Accounting Separation Reports of the service providers further indicate that revenue is generated by the service providers on account of fixed charges, administrative charges or rental. There is a point of view that if CAPEX and OPEX are both taken into account for calculating termination charges, then the revenue on account of fixed charges, administrative charges or rental would be a windfall gain to the service provider. Moreover, at present tariffs are under forbearance and service providers are offering different tariff plans having fixed and variable charges bundled together for post-paid and pre-paid subscribers. The bundled tariff plans are difficult for the consumer to compare and are a constant source of concern for them. If rental/ administrative or any other fixed charges component are removed from the tariff by regulatory intervention, retail tariffs would be considerably simplified. Your views are solicited on the following questions so that necessary amendment may also be issued in the tariff orders.

Question 3.5 Should CAPEX be included in calculating/ estimating termination charge? If so, which network elements from the ASR data should be included in the cost base?

Question 3.6 Do you agree that with inclusion of CAPEX in the calculation of termination charges, rental/ administrative or any other fixed charge component should be removed from the retail tariff by regulatory intervention? If not, please give reasons.

(2) Weighted Average Cost of Capital (WACC)

3.27 The Weighted Average Cost of Capital (WACC) is used to measure a firm's cost of capital. Firms are generally financed through a mixture of debt and equity investment. Since the costs of debt and equity capital are different, the overall measure of the cost of capital of a firm is the weighted average cost of capital (WACC).

3.28 In the Accounting Separation Reports, service providers are using different rates of WACC for determination of the return on capital employed. WACC may vary from company to company, depending on debt equity ratio, risk factors, brand name and various other parameters. TRAI in various regulations has used rate of return in the form of pre tax WACC of around 15%.

Question 3.7 Should TRAI continue with the existing rate of return of around 15% in the form of pre tax WACC as adopted in other regulations? If you do not agree with the above, please state what should be the rate of pre-tax WACC, along with justification for your proposed rate.

(3) Depreciation

- 3.29 One important element of cost is the cost of assets utilised but not currently consumed fully in the activity. Such assets produce benefits in future periods also. The cost relating to acquisition of such assets should be deferred rather than being treated as current operating expenditure. Such costs must be allocated to the period of use of such assets in a rational and systematic manner. In the financial books this is referred to as Depreciation. Depreciation is caused in assets due to use, wear and tear, passage of time, change in technology and obsolescence. Depreciation is a non-cash item of cost or intangible expenditure. Depreciation is the source through which Capital Expenditure (CAPEX) is recovered. A view expressed in this regard by some service providers is that existing telecom operators might have recovered their capital costs in full, and therefore their depreciation cost per minute may be negligible.
- 3.30 There are several accounting methods to charge depreciation on the useful life of assets. The most commonly used methods are Straight Line Method (SLM) and Diminishing Balance (Written Down Value) Method.
- (i) In the Straight Line Method, depreciation is calculated by taking an equal amount of the asset's cost as an expense for each year of the asset's useful life.
 - (ii) In the Diminishing Balance/ Written Down Value Method, a (fixed) percentage of the remaining value of the fixed asset is charged as depreciation every year.
- 3.31 The Straight Line Method of charging the depreciation is easy to understand and apply since it spreads the cost of fixed asset evenly over the useful life of the fixed asset. This method gives a constant amount of depreciation of an asset from year to year, while the Diminishing Value method allows more depreciation in initial years and less in later years of the life of the asset.

- 3.32 For companies, Schedule XIV, of the Companies Act, 1956 prescribes the rates of depreciation for various fixed assets to be adopted in preparation of Annual Accounts. Section 32 of the Income Tax Act, 1961 also provides the rates of depreciation for assets owned wholly or partly by the assessee and put to use for the purpose of business and profession. These rates are used by assessee during the process of computation of income tax for the year.
- 3.33 Depreciation is an important component of a cost based calculation. The Accounting Separation Reports submitted by the service providers under the Reporting System on Accounting Separation Regulation 2004, give information on depreciation charged on various fixed assets but they do not provide network element wise amount of depreciation charged during the year. There is wide variation in the rates of depreciation adopted by various service providers. Different classes of assets also have different life spans. In order to calculate the depreciation of the different network elements on a uniform basis, TRAI proposes to use Straight Line Method (SLM) adopting an average asset life of 10 years. In earlier regulations, TRAI has calculated depreciation @ 10% per annum based on Straight Line Method.

Question 3.8 Would it be appropriate to adopt Straight Line Method with an average life of 10 years for all network elements for taking into account depreciation? If you do not agree with this proposal, please give your alternative method with justification.

(4) Relevant Operational Cost (OPEX)

- 3.34 There are many cost items in the operational cost which may not be directly attributable for termination charges. Internationally, also some of the cost items in the OPEX are removed from the cost taken for calculating the termination charges. TRAI has also used similar principles during the previous regulations and removed the components which are not directly

related to termination charges. Proforma B of Accounting Separation Reports provides service wise Profit & Loss statement of the service providers which include cost items of OPEX. The proposed treatment of various cost items is indicated in the following table:

Table 3.2: Treatment of various cost items

| Cost Item | Treatment |
|--|--|
| Licence Fee and spectrum charge | Proposed to be included proportionately for termination charge |
| Employee Cost | Proposed to be included |
| Administration Cost | Proposed to be included |
| Sales &Marketing | Proposed not to be included |
| Maintenance Cost | Proposed to be included |
| Network Operating Cost | Proposed to be included |
| Other Costs[excluding loss on sale of fixed assets(net)] | Proposed to be included |

3.35 Constituents of each head of cost in the above table are already part of the ASR regulation and have not been described here. All sub-heads of any head of cost will have the same treatment as has been indicated in the above table for that particular head of cost. As there is a wide variation in the cost structure of various service providers, therefore there may also be a need to suitably adjust/ normalise the cost data provided in the ASR.

Question 3.9 Do you agree with the proposal for treatment of the cost items as indicated in Table 3.2? If not, please give your proposal with justification.

(5) Treatment of revenue and costs related to value added services

3.36 Apart from the usual voice services, operators are also providing many value added services like SMS, roaming, 3G, GPRS, ring tones etc to the customers. Logically, the costs attributable to these services should not form a part of the

cost base for determination of the call termination charges. However in most of the Accounting Separation Reports (ASR) submitted by the service providers, costs corresponding to these services have not been segregated appropriately. These services are increasing day by day, and revenues and costs corresponding to these services are becoming significant. During the last IUC exercise, the total VAS revenue was not deducted from the total OPEX, as was done in 2003 IUC exercise. The proportion of VAS revenue to the total revenue was used as a driver to apportion the cost of VAS out of total relevant OPEX. As the VAS revenue was about 10% of the total revenue therefore only 10% of the OPEX was deducted to account for VAS. Some of the service providers have felt that revenue is not the appropriate driver for apportioning these costs. Another basis could be to apportion the cost of VAS in the proportion of assets allocated for VAS in the ASR of the service providers. However, many of the service providers have not allocated assets for VAS separately in the ASRs. Therefore, it would become difficult to apportion the cost of VAS in the proportion of assets allocated for VAS for most of the service providers.

Question 3.10 Do you agree that revenue can be used as a driver for segregating the cost pertaining to VAS services from the total cost indicated in the ASRs? If not, please provide a template with appropriate method for separating the cost items for value added services from the cost data provided in the ASR.

(6) Asymmetric termination charge

3.37 Another issue that requires debate is whether all market players, should be subjected to the same extent of the regulation. Several types of symmetry and asymmetry might be discussed in this context.

- Symmetric or asymmetric regulation between new comers and existing operators and/ or between operators with different size of network;

- Symmetric or asymmetric regulation between different types of networks; and
- Symmetric or asymmetric regulation according to the origin of call

3.38 During the pre-consultation process some of the service providers have submitted that the termination charge should be asymmetric i.e. termination charges applicable to new entrants should be different from those applicable to existing service providers. They have submitted that internationally, regulators adopt asymmetrical MTC regime to compensate late entrants for the higher costs incurred due to the differences in the spectrum allocation band. They have further stated that late entrants suffer from inherent disadvantages in a fixed cost industry with fast growing demand. The later a firm enters such a market, the higher is the initial investment required. The late entrant cannot afford to spread his investments over several years as he has to immediately offer the same quality of service as the early entrant. Also, the late entrants in the telecommunication service sector were awarded spectrum in the 1800 MHz band, in which the coverage costs are higher than in the 800-900 MHz band. One of the service providers has also submitted that world over, in non-Bill and Keep regimes, whenever new players enter an established market, regulators apply the principles of asymmetric termination charges in a glide path. They have also submitted that under this approach, new entrants are given some mark-up on MTC receivable by them, over the MTC payable by them, to sustain the competition till the time they obtain a fair market share (usually it is for 4-5 years). A further issue which arises in this connection is to define the basis on which the new entrant can be distinguished from the existing operator using different criteria like date of license, date of commencement of service, subscriber base, market share etc.

3.39 The second type of asymmetric regulation can be between different types of networks, e.g. mobile vs. fixed network. In the United States, the reciprocity requirement imposed by Federal Communication Commission (FCC) means that fixed to mobile termination charges are said to equal those for mobile to fixed termination.

- 3.40 The third type of asymmetric regulation could be according to the origin of a call. For example, a question can be raised on whether the internationally originated call should be terminated at the same rate as the nationally originated call. This kind of asymmetry is discussed later under International Termination Charges.

Question 3.11 Should termination charges be asymmetric in respect of existing operators and new entrants or between different types of networks? What should be the criteria to distinguish between an existing operator and a new entrant? Please justify your answer.

(7) Traffic minutes for estimating domestic termination charge

- 3.41 An important issue relates to the definition of the denominator used in the calculation of termination charges. From the time the IUC regime was put in place, the TRAI has employed the total of all incoming and outgoing call minutes as the denominator to arrive at per minute charges. This has been done on the assumption that work done for terminating or originating a call is almost the same. The total incoming and outgoing minutes also include off-net and on-net minutes of all the networks. However, it is sometimes argued that on-net calls should not be treated on par with off-net calls. In the case of on-net calls, typically, the number of network elements utilised is less than in the case of off-net calls. From this point of view, on-net calls should be assigned a lower weight in the denominator as compared to off-net calls.
- 3.42 The estimation of traffic in the fixed line network is a major challenge. BSNL, which accounts for a market share in terms of subscribers of nearly 73% of the fixed line market in March 2011, has not furnished the figures of traffic minutes flowing on its network even after repeated follow up. During the last IUC exercise, BSNL had furnished certain sample traffic data which indicated that the traffic on their network was falling. TRAI had however consciously adopted the traffic minutes submitted by BSNL in 2003 on the assumption

that these minutes were achievable on the BSNL's network or in other words, the BSNL network was capable of handling these minutes. It was assumed that theoretical plan capacity may not have been reached but if the utilization has attained a level then reduction could be because of operator specific reasons.

Stakeholders' comments are solicited on the following questions:

Question 3.12 Should the TRAI treat the work done in origination and termination of a call as identical for the purpose of determining termination charges? If not, please provide justification in support of your answer.

Question 3.13 What should be the criteria to estimate the traffic minutes for the fixed line network as actual traffic minutes for the fixed network are not available with TRAI? Please provide justification in support of your answer.

F- Origination Charge

3.43 At present, origination charge is under forbearance. Forbearance in origination charges allows operators to roll out innovative tariff plans. Prescribing origination charge along with all other components of IUC would amount to fixation of retail tariffs and would take away the flexibility currently available with service providers to offer different call charges to attract diverse segments of subscribers. During pre-consultation, service providers also submitted that since market forces are working well, there is no need for regulating origination charges. Internationally, the trend is for keeping origination charges under forbearance wherever tariff is also under forbearance.

Question 3.14 Do you agree with the policy that origination charge should be under forbearance? Please provide justification in support of your view.

G- International Termination Charge

- 3.44 The prevalent termination charge for international incoming calls is Re 0.40 (40 paisa) per minute while the termination charge is Re.0.20 (20 paisa) per minute for domestic calls. During the pre-consultation process, some of the service providers have submitted that the termination charges for international calls fixed by TRAI during the last review of IUC, put Indian access providers in a hugely disadvantageous situation vis-à-vis foreign operators, as termination charges in some other countries are almost 8-10 times higher than the Indian termination charges. On the other hand, some service providers are of the view that there is a no extra cost involved in terminating the international call, and therefore, termination charges for domestic and international calls should be same. They have submitted that asymmetric termination charges for domestic and international calls may create an artificial arbitrage opportunity and hence give rise to a grey market.
- 3.45 The following may be the options for specifying the termination charges for international incoming calls
- (a) Left for mutual negotiation between access providers and ILDO
 - (b) Reciprocal arrangements with other countries
 - (c) Higher than the domestic termination charge
 - (d) Same as domestic termination charge
- 3.46 The option of forbearance or leaving the charges to negotiation between ILDO and access providers has both advantages and disadvantages. It may help access providers in negotiating higher than prevalent rates and earn more revenue. It may also reduce the tariff for outgoing international calls if the service providers are willing to share the increased revenue with the customers. However, such negotiations may become protracted and may lead to uncertainty and disputes in the market. Call termination is a monopoly, therefore, an access provider would always try to obtain higher termination charges from the ILDOs which may lead to a situation of non-settlement and, therefore, non-completion of calls.

- 3.47 Reciprocal arrangements i.e. mandating the same termination rate for calls from a country as the country applies to calls from India may lead to complexity in settlement. There would be a large number of prevalent termination rates for calls terminating in India and settlement disputes would increase. This arrangement would also lead to hubbing of international traffic in a country that has low termination rate arrangement with India. This would not only lead to dependence on bandwidth on some routes and inefficient utilization of bandwidth on other routes but may also encourage the operators to alter Caller Line Identification (CLI) to show that the calls are from a country that enjoys low termination charges for calls to India.
- 3.48 The option of fixing the international termination charges higher than the domestic termination charges, increasing the international incoming termination charge from the current level also has its plus and minus points. The advantages are that it may help access providers to earn more revenue; at the same time the disadvantage of stalled negotiations as in the case of forbearance, would disappear. It may also reduce the tariffs for outgoing international calls if the service providers are willing to share the increased revenue with the customers. Critics of this approach would cite the disadvantage of the arbitrage opportunity that differential domestic and international termination charge would create. One view has also been expressed that the grey market is a concern of the Government, and should not be considered while fixing the international termination charge.
- 3.49 Maintaining the international termination charge same as domestic termination charge has the obvious advantage of justifying the fixation of such charge as the cost involved in terminating the international call is equal to that of domestic calls. However this would not ensure parity for access providers as they would be paying higher charges for their outgoing international calls.

Question 3.15 Which of the following is the best option for International Termination Charge?

- (a) Left for mutual negotiation between access providers and ILDO**

- (b) Reciprocal arrangements with other countries**
- (c) Higher than the domestic termination charge**
- (d) Same as domestic termination charge**

In case it is decided that international termination charge should be higher than domestic termination charge, what would be most appropriate level so that grey market does not flourish?

H- Carriage Charge

3.50 Some of the service providers have submitted that as the prevailing market rates for carriage charge are below the ceiling of Re.0.65 per minute and there is sufficient competition in the market, therefore, there is no need to review the carriage charges. On the other hand, some of the service providers have submitted that there is a need to reduce carriage charges. In their view, actual cost of carriage is not more than Re.0.11 per minute. Some of the service providers have also mentioned that there is a case for reduction of carriage charges in consideration of improved utilization of the network. However, to maintain sufficient incentive for investment in fibre layout, they have proposed that the ceiling on carriage charges may be reduced to Re.0.50 per minute. BSNL has also consistently represented to TRAI that while this ceiling may be reasonable for high traffic routes, there are many SDCAs in remote and hilly areas where the ceiling of Re.0.65 is not sufficient and there is a need to specify a higher ceiling for carriage charge. Many of the service providers have migrated their long distance traffic to IP based networks and, therefore, their cost of carriage has been drastically reduced. One of the service providers has submitted that the ceiling based approach should continue. However, there is a need to undertake a fresh analysis of the costs. A high ceiling is a powerful tool in the hands of the operator with a dominant position in the market in carriage rate negotiations, particularly in poorly connected geographical areas or wherever these dominant operators can dictate connectivity. One of the service providers has also suggested that

carriage charges need to be reviewed to bring the ceiling in line with the average range of carriage charges being levied and settled by and between the Unified Access Service (UAS) and NLD licence holders.

Question 3.16 Is there a need to specify separate ceilings for carriage charges for remote and hilly areas? If yes, how should the costs corresponding to remote/ hilly areas be segregated for carriage charges to/ from remote/ hilly areas, as the Accounting Separation Reports of the NLD operators provide only a consolidated cost for pan India operations?

I- International Settlement Charge

- 3.51 In the principal IUC Regulation of 29th October, 2003 carriage charge for international long distance calls including international termination charges (i.e. international settlement) are under forbearance.
- 3.52 Recently, it was brought to the notice of TRAI that operators in the Middle East have unilaterally raised the settlement rates paid by Indian NLDOs for the traffic from India to those countries. However, the settlement rate paid by the Indian operator is low due to aggressive competition amongst Indian service providers. The views of the stakeholders on the reference received were sought through website on 04.11.2010. Comments from 12 stakeholders were received on the reference. Generally, stakeholders are of the view that this is an area of concern which requires attention and intervention of the Authority. However, stakeholders were divided as to the approach to be followed for tackling this issue.
- 3.53 One view received was that settlement charges between Indian telecom operators and foreign carriers cannot be and should not be prescribed by TRAI being beyond its jurisdiction as per the provisions of the TRAI Act. Many of the stakeholders are of the view that the core issue is the comparatively low level of termination rates in India which sets an artificially

low floor price for international settlement rates. A few of the service providers have also indicated that the issue is not confined only to the Middle East but applies to the entire world. One of the major ILDOs has also submitted that a differentiated rate for calls originating from specific world regions for India will result in a situation that may not only impact the affordability of calls to Indian subscribers but also create serious challenges in monitoring inbound calls to India.

Question 3.17 Do you feel that TRAI should intervene in the matter of International Settlement Rates? If so, what should be the basis to determine International Settlement Rates?

J- Transit Carriage Charge

3.54 As per the present licensing/ regulatory framework mobile service providers are required to handover intra circle calls to BSNL fixed line at Level-II TAX. The carriage/ transit charges for carrying the mobile originated call from Long Distance Charging Area (LDCA) to Short Distance Charging Area (SDCA) have been prescribed Re.0.15 (15 paisa) per minute by the TRAI in the IUC Regulation dated 9th March, 2009 based on the cost prevailing at that time. During the pre-consultation process, service providers have submitted that it is BSNL that has declared its Level-II TAX as the terminating point for the calls originating from other mobile networks meant for termination in its fixed line network. Having declared Level-II TAX as the terminating point, it should be the responsibility of BSNL to carry the calls further to the terminating SDCA without any additional charges. Some of the service providers have also elaborated further on the issues of handing over of these calls. The question of treatment of various types of calls is the subject matter of other licensing and regulatory requirements and the limited issue to be dealt in the IUC regulation is the review of transit carriage charges. Since this is not a separate service/ product, therefore, no separate cost corresponding to this service is available in the Accounting Separation Report submitted by BSNL.

It is very difficult to segregate the cost corresponding to the transit carriage charge. Stakeholders' views are solicited on the following:

Question 3.18 How can the cost of providing transit carriage be segregated from the cost data in the ASR? Please provide a method and costing details to separately calculate this charge.

Question 3.19 If the cost of all relevant network elements are taken into account in the calculation of the fixed line termination charge, is there any further justification to have a separate transit carriage charge? Please give reasons for your answer.

K- TAX Transit Charge

3.55 Though direct connectivity is preferred by the service providers, however, in the absence of adequate direct links, the traffic is routed through BSNL TAX or Tandem. Transit charge lower than Re.0.15 (15 paisa) per minute have been prescribed by TRAI in the IUC Regulation, 2009. In response to the pre-consultation paper, many of the service providers have proposed either no transit charge or downward review of TAX transit charge. However, no service provider has given any data to calculate the TAX transit charges. Response is solicited to the following question:

Question 3.20 Is there a need to regulate the TAX transit charges or should it be left for mutual negotiations? In the event transit charge is to be regulated, please provide complete data and methodology to calculate TAX transit charges.

L- Video calls

3.56 During the pre-consultation process, one of the service providers has submitted that with the launch of 3G services the operators are also likely to commence inter-operator video calling. Therefore, there is also need to

determine the Interconnection Usage Charges for video calls. The service provider submitted that existing framework of IUC may be extended to video call termination wherein the Authority may determine the terminating and carriage charges leaving the origination charge under forbearance. The service provider further stated that technically the video call utilizes approximately 4-5 times the resources/ bandwidth as compared to a normal voice call. Other service providers have however, not volunteered any view on the subject.

Question 3.21 Is there any need to prescribe separate termination charges/ carriage charges for video calls? If yes, how should this charge be calculated in the absence of cost data? Please provide the methodology and data to be used.

M- SMS Termination Charge

3.57 Concern was raised by some of the service providers on the termination charges for SMS. During the pre-consultation process, some of the service providers submitted that the SMS termination charge is very important to avoid abuse of the network of terminating operators by way of bulk and free SMS sold by the originating operators. These service providers have suggested that TRAI should fix a termination charge which acts as a deterrent against any such abuse of the network of one service provider by another service provider. It is seen that the concern expressed by the service providers is mainly with regard to bulk SMSs which disproportionately overload the receiving network. In this connection, to curb the menace of the unsolicited commercial communications to consumers, TRAI has recently issued the Telecom Commercial Communications Customer Preference Regulations, 2010 in December 2010. To further discourage bulk SMSs which are inconveniencing consumers and receiving networks alike, one of the methods could be to impose a disincentive in the form of a deterrent termination charge. Some service providers had earlier raised a concern about

the method of identification of commercial SMS for imposition of deterrent charges. However, the Regulation of December 2010 takes care of this concern as only registered telemarketers are permitted to send commercial SMS and these SMS are clearly distinguishable from other SMS through the use of specific headers.

3.58 With regard to cost based charges for SMS, some of the service providers submitted that the actual cost of terminating an SMS is negligible and even as low as 1/144 times of terminating a voice call and TRAI may prescribe a strict cost based termination charge for SMS or else mandate bill and keep.

3.59 In the Accounting Separation Report, service providers have not given separate cost data corresponding to the SMS business. Therefore, it is very difficult to extract the cost data corresponding to SMS. One way could be to apportion the cost of SMS from out of the existing aggregate data for voice using a driver such as asset allocation to SMS/ revenue from SMS, and divide this cost by the total number of SMS handled by the service provider. Another way could be to estimate the number of SMS which use the same amount of network resources as one minute of normal voice traffic and convert these SMS into equivalent voice minutes, which could then be added to the total incoming and outgoing voice call minutes and used as denominator for the total cost as obtained from the Accounting Separation Report. As the cost of terminating an SMS is likely to be negligible, inter operator billing and settlement for SMS would unnecessarily increase transactional costs in a cost based usage charge regime. One way of resolving this problem is to prescribe a deterrent termination charge for commercial SMS and Bill and Keep for all other types of SMS.

Stakeholder comments are solicited on the following questions:

Question 3.22 Do you agree that a deterrent termination charge should be imposed for commercial SMS? In your

view, what would be the most appropriate level of termination charge for commercial SMS?

Question 3.23 Do you agree that Bill and Keep regime should be put in place for other types of SMS (non-commercial SMS)? Please provide justification for your response.

N- SMS Carriage Charge

3.60 Inter circle SMS are carried on the SS7 signalling of NLD operator. The new operators who do not have a vast pan India NLD network are dependent on the NLD operators for delivering their inter-circle SMS in other service areas. Some of the service providers have also raised their concern regarding higher SMS carriage charges being demanded by the existing operators from the new entrants. There is a no separate data available with TRAI for calculating the cost for carrying an SMS from one circle to another.

Question 3.24 Is there any need to prescribe SMS carriage charges or should it be left for mutual negotiation? If SMS carriage charges are to be calculated, what methodology should be used to calculate these charges? Please provide all cost details and methodology.

Chapter IV

Issues for Consultation

It may please be noted that answers/ comments to the issues given below should be provided with justification. The stakeholders may also comment on any other issue related to Interconnection Usage Charges along with all necessary details.

1. Do you agree that the IUC regime determined through this consultative process should be applicable for 3 years? If not please indicate your preferred time period with justification.
2. Keeping in view the time period indicated by you in question 1, which of the following approaches would be most appropriate for the Indian telecom sector?
 - (a) Cost oriented or cost based;
 - (b) Bill and Keep;

Please provide justification in support of your answer. In case you feel that the approach should vary according to service, please explain why?

3. In case your answer to question 2 above favours the cost oriented approach, would it be appropriate to permit Bill and Keep between service providers who have symmetric traffic?
4. If the cost-oriented or cost based approach is used for Interconnection Usage Charges, do you agree that fully allocated cost can be used with historical cost data submitted by various service providers in their audited Accounting Separation reports, published documents or any other information submitted to TRAI? If not, please give your alternate solution with explanation, required data and proper justification.

5. Should CAPEX be included in calculating/ estimating termination charge? If so, which network elements from the ASR data should be included in the cost base?
6. Do you agree that with inclusion of CAPEX in the calculation of termination charges, rental/ administrative or any other fixed charge component should be removed from the retail tariff by regulatory intervention? If not, please give reasons.
7. Should TRAI continue with the existing rate of return of around 15% in the form of pre tax WACC as adopted in other regulations? If you do not agree with the above, please state what should be the rate of pre-tax WACC, along with justification for your proposed rate.
8. Would it be appropriate to adopt Straight Line Method with an average life of 10 years for all network elements for taking into account depreciation? If you do not agree with this proposal, please give your alternative method with justification.
9. Do you agree with the proposal for treatment of the cost items as indicated in Table 3.2? If not, please give your proposal with justification.
10. Do you agree that revenue can be used as a driver for segregating the cost pertaining to VAS services from the total cost indicated in the ASRs? If not, please provide a template with appropriate method for separating the cost items for value added services from the cost data provided in the ASR.
11. Should termination charges be asymmetric in respect of existing operators and new entrants or between different types of networks? What should be the criteria to distinguish between an existing operator and a new entrant? Please justify your answer.

12. Should the TRAI treat the work done in origination and termination of a call as identical for the purpose of determining termination charges? If not, please provide justification in support of your answer.
13. What should be the criteria to estimate the traffic minutes for the fixed line network as actual traffic minutes for the fixed network are not available with TRAI? Please provide justification in support of your answer.
14. Do you agree with the policy that origination charge should be under forbearance? Please provide justification in support of your view.
15. Which of the following is the best option for International Termination Charge?
 - (a) Left for mutual negotiation between access providers and ILDO
 - (b) Reciprocal arrangements with other countries
 - (c) Higher than the domestic termination charge
 - (d) Same as domestic termination charge
16. Is there a need to specify separate ceilings for carriage charges for remote and hilly areas? If yes, how should the costs corresponding to remote/ hilly areas be segregated for carriage charges to/ from remote/ hilly areas, as the Accounting Separation Reports of the NLD operators provide only a consolidated cost for pan India operations?
17. Do you feel that TRAI should intervene in the matter of International Settlement Rates? If so, what should be the basis to determine International Settlement Rates?
18. How can the cost of providing transit carriage be segregated from the cost data in the ASR? Please provide a method and costing details to separately calculate this charge.

19. If the cost of all relevant network elements are taken into account in the calculation of the fixed line termination charge, is there any further justification to have a separate transit carriage charge? Please give reasons for your answer.
20. Is there a need to regulate the TAX transit charges or should it be left for mutual negotiations? In the event transit charge is to be regulated, please provide complete data and methodology to calculate TAX transit charges.
21. Is there any need to prescribe separate termination charges/ carriage charges for video calls? If yes, how should this charge be calculated in the absence of cost data? Please provide the methodology and data to be used.
22. Do you agree that a deterrent termination charge should be imposed for commercial SMS? In your view, what would be the most appropriate level of termination charge for commercial SMS?
23. Do you agree that Bill and Keep regime should be put in place for other types of SMS (non-commercial SMS)? Please provide justification for your response.
24. Is there any need to prescribe SMS carriage charges or should it be left for mutual negotiation? If SMS carriage charges are to be calculated, what methodology should be used to calculate these charges? Please provide all cost details and methodology.

ANNEXURE

International Experience on IUC

The international experience are compilation of the information received from regulatory bodies and available on various websites.

A- European Commission

- 1 EU observed that the decisions of the national telecoms regulators result in very divergent rates across the EU. Mobile termination rates range from €0.02/min (in Cyprus) to over €0.18/min (in Bulgaria) and are 9 times higher than fixed line termination rates (on average €0.0057/min for local call termination). The Commission, after assessing over 770 regulatory proposals by national regulators over the past 5 years, observed that price regulation of termination markets across Europe lacks consistency.
- 2 In Europe, the last few years have seen a lively debate on charging mechanisms for interconnection of communication networks at the wholesale level. Currently interconnection payments at the wholesale level in PSTN/mobile and IP- networks are typically governed by different charging mechanisms. As separate networks are expected to converge towards a multi-service (including voice) NGN IP network, such differences may not be sustainable or efficient in the long run. This convergence is considered an important factor driving the need to assess which interconnection regime is appropriate for the long-term.
- 3 In view of this a Draft Common Position (CP) consultation paper was released by European Group (ERG) in October 2009. This paper specifically assesses Bill & Keep (BAK) as an alternative to the currently used regime for voice in Europe: calling Party Network Pays (CPNP). In this Draft CP the ERG found that BAK was more promising than CPNP as a regulatory regime for termination in the long term, and depending on national circumstances (including legal issues) National Regulatory Authorities (NRAs) could set a

glide path to BAK within the regulatory period related to the next market analysis they carry out for voice termination. However, for the short and medium term CPNP could also be an appropriate choice based on national circumstances, so NRAs could also continue the CPNP regime at least in the next regulatory period. The paper and responses received on the same are available at <http://www.erg.eu.int>.

B- Australia

- 4 The indicative price for mobile terminating access service (MTAS) from 1 January 2009 to 31 December 2011 is 9 cents (AUD) per minute. The pricing principles continue to adopt a cost-based pricing approach based on a total service long run incremental cost (TSLRIC+) framework. The Australian Competition and Consumer Commission (ACCC) is of the view that maintaining the MTAS price at 9 cents per minute for three years would provide a higher level of certainty for network operators and would promote efficient investment, and is in the long-term interest of end-users.
- 5 Retail prices of fixed to mobile calls are relatively expensive compared to fixed to fixed calls. Part of the reasons for this is that fixed operators pay mobile operators a high wholesale termination rate; part of it is due to the margins that fixed operators make on FTM calls. Fixed to mobile pass-through refers to the passing on of the reduction in the wholesale mobile termination rates to the fixed to mobile calls. In finalising the MTAS pricing principles the ACCC noted a lack of fixed to mobile (FTM) pass-through.

C- Brazil

- 6 For calls between different mobile networks, in the period 2002 to 2005 a partial Bill and Keep system was adopted in which only operators with traffic imbalance (traffic ratio exceeding 45/55) pay for access. After 2005, the full Bill and Keep system was to be adopted and no payments for interconnection were supposed to be made. After ANATEL, the regulator, failed to reach an

agreement with MNOs on interconnection rates, the proposed full Bill and Keep system implementation was postponed.

- 7 By the end of 2004, ANATEL put forward a proposal for a new General Regulation of Interconnection, including termination on both the fixed and the mobile networks. On this regulation a new asymmetric regulation structure is also put in place, in which some operators are designed as having Significant Market Power (SMP), with access prices to be set by the regulator. Those considered as not having SMP are expected to have its access charges as determined by negotiation. The mobile termination charge for those considered to have SMP was to be set by the Fully Allocated Cost method, while the fixed termination was to be determined by the Long Run Incremental Cost (LRIC) method. The process for moving towards a LRIC costing methodology for mobile termination has already been started.

D- Canada

- 8 All interconnection prices in Canada are determined using a cost-based capacity charging model, and are specific to each carrier. In contrast to most other jurisdictions, termination or transit rates in Canada are assessed on a capacity basis (per DS0/E1) rather than attracting a per-minute charge. The cost standard used is referred to as 'Phase II' costing and an incremental costing approach.
- 9 Termination arrangements for a mobile operator in Canada are determined by the official regulatory classification under which the operator provides services. There are two classification options available to mobile operators viz competitive local exchange carrier (CLECs) and wireless service provider.
- 10 Classification as a Competitive local exchange carrier (CLECs): Competitive Local Exchange Carrier (CLECs) are entitled to be treated in the same way as incumbent local exchange carriers (ILECs). This includes the right to equivalent interconnection agreements and costs, but comes with the same competitive obligations as ILECs. Termination charges are determined

according to whether the traffic being exchanged is local or long-distance traffic:

- Local termination – traffic exchanged between two local exchange carrier (LECs) within a given Local Interconnection Region (LIR) is exchanged on a Bill and Keep (BAK) basis. However on these BAK links, an operator is permitted to track the volume of traffic exchanged, and claim termination payments from the other interconnected operator if a net traffic imbalance is observed. This process is referred to as ‘mutual compensation’. In this case, an operator may levy a set charge per DS0 based on the level of imbalance observed; and
- Long-distance traffic – for traffic that is to be terminated in a different Local Interconnection Region (LIR) from where the traffic is exchanged, a CLEC can either pay the terminating LEC a set long-distance rate (again, based on a per-DS0 charge, with the traffic carried over separate links set aside for long-distance traffic) or can set up agreements with an independent inter-exchange carrier which already has arrangements to terminate traffic in the required LIR.

11 Classification as a wireless service provider: Mobile operators classified as wireless service provider (WSPs) are typically responsible for all costs caused by their interconnection. CRTC does not regulate the operations of mobile providers, therefore WSPs are not subject to any of the obligations on ILECs and are generally free to deploy network and services in whatever way they deem suitable.

12 For local WSP-LEC interconnection, a WSP must set up, provision and upgrade interconnection links to the LEC such that there is always sufficient capacity to carry any traffic (outgoing or incoming) between the two networks. How the WSP chooses to do so (self-provisioning or commissioning from the LEC) is up to the WSP. There are additional separate termination charges (per DS0) assessed for traffic that is terminated in a different local

exchange than that in which it was exchanged. WSP-WSP interconnection is completely unregulated.

E- China

- 13 All networks and IT manufacturing industries are subject to Ministry of Information Industry's (MII) regulation. The "Provisional Regulation over Telecommunications Network Interconnection" inter-alia specifies that each party is to cover the cost of interconnection only on their own side, with full ownership of interconnection facilities.
- 14 As for interconnection charges, the regulation clarifies that these should be based on actual cost. Each party is to submit cost data to the MII, which then makes a settlement based on these costs with the help of an independent auditing agency. Until cost data is available, interconnection charges out to be based on the current retail tariff. The regulation also defines other terms of interconnection, including the time limit for interconnection installation, the content of interconnection agreements, arbitrary procedures and penalty rules.

F- Egypt

- 15 In Egypt, the termination rate of an operator is set to be 65% of that operator's on-net retail rate. According to them, this method benefits from the strong competition on the retail level that brings retail prices as close as possible to cost. By applying the retail minus method (i.e. eliminating irrelevant costs, keeping relevant network costs and adding marginal interconnection costs) starting from these competitive retail on-net rates, a cost based termination rate for each operator has been reached. By unifying the basis for both retail and interconnection the possibility of using the termination rates in any anti-competitive behaviour has also been eliminated. They also claim that this also brings benefits to consumers by helping to

eliminate the on-net off-net differential. This method is fast, needs much less resources compared to the other methods like LRIC and leads to an economically efficient pricing system across all the industry at both the retail and the interconnection levels.

- 16 Calling Party Pays charging methodology is prevalent in Egypt. The termination rates are asymmetric between the operators depending on the operators' on-net retail rates. SMS termination charges are mutually negotiated by the operators.

G- France

17. Following a public consultation that ran from 22 December 2010 to 31 January 2011 on the technical-economic model for a mobile network operator in Metropolitan France, in March 2011, ARCEP has notified the European Commission and submitted to public consultation its draft decision on tariff supervision for mobile voice call termination for the carriers Orange France, SFR and Bouygues Telecom, for the period running from 1 July 2011 to 31 December 2013.
18. Based on the results of the revised network cost model for a generic operator in Metropolitan France, ARCEP has proposed a ceiling tariff of 0.8 c€/min for mobile voice call termination, to come into effect on 1 January 2013 and an incremental decrease towards the target rate over the next 18 months in a progressive, predictable and proportionate fashion. To this end, ARCEP is proposing a decrease in mobile termination rates in three stages:
 - a first decrease to 2c€/minute, starting on 1 July 2011 for a period of six months,
 - a second decrease to 1.5c€/minute, starting on 1 January 2012 for a period of six months,
 - and a third decrease to 1c€/minute, starting on 1 July 2012 for a period of six months.

These three stages will allow carriers to adapt to the target termination rate of 0.8c€/minute, which will come into effect on 1 January 2013.

19. Symmetrical MTR as of 1 July 2011: Given the planned decreases in mobile termination rates and so the much smaller gap with operating costs, and in an environment where fixed-to-mobile calling traffic is expected to increase substantially over the coming months and years, ARCEP considers that imposing symmetrical termination rates on all three mobile operators as of 1 July 2011 to be a justified and proportionate measure. The draft decision has been notified to the European Commission and to national regulatory authorities in the other European Union Member States, and submitted to a public consultation that will run until 26 April 2011. Once these two stages are complete, ARCEP will be in a position to adopt its final decision.
20. With regard to SMS, ARCEP has found that in the absence of regulation on SMS termination, this structural bottleneck allows each mobile operator to set the terms and conditions applying to this service unilaterally. As a result, in 2006 ARCEP established a first cycle of regulation for these markets for a three-year period, requiring that all three mobile operators in Metropolitan France provide SMS call termination access and interconnection services under transparent, non-discriminatory conditions and at cost-oriented prices. ARCEP has decided to impose a price cap on SMS termination. The price cap for SFR and Orange is 3 euro cents per effective SMS, for Bouygues, the cap is set at 3.5 euro cents per effective SMS.
21. In 2009, ARCEP also started public Consultation process for regulation of SMS termination charges. After taking account of the feedback received from the European Commission and the sector's stakeholders, on 22 July 2010 ARCEP adopted the final decision on its analysis of the market for wholesale SMS call termination on mobile networks in France. In this decision the Authority sets the maximum SMS call termination fee that can be billed to other operators. The charges from 1st October 2010 to 30th June 2011 will be 2 cents per SMS-MT for Orange and 2.17 cents per SMS-MT effective for Bluygues Telecom.

From 1st July 2011 to 30th June 2012 1.5 cents for all and from 1st July 2012 1 cent per SMS-MT.

H- Germany

22 FL-LRIC methodology is used for determining termination charges. Prevalent rates are follows:

| Fixed Termination Rates | | |
|-------------------------|---|---|
| <i>Zones</i> | Peak <i>weekdays (Monday-Friday)</i> <i>09.00 h - 18.00 h</i> <i>EUR/min(Excluding VAT (19%))</i> | Off-Peak <i>Weekdays (Monday-Friday)</i> <i>18.00 - 09.00 h</i> <i>Saturdays, Sundays nationwide</i> <i>holidays 00.00 h - 24.00 h</i> |
| <i>Zone I</i> | 0,0054 | 0,0038 |
| <i>Zone II</i> | 0,0089 | 0,0060 |
| <i>Zone III</i> | 0,0134 | 0,0089 |

| Mobile Termination Rates | | | | |
|--------------------------|-------------------------------|--------|--------|--------|
| <i>Time</i> | EUR/min (Excluding VAT (19%)) | | | |
| | Mobile Network Operator | | | |
| | D1 | D2 | E1 | E2 |
| 01 04 09 – 30 11 10 | 0.0659 | 0.0659 | 0.0714 | 0.0714 |
| 01 12 10 – 30 11 12 | 0.0338 | 0.0336 | 0.0336 | 0.0339 |

D1 - Telekom Deutschland GmbH [formerly T-Mobile Deutschland GmbH]

D2- Vodafone D2 GmbH

E1 - E-Plus Mobilfunk GmbH & Co. KG

E2 - Telefónica O₂ Germany GmbH & Co. OHG

If the call is terminated to a geographical number, the rate is 0 EUR/Min. The reason for this is that this kind of termination, the so called home-zone-termination, is done for customers who already pay higher fixed rates for the ability to use their mobile phone in a certain place for fixed-line rates, and thus do not incur extra cost. The asymmetry of the rates is due to different costs

I- Hong Kong

23. For interconnection between fixed network operators ("FNOs"), FNOs are free to set their fixed-fixed interconnection charge ("FFIC") commercially, although they may request a determination by the Telecommunications Authority ("TA")

pursuant to section 36A of the Telecommunications Ordinance. The TA has given regulatory guidance to the industry on the payment structure based on a symmetric and reciprocal "Calling Party's Network Pays" mechanism. The last TA determination was made for two FNOs in 2003, at around 2.7 cents per minute, and applied to a historical period. The TA has not made any new determination thereafter. FFIC was fixed by TA based on long run incremental cost.

- 24 For interconnection between mobile network operators ("MNOs"), MNOs are also free to set their mobile-mobile interconnection charge ("MMIC") commercially. It should be noted that the TA has never given any regulatory guidance or intervened on the mobile-mobile interconnection charge, up to present. The interconnection charging arrangement between MNOs is primarily based on Bill and Keep ("BAK").
- 25 For interconnection between FNOs and MNOs, the TA had given regulatory guidance on fixed-mobile interconnection charge ("FMIC") based on the "Mobile Party's Network Pays" mechanism. The regulatory guidance was withdrawn on 27 April 2009. FNOs and MNOs are free to agree commercially the FMIC between themselves. According to information filed with the TA so far, it has been noticed that in all the agreements or understanding that have been reached among operators, the parties agree to exchange traffic with each other based on BAK.
- 26 In Hong Kong, mobile users are required to pay for both incoming and outgoing calls. As far as SMS termination charges are concerned regulator has not prescribed any termination rate.

J- Italy

- 27 Alternative fixed operators were taking advantage of asymmetric interconnection termination charges. As of October 2007, they can charge up to 1.32 €/cents per minute, as against 0.74 €/cents applied by the incumbent (single transit). While this is the highest asymmetry level in the EU, five alternative operators had requested even higher termination prices (for 2006 and 2007), claiming high costs. AGCOM has allowed three operators to apply

termination rates above 1.54 €/cents per minute, from 2006 to 30 June 2007. AGCOM has announced the approval of the glide path that will lead to symmetric termination rates among all fixed operators of 0.57 €/cents per minute in 2010. The glide path differs according to the extent each operator rolled out its own infrastructures. With a view to introducing a new glide-path towards symmetric prices, AGCOM has also been developing a cost-based model for determining the termination cost for an efficient alternative operator, in cooperation with the European Regulators Group (ERG), as requested by the Commission. The incumbent claims it suffers a significant net loss because of the obligation not to differentiate its retail prices according to the termination rates of the different alternative operators' networks. AGCOM found that the asymmetry does not impose retail prices below costs on the incumbent and this decision has since been confirmed by the Italian Court.

(1) Interconnection Charges for Terminating calls on Incumbent's Fixed Network(Per minute Euro/cents) in Italy

| Level | January 2006 | January 2007 |
|---|--------------|--------------|
| local level | 0.46 | 0.42 |
| single transit <i>(metropolitan)</i> | 0.83 | 0.74 |
| double transit <i>(national)</i> | 1.36 | 1.18 |

(2) I/C Charges For Terminating Incumbent's Calls On Main Alternative Operators' Fixed Networks in Italy for single transit was 1.32 Per minute Euro/cents in 2007.

(3) I/C Charges For Terminating Calls On Mobile Networks (Jan 2006 and 2007)

| Operator's name | INTERCONNECTION CHARGE (Per minute Euro/cents) | | | |
|------------------|---|-------|----------------------------|-------|
| | Fixed-to-mobile | | Mobile-to-mobile (off-net) | |
| | 2006 | 2007 | 2006 | 2007 |
| TIM | 11.2 | 9.97 | 11.2 | 9.97 |
| Vodafone Omnitel | 11.2 | 9.97 | 11.2 | 9.97 |
| WIND | 12.9 | 11.09 | 12.9 | 11.09 |
| H3G | 18.76 | 18.76 | 18.76 | 18.76 |

K- Korea

28 After 2004, The Korean Communications Commission directly determines termination rates for each mobile operator according to a LRIC-based framework. The Korea Communications Commission publishes the exact methods by which call termination prices will be determined for each year.

L- Malaysia

| Year | Interconnection Charging Arrangement | Costing Methodology | Instrument |
|---------------------------|--|---|---|
| 1990 – 1998 | Sender Keeps All (SKA) and Revenue Sharing | - | Commercial Negotiation |
| 1998 – June 2003 | Benchmark prices based on cost | Closer to long-run incremental cost (LRIC) for mobile Closer to fully allocated cost (FAC) for fixed | Determination of Cost-based Interconnect Prices and the Cost of Universal Service Obligation (TRD 006/98) |
| 1 Jul 2003 – 15 Feb 2006 | Maximum prices based on cost | Total service LRIC (TSLRIC) | Commission Determination on the Mandatory Standard on Access Pricing |
| 15 Feb 2006 – 31 Dec 2008 | Maximum prices based on cost | TSLRIC | Commission Determination on the Mandatory Standard on Access Pricing, Determination No. 1 of 2006 |

29 Interconnection arrangements including interconnection charges between operators in Malaysia are currently governed by the Access Regime under CMA 1998 and the ensuing interconnection agreements (ICAs) signed between the respective parties. In a seminal effort to establish the Access Regime under Communications and Multimedia Act (CMA) 1998, Malaysian Communications and Multimedia Commission (MCMC), the regulator, issued a new Mandatory Standard on Access Pricing, effective from 1st July 2003. The Mandatory Standard sets out the maximum standard prices for fixed network origination/termination services and mobile network origination/termination services in the form of 24-hour weighted average prices which will be fixed until 2005. The costing methodology used was closer to FAC for fixed services, using Telecom Malaysia's fixed network as proxy to nationwide fixed network and was closer to LRIC for mobile services, using Celcom's mobile network as proxy for nationwide mobile network.

30 Subsequently, MCMC reviewed the termination rates and issued a new Mandatory Standard on Access Pricing, effective from 15 Feb 2006 (to 31 Dec 2008) with new maximum prices for the said interconnection services as well as other (including additional) services. The costing methodology used is total service LRIC.

Pursuant to the Public Access Pricing inquiry, MCMC has increased the MTC in Malaysia gradually from US 2.12 cents in 2006 to US 2.55 cents in 2008.

31 The key features of the costing methodology and principles used are listed below:

- Factors taken into account when regulating prices: On the decision of regulating the prices, factors such as barriers to market entry, whether the market is moving to competition, were taken into account by the regulator.
- Mobile interconnection cost based on theoretical operator: MCMC attempted to cost mobile interconnection based on factors such as market share (traffic volume) and spectrum allocation. However, at the end, MCMC decided to adopt a theoretical network based on 33% market share as competition will eventually lead to 33% market share each (fair share between three players); and incorporating time for nationwide roll-out
- Peak and off-peak charges: MCMC replaced peak and off-peak charges with a 24-hour weighted average
- New interconnection services: Currently, 3G voice termination follows 2G voice termination. The regulator opined that inclusion of 3G expenses in the LRIC calculation might distort incentives to efficient migration from one platform (2G) to the other (3G), and introduce in the market undesirable cross-subsidization. Moreover, 3G networks are still quite new and innovative, making LRIC modeling results less reliable as a basis for forward-looking policy.

- Cost elements considered in costing exercise: CAPEX (Passive, active and transmission links), OPEX (Fixed and variable) and common costs (Personnel, General administration) were considered. Depreciation, cost of capital (WACC - 12.24%), indirect shared and common fixed costs (mark-up to LRIC) were also included in the cost elements considered. Moreover, MCMC is of the opinion that rural roll-out costs are mandated by factors external to operators, and hence should be regarded as an unavoidable cost and should thus be included in the LRIC cost.

32 In the report titled "A Report of Public Inquiry on Access Pricing" dated 30.11.2005 the Malaysian Communications and Multimedia Commission (MCMC) has concluded that mobile termination service is a bottleneck facility. Accordingly, it decided that price for mobile network termination service (voice only) should be mandated and an indicative price for mobile network termination service (SMS only) would be published. And in doing so they fixed such rates for the years 2006, 2007 and 2008.

M- Pakistan

33 In 2005, the regulator through its Determination dated 7th July 2005 determined the Mobile Termination Rate (MTR) on Fully Allocated Cost (FAC) basis. The mobile termination rate was determined as Pakistan Rs. 1.6 for the period 1st August 2005 to 30th June 2006 on this basis. A glide path was given to the industry for implementation of the MTR and it was also determined that the termination rate would be reduced to Rs. 1.25 from July 2006 to June 2008. The regulator engaged UK-based consultant Ovum plc., in collaboration with the World Bank, to provide consulting services to determine various interconnection charges for both fixed-line and mobile operators, using FAC under historical costing, bottom-up LRIC approach and international benchmarking. Based on the outputs of the LRIC model the mobile termination charge was set at Rs. 1.1 for the period from June 2008 to 31st Dec 2008. The authority also set a MTC glide path and determined that

MTC would be further revised to Rs. 1.00 in the period from Jan 2009 to Dec 2009 and would finally remain constant at Rs. 0.90 from Jan 2010.

- 34 For SMS termination charges, the service providers mutually agree to apply SKA (senders keep all) regime.

N- South Africa

- 35 In South Africa mobile termination rates have been determined by commercial agreement. Concerns have been raised that these rates have not been subject to effective competitive pressure and should be regulated. The clearest illustration of this concern is the 515% increase in interconnection rates between 1998 and 2001.

O- United Kingdom (U.K.)

- 36 The regulator and competition authority for the UK communications industries, Ofcom has recently announced around an 80% reduction in termination rates over the next four years. The major factors behind this decline are: (i) expected falls in the cost of network equipment, as 3G technology becomes more established; and (ii) the removal, as a result of moving to pure LRIC, of the contribution by mobile termination charges to the joint and common costs of the network. Ofcom has placed a cap on the rates charged by all four national mobile network operators. The revised rates are applicable from 1st April 2011 and end on 31 March 2015.
37. Consultation process for the review was started in May 2009, seeking views of stakeholders on different approaches to regulate Mobile Termination Rates (MTRs), including potentially radical reforms such as removing all rules on call termination or requiring that mobile termination rates be priced at zero (termed 'bill and keep'). For consultation, Ofcom set out six options, and asked for comments on these options, or any other option. At the same time the European Commission (EC) in May 2009, published a recommendation that member states should aim to set mobile termination rates in a way that only takes into account costs that are incurred directly from terminating calls

from other networks. The Commission has indicated that it expects rates to be between around 1.5 to 3 cents by the end of 2012 across member states. Ofcom has also taken account of this recommendation when setting out these proposals.

38. Ofcom decisions of the review are set out in a statement. Main points are as follows:

- Limit MTRs for all four national MCPs so that the maximum permitted charge for MCT reaches pure LRIC by 1 April 2014.
- The MTR cap will be set on a four-year glide path and aims to limit disruptive price-setting flexibility ('flip-flopping') by setting a simple cap with a single maximum charge in each year after a two-month transition period.
- Require the four national MCPs not to unduly discriminate in relation to the provision of MCT.
- Require all 32 MCPs to provide MCT on fair and reasonable terms, to publish their MTRs, and to give 28 days notice of changes to their MTRs.

Proposed MTRs (pence per minute - 2008/09 prices)

| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 |
|--|---|---------|---------|---------|---------|
| Vodafone / O2 / Everything Everywhere 7 | 4.180 | 2.664 | 1.698 | 1.083 | 0.690 |
| H3G 8 | 4.480 | 2.664 | 1.698 | 1.083 | 0.690 |
| Other designated mobile communications providers | Set on the basis of being fair and reasonable | | | | |

P- United States of America (U.S.A.)

39 In USA, "Local" fixed-to-mobile and mobile-to-fixed termination is subject to regulation as follows. ("Long distance" calls are subject to yet other inter-carrier compensation regimes that have not been described here.) Pursuant to a 1996 Act, all local exchange carriers (*i.e.*, local wireline telephone companies) are required to enter into "reciprocal compensation arrangements" for the transport and termination of local telecommunications traffic. Because "incumbent" local exchange carriers are assumed to possess market power, the Act imposes an additional obligation on them: their termination rates

must be based on “a reasonable approximation of the additional costs of terminating such calls.” In interpreting the statute, the Federal Communications Commission (FCC) ruled that rates set pursuant to “Total Element Long-Run Incremental Cost” (TELRIC) satisfied the “additional cost” standard. The FCC also adopted a presumption of symmetry: *i.e.*, the rate for terminating a fixed-to-mobile call should equal the rate for a mobile-to-fixed call.

- 40 Under this regime, operators are to attempt to voluntarily negotiate bilateral termination arrangements. If agreement is not possible, disputes are taken to arbitration at the State level, with the States applying the general cost and pricing principles articulated by the FCC.
- 41 The result of this regime has generally been an evolution to very low fixed-to-mobile (and mobile-to-fixed), termination rates for local calls. Today, these rates typically are a small fraction of a U.S. cent per minute, very close to zero.
- 42 Mobile-to-mobile termination is unregulated in the U.S., and termination arrangements are commercially negotiated between operators. What has emerged as an apparent equilibrium is a lack of termination charges—that is, voluntary “bill and keep,” a system under which each carrier recovers costs for these calls entirely from its own subscriber. But note that bill and keep is not mandated by law or regulation. Mobile service in the U.S. operates pursuant to a receiving party pays regime. There is no legal bar to adding a non-zero termination charge to what is generally a receiving party pays regime. SMS termination, which is virtually always a mobile-to-mobile communication, is also not subject to any regulation. The FCC recently proposed inter-carrier compensation reforms and is considering greater use of bill and keep.
- 43 The following table provides the summary on Interconnection Usage Charges in various countries:

| Sr. No. | Country | MTC/ FTC Regulated | Approach | Costing Methodology | Retail Charging Method- | SMS Termination Charge |
|---------|---------------------|-------------------------------------|--|---|--------------------------------------|--|
| 1 | Australia | Yes | Cost Based/ Cost oriented | Total Service Long Run Incremental Cost | CPP | - |
| 2 | Brazil | Yes | Cost Based | MTC- Fully Allocated Cost FTC- LRIC | CPP | - |
| 3 | Canada | Yes | Cost Based/ Cost oriented | Cost Model Similar to TELRIC | RPP/ BaK (Effectively Bill and Keep) | - |
| 4 | China | Yes | Cost oriented | - | RPP | - |
| 5 | Egypt | Yes | Cost oriented | Retail Minus (65% of operators onnet retail tariff) | CPP | Mutually Negotiated |
| 6 | France | Yes | Cost Based/ Cost oriented | LRIC | CPP | Maximum SMS termination Fee has been set by Regulator. |
| 7 | Germany | Yes | Cost Based/ Cost oriented | FL-LRIC | CPP | Not prescribed |
| 8 | Hong Kong | Free to set Parties agree for "BAK" | - | F to F- Long run average incremental cost | RPP | Not prescribed |
| 9 | Italy | Yes | Cost oriented | FAC | CPP | - |
| 10 | Korea | Yes | Cost Based/ Cost oriented | LRIC | RPP | - |
| 11 | Malaysia | Yes | Cost Based/ Cost oriented | FL-LRIC or its variant | CPP | Mutually Negotiated |
| 12 | Pakistan | Yes | Cost Based/ Cost Oriented | Combination of FAC and LRIC | CPP | Service providers Mutually agreed for SKA |
| 13 | South Africa | Yes | Cost Based/ Cost Oriented | FL-LRIC | CPP | - |
| 14 | UK | Yes (Capping of MTRs)) | Cost Based/ Cost Oriented | LRIC | CPP | Not Regulated |
| 15 | USA | F to M & M to F- Yes | F to M & M to F- Reciprocal | F to M & M to F- TELRIC | RPP | No regulation |
| | | M to M- No | M to M- Commercially Negotiated | M to M- Voluntarily Bill & Keep | | |

List of Acronyms

| Acronym | Expansion |
|----------------|---|
| 2G | 2 nd Generation |
| 3G | 3 rd Generation |
| A2P | Application to Person |
| ACCC | Australian Competition and Consumer Commission |
| AGCOM | Autorità per le Garanzie nelle Comunicazioni (Italian Regulator) |
| ANATEL | Agência Nacional de Telecomunicações (Brazilian Telecommunication Regulator) |
| ARCEP | Anciennement Autorité de Régulation des Télécommunications (French Regulator) |
| ASR | Accounting Separation Report |
| AUD | Australian Dollar |
| AUSPI | Association of Unified Service Providers of India |
| B2C | Business to Consumer |
| BAK | Bill and Keep |
| BSC | Base Station Controller |
| BSNL | Bharat Sanchar Nigam Limited |
| BSO | Basic Service Operator |
| BTS | Base Transceiver Station |
| CAGR | Compound Annual Growth Rate |
| CAPEX | Capital Expenditure |
| CCS7 | Common Channel Signalling-7 |
| CDMA | Code Division Multiple Access |
| CLEC | Competitive Local Exchange Carrier |
| CLI | Caller Line Identification |
| CMA | Communications and Multimedia Act (Malaysia) |
| CMTS | Cellular Mobile Telecom Service |
| COAI | Cellular Operators Association of India |
| CPNP | Calling Party Network Pays |
| CPP | Calling Party Pays |

| | |
|---------|---|
| CRTC | Canadian Radio-television and Telecommunications Commission |
| DOT | Department of Telecommunications |
| EC | European Commission |
| EDGE | Enhanced Data Rate for GSM Evolution |
| EMI | External Machine Interface |
| ERG | European Regulators Group |
| EU | European Union |
| FAC | Fully Allocated Cost |
| FCC | Federal Communication Commission |
| FFIC | Fixed-Fixed Interconnection Charge |
| FL-LRIC | Forward Looking Long Run Incremental Cost |
| FMC | Fixed-Mobile Convergence |
| FMIC | Fixed-Mobile Interconnection Charge |
| FNO | Fixed Network Operator |
| FTC | Fixed Termination Charge |
| FTM | Fixed to Mobile |
| GATS | General Agreement on Trade in Services |
| GDP | Gross Domestic Products |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communication |
| H-LRIC | Hybrid-Long Run Incremental Cost |
| HSPA | High Speed Packet Access |
| ICA | Interconnection Agreements |
| ILD | International Long Distance |
| ILDO | International Long Distance Operator |
| ILEC | Incumbent Local Exchange Carriers (Canada) |
| IN | Intelligent Network |
| IP | Internet Protocol |
| IUC | Interconnection Usage Charge |
| LDCA | Long Distance Charging Area |

| | |
|-------|--|
| LDCC | Long Distance Charging Center |
| LIR | Local Interconnection Region (Canada) |
| LLU | Local Loop Unbundling |
| LRAIC | Long Run Average Incremental Cost |
| LRIC | Long Run Incremental Cost |
| MCMC | Malaysian Communications and Multimedia Commission |
| MCP | Mobile Communication Provider |
| MII | Ministry of Information Industry, China |
| MMIC | Mobile-Mobile Interconnection Charge |
| MNO | Mobile Network Operator |
| MNP | Mobile Number Portability |
| MOU | Minutes of Usage |
| MPP | Mobile Party Pays |
| MSC | Mobile Switching Center |
| MTAS | Mobile Terminating Access Service |
| MTC | Mobile Termination Charge |
| MTNL | Mahanagar Telephone Nigam Ltd. |
| MTR | Mobile Termination Rate |
| M/W | Microwave |
| NGN | Next Generation Network |
| NLD | National Long Distance |
| NLDO | National Long Distance Operator |
| NRA | National Regulatory Authority |
| NTS | Non-Traffic Sensitive |
| OFC | Optical Fibre Cable |
| Ofcom | Office of Communication, U.K. |
| OPEX | Operational Expenditure |
| OSS | Operational Support System |
| P&L | Profit & Loss |
| P2P | Person to Person |
| PSTN | Public Switched Telephone Network |

| | |
|--------|---|
| SDCA | Short Distance Charging Area |
| SKA | Sender Keep All |
| SLM | Straight Line Method |
| SMP | Significant Market Power |
| SMS | Short Message Service |
| SMS-MT | Short message Mobile Terminated |
| STD | Subscriber Trunk Dial |
| RPP | Receiving Party Pays |
| TA | Telecommunications Authority |
| TAX | Trunk Automatic Exchange |
| TELRIC | Total Element Long-Run Incremental Cost |
| TRAI | Telecom Regulatory Authority of India |
| TS | Traffic Sensitive |
| TSLRIC | Total Service Long Run Incremental Cost |
| U.S.A. | United States of America |
| UASL | Unified Access Service Licence |
| VAS | Value Added Services |
| VAT | Value Added Tax |
| VoIP | Voice over Internet Protocol |
| WACC | Weighted Average Cost of Capital |
| Wi-Fi | Wireless Fidelity |
| Wi-Max | Worldwide Interoperability for Microwave Access |
| WSP | Wireless Service Provider |