Contribution of

Hellenic Telecommunications Organisation S.A. (OTE S.A.)

to the ERG Consultation on

Next Generation Networks Future Charging Mechanisms / Long Term Termination Issues

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OTE is pleased to contribute to the public consultation launched by ERG on the issue of "Next Generation Networks Future Charging Mechanisms / Long Term Termination Issues". With its commitment in making investments, promoting innovative solutions and services in the Greek market, OTE S.A. (Hellenic Telecommunications Organization), the incumbent telecommunications provider in Greece, is concerned about ERG's current assessment of future interconnection regimes and Bill and Keep.

A. General Comments

OTE would like to raise some general comments on the assumptions made for the proposed change of interconnection regime and the potential regulatory implications:

- OTE questions the proposed timing in the Common Position (e.g. "within the regulatory period related to the next market analysis") for the introduction of Bill and Keep interconnection regime. ERG defines as the need to open this debate "the convergence toward a multi-service (including voice) NGN IP network" and "the expected decrease of cost price (unit cost) for both voice and data services". This is supported based on the assumption that NGNs are expected to exhibit significantly lower OPEX and CAPEX in the long run than current legacy technologies. These arguments completely disregard that currently NGNs network deployments are and will continue to be characterised by uncertainty: uncertainty over the optimal pace of transition to NGN, over the future interconnection arrangements of networks (both PSTN-NGN and NGN-NGN) and, most importantly, over the demand for next generation services by consumers. Since services and business models have not been established in the market, investments in fully fledged next generation infrastructures are considered of high risk. This should be borne in mind when considering another uncertainty – that of regulatory intervention. OTE strongly believes that inappropriate regulatory intervention endangers delaying innovation and investment in NGNs. Moreover one of the issues that only recently has been addressed both by the Commission[1] and ERG[2] regarding regulation of termination rates, is the asymmetry between fixed operators, incumbents and new entrants, asymmetry that for long has subsidised new entrants. Decisions have been taken but have not yet been implemented and their impact is not yet known. Discussing on the future of the interconnection regime, when the impact of current regulation is still an unknown, is premature.

- ERG has investigated only Bill and Keep (BaK) considering it as "the most promising alternative to CPNP." We strongly believe that the investigation of future interconnection regimes should be extended so that more options are assessed, with the evolution of the current CPNP regime being included. It is noted that Ofcom has recently (May 2009) carried out a relevant consultation on future mobile termination regimes, in which six different

[1] "Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU", May 2009
[2] ERG (07) 83 "Common Position on symmetry of fixed call termination rates and symmetry of mobile call termination rates", February 2008

options are thoroughly examined[3]. Ofcom's current view is that: "…there is no single regulatory option for termination regulation that is unambiguously better than the alternatives. Different approaches would affect different types of consumers to differing degrees, particularly if there were to be a sudden shift in approach, and considerable uncertainty remains about how future services might develop." Moreover, concerning the possible remedies, Ofcom summarises about the different options: "The economic case for and against each of the candidate regimes is mixed, both in theory and in evidence… There is no consensus on the correct regime in the economic literature or among the academic commentators consulted."[4]

- The draft Common Position, which is clearly in favor of BaK, is based mainly on a qualitative analysis and some limited empirical data. In our opinion, before reaching to such an important conclusion which could have unpredictable effects in the whole telecommunications market in EU, a quantitative cost-benefit analysis should be carried out.

- The influence of BaK on the various types of operators has not been adequately assessed. OTE considers that BaK would introduce severe market distortions, especially in the presence of asymmetries in network sizes, network costs and traffic.

- According to Analysys Mason: "Change to an alternative system deemed as more efficient in theory, but with radically different base principles will certainly be much more costly and may require different approaches to those taken in the case study countries in order to be deemed feasible and beneficial."[5]

- Except for Singapore, no pure BaK is applied in the countries mentioned in this draft CP. In USA, interconnection between mobile operators, between mobile operators and non-incumbent LECs and between non-incumbent LECs is not regulated, while there are inter-carrier compensation payments exchanged between mobile/CLEC and ILECs. In Hong Kong MPNP (Mobile Party Network Pays) is applied for mobile termination (mobile operators receive no revenue from fixed operators when they interconnect with them). In Canada, BaK with mutual compensation (when there are traffic imbalances) is applied.[6]

- In these those countries where BaK (or nearly BaK) interconnection regimes exist, RPP retail pricing schemes are applied. In EU there are only CPP retail schemes, so a possible change to

[3] Ofcom has recently consulted on its assessment of six options for future mobile termination regimes: 1) Deregulation, 2) Long-Run Incremental Cost plus (LRIC+), broadly on the basis of the same cost standard as today, 3) Long-Run Marginal Cost (LRMC), revised charge control methodology with no allowance for recovery of common costs, 4) Capacity-based charges (CBC), charges based on the capacity required for termination, 5) Mandated Reciprocity, mobile charges match fixed charges, 6) Mandated BaK. See Ofcom, "Wholesale mobile voice call termination – Preliminary consultation on future regulation," May 2009

[4] Point 6.23, as above

[5] "Case studies of mobile termination regimes in Canada, Hong Kong, Singapore and the USA", Analysys Mason, Annex 8.1, as 3

[6] As previous

fit with BaK would cause unpredictable effects in the market. It is noted also that in a recent research, the majority of consumers replied that under an RPP regime, they would answer only some of the incoming calls, while a considerable percentage of them (12-27% for prepaid subscribers) would stop having a mobile.[7]

- The analysis focuses on voice services. However the situation in NGNs will be more complicated, as new multimedia services are expected to emerge, with different business models and wholesale agreements between operators and content providers. So a more general analysis is required before proceeding to the adoption of radical changes, such as BaK.

- Introducing interconnection regulation and new regimes, before NGN services and corresponding markets have adequately matured, could have the effect of regulating one part of the value chain, preventing the market from finding a workable solution suitable for new business models.

- Quality of Service is an essential part of electronic communication services both at the wholesale and the retail level. In an NGN world, QoS can be expected to be an important differentiating factor in competition. Different services and markets for low quality and for high quality may develop. Generally, the market players should be left to determine prices and conditions in the context of QoS.

OTE considers that there is no IP interconnection model that can be defined as being superior under all circumstances and that regulators should be careful when imposing any particular IP interconnection charging model. Through NGNs a wide range of services could be provided, with diverse retail pricing models (including QoS differentiation) and wholesale pricing must support that diversity, if it is to sustain efficiency and innovation in retail markets. Thus, the industry should be let to set the IP interconnection charging model under competition rules while regulators should be allowed to intervene only when market failures are clearly defined.

Interconnection arrangements should in principle be left to market parties and only when there is a market failure NRAs should intervene. According to Ofcom "no NRA in the world mandates BaK (with the exception of Singapore), though there are examples (notably in US) where BaK is the result of commercial negotiations".[8]

B. CPNP vs. BaK

Any IP-interconnection arrangement has to meet the following objectives:

- give incentives for investments
- foster competition

[7] "Mobile calling patterns research", Jigsaw Research, Annex 10.2, as 3
[8] Point 6.145, as 3

- give incentives for efficient network usage
- to minimize transaction costs
- to avoid regulatory induced arbitrage

These objectives would be best achieved by privately negotiated arrangements. As stated by Ronald Coase, who received the Nobel Prize in Economics in 1991, privately negotiated arrangements are frequently superior to regulated arrangements[9].

In today's PSTN networks, CPNP is the most commonly employed wholesale charging mechanism. This mechanism is seen as being economically efficient, since:

- Ideally, pricing should be such that it encourages only the calls that would pass a cost-benefit test. That is, the only calls placed should be those where the combined benefit (to both parties) exceeds the total costs to all networks involved in the delivery. But precise measurement of the benefit allocation is difficult, and billing additional parties imposes transaction costs, so practical considerations often dictate that only one party pays even though benefits are likely shared. The most efficient party to pay is the one for whom there is sufficient benefit available to induce them to place all (or most) of the socially desirable calls that they might initiate.
- Having as a basic principle that at the wholesale level, the primary beneficiary will be the CP which has the primary retail beneficiary as client, it can be supported that the initiator of a call (or the sender of a message) always expects to receive some benefit (positive utility) from the call, if it is completed (accepted) by the called party. In this case the CPNP appears to be the most suitable model as the primary beneficiary is the calling party. If we extend the analysis so that it is more general, then the party who expects to receive the most benefit at the time the call is placed (message sent) can efficiently subsidise the other party's direct costs.
- Due to the fact that network usage is always paid for, the CPNP-principle has the advantage that network operators can recover their costs. This gives the necessary incentives for investments especially to improve network quality. Moreover CPNP induces efficient network usage as every network operator has the incentive to route the traffic as long as possible in his own network.

In case the average benefit is approximately equal to both parties the costs of the call should be split respectively. BaK reflects the circumstance where the distribution of costs aligns exactly with the distribution of benefits. Then it is efficient to pay no interconnection fee at all. The disadvantages of BaK derive from the fact that there are only limited conditions under which it yields efficient market results:

- BaK can be a superior model only under very limited conditions: balanced traffic between peers; and where network costs equal retail customers benefits. If symmetry is

[9] WIK Consult (2008), "The Future of IP Interconnection: Technical, Economic, and Public Policy Aspects, Study fort he European Commission", p. 5

not fulfilled in a BaK relationship, larger networks are disadvantaged because they bear higher network costs than small networks, which is the case if the market structure – for example in the fixed telephone sector – is very heterogeneous. Therefore in such case the introduction of BaK would conflict with current regulatory proposals of symmetrical termination rates that seek to eliminate market distortions introduced by asymmetry.

- In most cases the introduction of BaK leads to market distortions and damages efficiency. With zero interconnection revenues, networks must recover all costs from their own customers and this usually leads to inefficient retail pricing.
- Because Bill & Keep is inflexible, it can lead to the "hot-potato" problem. The result is network structure bias: costs are pushed onto other networks. If costs are under-recovered, networks will under-invest.
- Applying BaK to services like telephony – where CPNP is the historic model – would create confusion to retail pricing models and major transitional issues for customers.
- BaK fosters the problem of SPIT (Spam over internet telephony) and SPAM.
- These inefficiencies are likely to be amplified in a QoS world, where network costs are greater (so the un-recovered costs would be larger).

It has to be mentioned that BaK exhibits a number of advantages. It avoids transaction costs between operators in case of symmetric traffic between peers. However, this benefit can be offset if strategic behaviours (e.g. the "hot potato" problem) and traffic balance need to be monitored to check whether the conditions in which BaK is efficient still hold. Any model that "locks in" a static price (as does BaK with a zero price) risks becoming inefficient, even if it is efficient in the beginning.

Furthermore, existing billing systems will continue to be necessary for billing the traffic to specific service numbers (e.g. free phone numbers or premium rate services) or the traffic of network operators who have not realized the maximum amount of points of interconnection set by the NRA and regulatory intervention might still be necessary in such cases. So the advantage, acknowledged as most valuable by regulators, that BaK wholesale charging model removes termination monopoly issues, and as a consequence reduces the need for regulation, is not entirely true.

Last but not least the effect of the BaK wholesale charging model on the Universal Service has not been taken into consideration. Network costs are radically different for providers supplying services and competing only to highly populated areas with reduced network costs and providers supplying services to the whole of a country. If Bill & Keep was to be introduced under such a circumstance the additional cost incurred to a Universal Service provider should be compensated by all service providers.

Based on the above, OTE would like to conclude that:

– There is no IP interconnection model that can be defined as being superior under all circumstances
– Regulators should be careful when imposing any particular IP interconnection charging model.
– The industry should be let to set the IP interconnection charging model under competition rules while regulators should be allowed to intervene only when market failures are clearly defined.

C. OTE's response to consultation's questions

Question 1: Do you agree that in a multi-service NGN environment, in which different services use a shared transport layer, different interconnection regimes for different services could create arbitrage problems? If yes, could you describe the problems that you foresee or that have already occurred? If no, what prevents these arbitrage problems in your view?

As different services have different characteristics and quality attributes, different interconnection regimes could be applied. With network management and different QoS classes it is possible to distinguish different services and to realise the optimal charging mechanism for each QoS class. In the presence of different QoS classes with different pricing regimes and therefore different prices there would be no potential for arbitrage.

In contrast the introduction of BaK would prevent the implementation of different QoS classes because there would be no incentives for investments in higher QoS and – contrary to what is stated in the ERG's draft position – such a regime would lead to an 'adverse selection' problem.

Another important issue is that under BaK regime, unauthorised providers might pursue interconnection. In addition to authorised providers of electronic communications networks and services which are already interconnected, other market players, i.e., unauthorised providers, (e.g., private enterprises and government administrations) will be interested to take advantage of interconnection because of the free access to networks under mandatory BaK. Interconnection would enable such a player to originate and send traffic from a virtual private network (VPN) without bearing any of the cost of the network infrastructure used to transmit the call.

Question 2: What is the influence of the separation of transport and service for the interconnection regime and in particular the charging mechanism and in what way are NGNs and BaK related?

It raises concerns why ERG has conducted the analysis based on definitions of transport interconnection and service interconnection different from the definitions provided by the relevant European standardisation bodies.

ETSI/TISPAN's definition of 'service oriented interconnection' includes also transport related information. The ETSI/TISPAN'S definition, apart from being the defined as a part of a standard, correctly describes the term since NGNs are not a sum of independent layers. The typical presentation of NGN architecture, as a set of separate layers each one providing specific network functionalities, can be misleading as it suggests that there could be different kind of operators operating different layers. This has not been the case with the OSI-model and may not be the case with NGNs. In fact, a next generation network operator will manage a set of layers since these layers are interlinked, when providing services supported by the NGN. It has to be mentioned that

the ETSI/TISPAN specification does not exclude the possibility of providing interconnection at specific functional levels.

It is important to mention that multiple interconnection provisions, defined at several layers of the network would add significantly to total network costs for all services and operators, failing to benefit from economies of scale and scope in providing services and applications. It is also likely to create a strong disincentive for investments in upstream infrastructures. Furthermore, it is unclear how such a separation of transport and service level can assure and guarantee service specific QoS and security to the customer especially to offer a substitute for PSTN services (in particular voice services). Finally it is important to mention that with separated transport and service levels other regulatory obligations (e.g. legal interception, security issues) could not be fulfilled.

Question 3: How would you define the boundary for the application of BaK and where should it be located (i.e. points of interconnection where BaK is applicable)?

The development and implementation of IP-based NGNs is in early stages and the final network architecture is not known today. So, no definitive statement about the future network structure (number of network nodes and / or points of interconnection in NGN) can currently be made. ERG rightly is of the opinion that interconnection points will be more central since traffic in an IP network in general becomes less dependent on distance and the capacity and processing power of modern network equipment has increased significantly compared to current PSTN networks. Therefore the efficient amount of POIs in a NGN will generally be substantially lower than in current PSTN networks. More precise statements currently cannot be factual.

However, an early introduction of BaK would have a major impact on network design and architecture, possibly resulting in major network redesign and higher costs. Especially in existing circuit-switched networks, the cost of redesign would be huge and unnecessary, as this technology will be renewed.

As mentioned in ETNO comments to previous ERG consultations[10], the mandated setting of a maximum number of POIs could lead to inefficient investments. It is noted that the free rider problem in the context of the 'hot potato routing' problem, could only be solved with a relatively large number of POIs near the customers.

[10] "ETNO Reflection Document in response to ERG consultation on Regulatory Principles of IP-IC/NGN Core," RD286, July 2008.

<u>Question 4</u>: What is your conclusion on the relationship between the charging mechanism and penetration, usage and price level?

ERG assumes, based mainly on Merrill Lynch's data that the adoption of BaK would lead to higher usage and lower price levels. However there has been a lot of debate about the validity of ML's data. Ofcom examines also an alternative price measure, the Teligen price indices, which measure the price of a representative basket of mobile services over time across OECD countries.[11] From the Figures shown below it is clearly seen that prices for the US and Canada are higher in relative terms for the low and medium usage profile and lower for the high usage profile. However, even in this case the results are quite different than those drawn by ERG.

Figure 6: Low usage price index (post-paid)

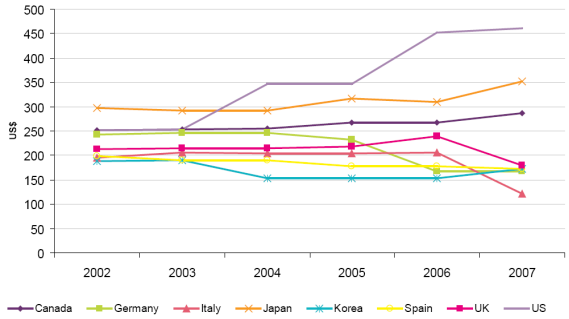


Figure 7: Medium usage price index (post-paid)

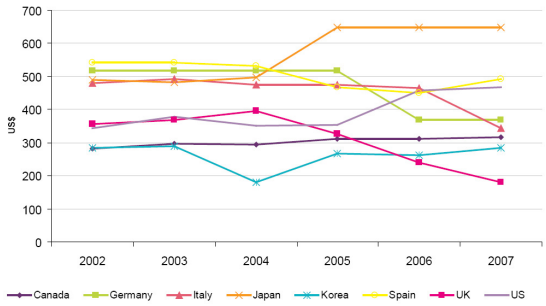
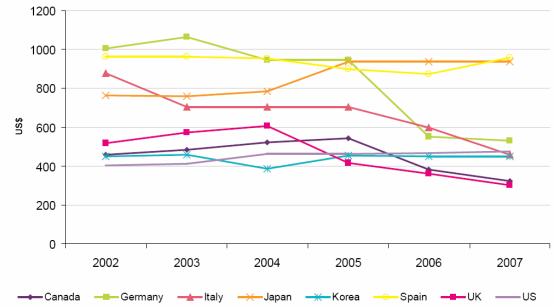


Figure 8: High usage price index (post-paid)



An even worse ranking for USA and Canada concerning prices for low, medium and high usage mobile baskets may be found in OECD's Outlook for 2009.[12]

Concerning the higher MoU observed in BaK countries, Ofcom states that: *"Last, it is also worth noting that the large difference in MoU between the US and Hong Kong on one side and other countries on the other appears to be a relatively recent development. The gap in MoU significantly increased over the period, suggesting that it may not perhaps be solely driven by differences in termination rates levels. A possible reason for the divergence could be the introduction of flat rate tariffs in the US in the early part of this decade."*[13]

[11] Annex 5, as 3
[12] OECD Communications Outlook 2009
[13] As 11 above

As far as penetration is concerned, the EU experience has shown that the CPNP charging method has lead to much higher penetration, possibly because of the related device subsidisation by network operators.

Network operators are looking at all possibility to reduce costs to either limit losses or maintain profitability. If they are unable to cover the costs of termination, as would be implied under mandatory BaK, they will be forced to recoup this loss elsewhere by increasing the price of other services.

As the ERG itself recognises, low-usage pre-pay mobile services in particular will experience a loss of revenue due to a move from CPNP to BaK. If mobile operators are forced to raise the price of these services, this will unfairly impact specific segments of end-users. This could result in some users having to cease their mobile service and thus in lower overall mobile penetration. And it should be noted that these 'at risk' low-usage customers are often vulnerable customers, for example, lower socio-economic classes, the elderly, and immigrants.

Question 5: How does BaK affect regulatory certainty and the risk of legal disputes?

Although we understand that BaK would alleviate NRAs from having to assess cost-oriented terminations rates, we do not agree that it would decrease regulatory uncertainty and legal disputes. A mandatory BaK regime could raise conflicts, such as QoS issues that the regulator will have to resolve in dispute resolution mechanisms.

Question 6: How do different wholesale charging mechanisms impact on the number of unwanted calls? Do you expect (other) effects on consumers/consumer groups? Where possible, provide a quantitative assessment of the expected effects.

OTE considers that SPIT might prove to be one serious drawback of BaK, as more unwanted calls are expected to be established with zero termination rates. BaK will foster the SPIT problem, and the fact that with BaK the called party also has to pay for the call has a greatly negative impact on the customer. And even if there is some related settlement inside EU (e.g. with no-call registries), the problem would still exist because of calls originated from countries outside EU.

Question 7: How do you assess the quantitative relevance of call and network externalities?

Call externalities: As mentioned in 5.2.1.1 it is nearly impossible to measure the utility distribution between the calling and the called party. Nevertheless we believe that practically the utility can be apportioned to the calling party for the following reasons:

1. The calling party makes the deliberate act of dialing at the time of its convenience.

2. When one considers only the benefit and cost of a particular call, it is logical to assume that the called party had a benefit too for which it did not incur a cost. However if one includes the whole communication between two parties in the division of cost and benefits, then it is logical to assume that the called party in a particular telephone call has already paid in one form or another for the "privilege" to be called, e.g. in the form of advertising for a trading company.

Consequently there are no distorting call externalities when CPNP is adopted.

In general, BaK would only be justified in case of huge call externality, which the ERG consultation document does not really demonstrate. It only concludes that *"(1) the utility of the called user is lower than that of the calling user, but that (2) the difference is not very significant."*

Other sources, such as the Jigsaw survey made for Ofcom[14], reflect different conclusions. In most scenarios presented to users, in case of charges for inbound calls, high percentages of respondents will change their pattern of receiving calls and some of them never answer them. For example, 12% of pre-paid customers will stop using their mobile in case of inbound call charges, even in case there is a 50% reduction of outbound call charges. This suggests that externalities are not so huge.

According to Ofcom: *"We are not aware of any empirical work systematically assessing the size of call externalities or the degree of possible internalisation of call externalities by consumers or operators. These, however, are the critical factors in reaching conclusions on the desirability of a BaK regime."*[15] In our view, it is necessary to undertake a sound assessment with empirical data to see the extent of call externality, and only a high level of evidence of huge call externality could really justify such a radical change of approach (from CPNP to BaK).

Overall, the statement of the ERG that BaK would best internalise call externalities is not justified. For example, as mentioned above, the negative call externalities for the called party in the context of unwanted calls are not mentioned.

<u>Question 8</u>: How would your business be affected by a move from CPNP to BaK? Please explain the expected impact on prices, volume of supplied services and profit.

The fact that there is a possibility that low usage offers might have increased retail prices is underestimated. Many operators, especially mobile, have based their Business Plan on this low ARPU market segment, and this effect could cause significant decrease of their revenues. Moreover the total welfare in this case should be estimated in more precision.

[14] As 7
[15] Point 6.151, as 3

A mandated BaK-approach as proposed by the ERG would inevitably induce considerable market distortions especially in the case of asymmetries.[16] If symmetry is not fulfilled in a BaK-relationship, larger networks are disadvantaged because they bear higher network costs than small networks. This is relevant if the market structure is heterogeneous as is the case in most fixed and mobile markets where there are various network operators with different network sizes and network costs.

Regulation-based BaK in the meaning of the consultation document with no payment at wholesale level irrespective of symmetry of the interconnection partners would lead to free-riding problems and destroy investment incentives. The argument that the cost could be covered by the own customers does not hold because strong competition in the retail market will drive down retail prices to very low levels. Furthermore, there are multiple large network operators which simply do not have (retail) end-customers but only interconnection partners. So no network operator will have an incentive to increase his costs by own network investments when he could use the networks of the interconnection partners with BaK for free.

Question 9: Do you agree with the conclusion that operators/users in the BaK domain will subsidise traffic coming from outside the domain (regardless of the legal aspect)? Are there any mechanisms to prevent this and how will they work in your view, in particular to avoid arbitrage?

OTE agrees with the conclusion that operators/users in the BaK domain will subsidise traffic coming from outside the domain. We concur with the ERG view that operators in a BaK domain will not be able to efficiently differentiate and charge a significant fee for traffic coming from outside the domain. Not being aware of other mechanisms to prevent this subsidy flow and arbitrage opportunities, OTE is greatly concerned the ERG seems to discount this serious downside to BaK.

As the ERG supports itself, having a significant percentage of traffic to neighbouring countries that use CPNP regime (which means BaK introduces a subsidy to the CPNP domain) is a 'con' which would justify continuation of the CPNP regime, at least for the short and medium term.

Question 10: Do you see any implementation problems for a migration period towards BaK? How could such problems be addressed?

If mandatory BaK were to be imposed by NRAs, migration issues and timing would be critical. Any glide-path transition foreseen will depend on the substance of the change, largely dependent on the level of the termination rates under CPNP at the start of the migration. As for the speed of migration, it is important that any mandated migration should allow retail business models to adapt, or new business models to be developed. And, of course, any new business model would

[16] ERG (2008), Consultation Document on Regulatory Principles of IP-IC/NGN Core, p. 84.

have a major impact on the network design, architecture and dimensioning. Also the billing systems would need to be updated and adapted to account for the complexity of boundaries and the differentiated application of BaK for the different type of calls.

Question 11: Does the draft CP miss any other relevant issues?

OTE would like to mention once again the fact that ERG's initiative to investigate BaK as a future interconnection regime is quite premature. We would like to stress that there are currently very important open issues regarding termination rates (e.g. the asymmetry between fixed operators, incumbents and new entrants) that should be handled appropriately by regulation. But even as a theoretical debate on future interconnection charging mechanisms, we believe that ERG's investigation on BaK is oversimplified.

As already mentioned in our general comments, it is proposed that ERG should also consider alternative charging mechanisms to BaK and carry out a thorough cost-benefit analysis. Moreover, in the light of the convergence towards a multi-service IP network, the investigation of interconnection regimes should not focus only on voice services, but be expanded in a wider range of multimedia services. For example ERG could consider the whole interconnection regime for all IP traffic, including data.