Unconditioned Local Loop Service

Response to the ACCC *Discussion Paper* examining possible variation of the service declaration for the unconditioned local loop service

Communications, Electrical and Plumbing Union (CEPU)
June 2007

The ACCC's discussion paper has been prompted by a request to modify the current Unconditioned Local Loop Services (ULLS) description to ensure that:

- Access seekers wishing to have ULLS access to the Telstra Customer Access Network (CAN) at points lower in the network than the exchange Main Distribution Frame (MDF) are able to do so and

- The ULLS service continues to be offered at the current level (at the exchange) even if Telstra builds out its proposed Fibre-to-the-Node (FTTN) network.

The questions raised by this request are, at one level, legal and definitional ones. If the current service description effectively covers these two scenarios, all that would appear necessary is for the ACCC is to monitor compliance with the present ULLS service declaration. In practice, however, the important questions confronting policy and regulation world-wide, as carriers extend fibre further into their networks, are not legal and conceptual ones but technical and economic ones. It is these that the CEPU wishes chiefly to address.

Before doing so, however, the union wishes to register its concern as to the actual thrust of this inquiry, given that it has been initiated by the very group, the G9, which has argued elsewhere that sub-loop unbundling (SLU) is neither technically nor commercially feasible. The CEPU would not dispute this contention. It notes, however, that it forms the basis for the G9's further argument for what it describes as "pillar migration" i.e. the cutting over of all Telstra's cable pairs at the pillar to the proposed G9 network.

In the CEPU's view, "pillar migration" is not so much an access service as a form of divestiture. Mandatory sub-loop unbundling (SLU), as we understand the concept and (proposed) practice in other jurisdictions, does not encompass or legitimate such radical measures. Nor does the CEPU support such a "solution" to the technical and commercial challenges posed by FTTN networks. We would not wish our scepticism about the practicability of SLU to be construed as implying tacit agreement with the G9 proposition.

On the contrary, we consider that in the current technological environment, regulatory energies could more usefully be focussed on forms of access better adapted to the evolutionary direction of fixed networks (e.g. Wholesale Broadband Access) than spent in ever more ingenious and more intrusive regulatory interventions in support of what are essentially transitional technologies ie. the DSL suite.

1. The current service description.

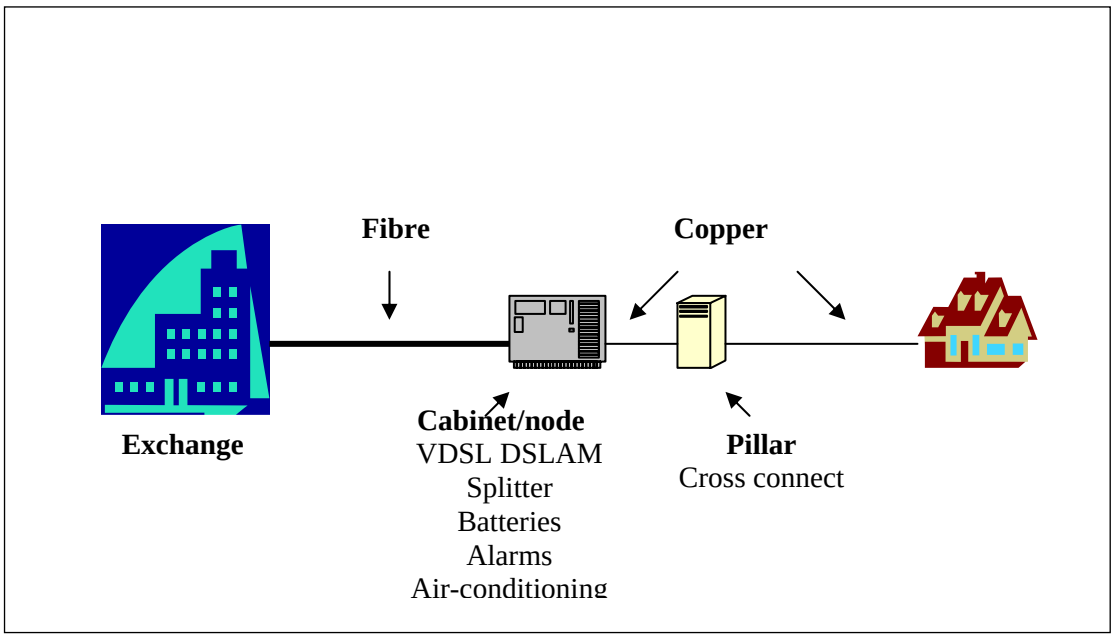
- ***Do you consider that a pillar, node or other remote device is "associated with a CAM" within the meaning of the current ULLS service description?***
- ***Do you consider that there is sufficient certainty around this issue? If no, what do you consider should be done to overcome this uncertainty?***

In the CEPU's view, it is difficult for submitters to give any definitive response to these questions because the answers will depend on the details of specific network topologies being developed at any point.

It is the union's understanding that Telstra now proposes to build a Fibre to the Node (FTTN) network capable of delivering VDSL2 services. Whether this network will differ significantly from that proposed in November 2005 will remain an unknown until more technical details of the network are in the public domain. Similarly, no technical details (to the extent that they exist) of the G9s alternative network are publicly available.

What can be said with some certainty, however, is that the continuing evolution of fibre-based all-IP Next Generation Networks (NGN) means that any definitions of network elements such as Customer Access Modules and any assumptions about their location within the network are based on shifting sands.

It is the CEPU's broad understanding that in an FTTN network such as Telstra proposes, ring tone, ring current (at least while POTS is still offered) and battery feed would be provided by equipment located in Optical Network Units (ONU) which would be themselves typically be located near if not immediately at pillars. Alternatively both the "pillar" (i.e. the cross-connect location) and the other ONU equipment could be contained within a single cabinet. In either case, the present definition of a CAM would seem to be satisfied as would the requirement that the CAM be "at or associated with" the proposed point of interconnection for SLU i.e. the pillar. (Whether such interconnection is practical is another question.)



Other network configurations are possible however. The ITU noted in 2002 that in order to achieve scale economies in FTTN build, some operators were intending to have centralised ONU serving a larger number of users, being connected to more than one cabinet or box.[1] In this case there may be no CAM located near a pillar at which interconnection is sought. However, it could still presumably be argued that the several pillars served by the remote CAM were still "associated" with it (as indeed all elements of the network must ultimately be functionally if not physically "associated" with each other for full service delivery to occur).

It is also theoretically possible, as Optus points out in its letter of 15th March, that Telstra (or indeed the G9) could roll-out an all-IP FTTN network in which the Customer Access Modules (CAM) did not provide ring-tone, VoIP services being generally powered at the customer premises rather than at the exchange or at such intermediate points along the network as a CAM might be located. In this case the present definition of a CAM would not be satisfied and whether or not it was located at or associated with a pillar would become irrelevant.

Such considerations lead the CEPU to question whether it is possible to craft service definitions for sub-loop unbundling that are sufficiently robust to encompass all possible network architectures as fibre is pushed closer to the premises. In our view, a better approach would be to determine what level and form of competitive access to actual (existing or planned) fibre-based networks is both physically and operationally possible and to proceed from this point.

2. Demand for the ULLS and sub-loop access

2.1.To what extent have access seekers sought to access the ULLS at RIM cabinets and other remote access units?

Have you experienced difficulties in accessing RIMs and other RAUs?

The CEPU is not an access seeker, nor does it have access to commercial-in-confidence information about the extent of demand for access to the copper network at Remote Access Units (RAUs). However, it is aware, both through information supplied by its members and through material in the public domain, of technical and commercial obstacles to the supply of ULLS from these points.

For a start, not all RAUs are capable of supporting xDSL services. RIMS and I-RIMS installed in the PSTN in the 1990s did not support such services. With the progressive introduction of CMUXs into the network since the early 2000s this problem is being overcome, especially in relation to new build. However, the question remains as to the extent of the retro-fitting that has occurred.

[1] ITU-T, *Full-Service VDSL: Focus Group Technical Specification, Part 1: Operator Requirements, Version 1.0.0* , 5 June 2002, p.28.

The union notes, in this regard, that Telstra's November 2005 FTTN Technology Briefing specified that some 7,500 pairgain systems in the five major cities covered by its proposed network would be removed (along with other broadband "blockers" such as loading coils) to allow for the provision of ADSL2+ from the node. This suggests that, even in high density areas, Telstra has not to date found it economic to equip all RAUs for xDSL delivery.

Over and above this possible obstacle, other difficulties that confront those seeking to access the PSTN at the RIM have been identified in the *Broadband Technology Rollout Costing Study* undertaken on behalf of DoCITA by Clear Advantage and Associates viz:

- The costs of backhaul (whether built or bought) from such multiple points of interconnection deeper in the network hierarchy
- Problems of equipment location as a result of space limitations in the Telstra cabinets (and, as a corollary, possible cost and legal [i.e. town planning] obstacles to duplication of cabinets)
- The fact that RIMs have typically been deployed in residential areas where customers have a lower average spend than business customers.
- Technical problems (interference) associated with the supply of multiple xDSL services via the RIM when these are carried over different types of bearers (i.e. copper and fibre).[2]

Clear Advantage and Associates suggest that, at least up until 2003, these difficulties had been sufficient to deter most market entrants from seeking access at this network level.

2.2. To what extent would the deployment of a fibre-based network affect the ability of access seekers to compete in downstream markets?
How will deployment of a fibre-based network affect demand for the ULLS or the sub-loop?

Telecommunications networks have been largely "fibre-based" for some decades. In Australia, fibre was deployed in Telstra's backbone and inter-exchange networks during the 1980s and 1990s and significant amounts of dark fibre were laid in the Customer Access Network (CAN). In recent years, fibre has been pushed further out into the Telstra CAN to Remote Access Units such as RIMS in order to overcome the bandwidth limitations associated with long copper line lengths and to achieve transmission efficiencies. In the CBDs of Australia's major cities there are multiple fibre loops which directly serve major business customers.

The CEPU makes this obvious point only because it sometimes suggested in industry discussions that the further deployment of fibre is entirely discretionary and that the activities of incumbents in moving to FTTN or FTTP networks are driven primarily by the desire to foreclose competition. The union would not deny that such

[2] Clear Advantage and Associates, *Broadband Technology Rollout Costing Study*, Department of Communications, Information Technology and the Arts, Canberra, November 2003, p.58.

considerations may affect the timing of network roll-out. However, the progressive extension of fibre further towards the premises represents the logical evolutionary path for wireline networks and the question has always been not whether, but when, such extension would occur.

Several factors other than competitive pressures are now combining to accelerate fibre deployment – the ageing of existing copper plant and the costs of its continuing maintenance, the rising cost of copper where replacement is necessary, the falling costs of xDSL equipment designed to be installed closer to the customer premises (ADSL2+, VDSL), the move to IP-based core networks and the evolution of IP-based products (voice, video) which require the higher bandwidths that fibre supplies.

The CEPU considers that it is counterproductive (and ultimately futile) for regulation to seek to retard such trends. Nevertheless, it is clear that they pose challenges to current telecommunications competition policy, based as it has been on ever deeper regulatory intervention into the wireline networks of incumbent carriers.

The CEPU has discussed some specific technical problems associated with the supply of access to Telstra's proposed FTTN network at 3.1. below. Broadly, however, access seekers wishing to operate on the basis of physical interconnection at the node will face the same problems identified above in relation to RIMS.

These problems are to some degree practical (e.g. gaining local government approval for installation of multiple cabinets in metropolitan locations) but chiefly economic. The further fibre is pushed towards the premises, the higher are the costs of equipment (DSLAMs, splitters, cabinets etc), the higher are the costs of backhaul and the fewer are the opportunities to achieve economies of scale.

European consultants WIK recently estimated that the investment required for deploying VDSL at the cabinet level is about five times that required for ADSL at the exchange.[3] While costs will, of course, vary depending on specific national characteristics (population densities, network topologies), these figures do at least suggest the order of magnitude of the economic challenge.[4]

These are capex costs. The CEPU notes that the G9 have themselves argued that the operational costs associated with physical interconnection at the node would be prohibitive if sub-loop unbundling took place on a service-by-service basis:

> ..this would be an extremely expensive and inefficient method of provisioning the .. Network. It would destroy much of the economic benefit which is achieved from moving to a [FTTN] network.[5]

The G9 proposal for "pillar migration" is based, in part, on such considerations i.e. on the proposition that sub-loop unbundling in the form of physical interconnection at the pillar/cabinet is not only technically problematic but uneconomic. Similarly, WIK

[3] Gabriele Kulenkampff, VDSL – The Way to Next Generation Access Networks, WIK Conference, Konigswinter, 22nd March 2007, p.3.
[4] The Clear Associate study in fact suggested a slightly more favourable ratio of VDSL to ADSL costs (3.6:1) in the Australian context. See Clear Associates, *op cit* p.142.
[5] *Submission to the Federal Government by the G9 Consortium Dated 30th May 2007*, p.3

states bluntly that in a FTTN/VDSL environment "there is no relevant business case based on sub-loop unbundling for alternative providers" and that "it is not economically viable and therefore possible for alternative providers to deploy SLU for the mass market".[6]

Other studies, reviewed below, have suggested that competition on the basis of sub-loop unbundling may be viable in certain market niches i.e where there is a very high density of potential customers or where customers are very high spend. (Though in these cases, the CEPU queries why competitors would not simply move to Fibre-to-the-Premises). It would appear that to compete in the mass market, however, access seekers will have, in the main, to rely on other access products, primarily Wholesale Broadband Access (WBA).

The CEPU notes that in some jurisdictions, regulation has required that continuing access at the present network level (i.e. the exchange) be made available for ADSL operators even after the access provider has moved to an FTTN/VDSL network. The union understands, however, that in practice there are significant technical problems (interference) associated with this requirement. These are discussed below. Moreover, it is hard to see how ADSL-based competition would be commercially viable for any significant period of time once higher bandwidth products are available over the FTTN – depending of course on pricing structures.

3. Supply of sub-loop access.

3.1. Is it technically feasible to connect to the local loop at a RAU such as a node? How? Are there any technical impediments?

It is the union's understanding that sub-loop unbundling is mandatory under the European Commission's regulatory framework and that the requirements of that framework have been specifically reinforced in a number of national jurisdictions. This implies that such interconnection is regarded as technically possible. Nevertheless, access seekers are not making use of this opportunity. As discussed above, the obstacles faced by those seeking access at this level are primarily economic, with the result that the technical feasibility of such interconnection is not in fact being tested in a real world environment.

It is clear, however, that there is a number of technical hurdles to be overcome for this form of interconnection to succeed. These exist both at the pillar (the point of physical cross-connect) and at the access module (which may be proximate to, but not immediately co-located with, the pillar).

The most immediate difficulty in the Australian case (again acknowledged by the G9), is that the existing Telstra pillars are full i.e. the physical connection points on the exchange side of the pillar (for Mains/M cables) are all (or virtually all) in use for active services.[7] An access seeker who had built its own cabinet at a Telstra node

[6] Kulenkampff *op cit* p.13

[7] Many of Telstra's pillars are in fact "overfull" with occupancy rates well exceeding those previously recommended by the ACA (now ACMA) i.e. 85%. Such low sparing ratios compromise both service

would thus not be able to connect that node (via, say, a 900 pair cable) to the exchange side of the Telstra pillar in order to connect customers switching from Telstra to its network.

Telstra could be required to reconfigure or reconstruct its pillar/cross-connect facility to allow for such extra capacity, but this would obviously involve a cost. The Union notes that BT's SLU offer provides this option but the cost is borne entirely by the access seeker.

It is also possible that this problem could be addressed by the competitor building not only its own node but its own pillar/cross connect. This would also address the technical, if not the economic, problem identified by the G9 to the extent that the pillar could be fully provisioned on the node side, awaiting prospective customers. It would not, however, resolve any technical problems that might relate to the physical transfer of pairs belonging to existing Telstra customers to the alternative network (via tie cabling between the two pillars).

One such problem that occurs to the CEPU is the question of how the alternative carrier would be able to identify the relevant cable pair to be transferred. This would require access to Telstra's cable records data base. This access could, presumably, be mandated, but such a step would represent a potentially costly intrusion into the incumbent's internal systems. There is also the question of who, in practice, would get access to these records and how commercial confidentiality and customer privacy would be protected in such circumstances.

These difficulties could be circumvented if Telstra's own staff (or contractors) were responsible for transferring the relevant copper pairs over to the alternative provider. In this scenario, however, it would be necessary for those staff to have access to the competitor's pillar/ONU.

Another issue is the impact of SLU on service quality. All other things being constant, the performance of cable is directly related to the number of times it is cut. Transferring a customer from one pillar to another (or from one pillar to another node) would have to involve the use of tie cables, with attendant impacts on performance standards and reliability.

The actual physical condition of the Telstra copper network and hence its capacity to deliver high speed services is a question that the CEPU has addressed at some length in submissions that are in the public domain. In our view, significant remedial work will still need to be done to the remaining copper loop (or sub-loop) if VDSL2 services are to be widely available. The last thing that is needed is any further physical intrusions that could affect services quality.

Such intrusions would indeed be perverse, given that one of the technical advantages of IP/fibre-based networks is the promise of higher reliability because fewer physical interventions are needed for service activation.

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availability and service quality (because there are fewer spare pairs to use in the event of persistent faults on an occupied pair).

At the ONU/node itself (as opposed to the cross-connect facility) further problems will be encountered. The chief of these that the CEPU can identify is the need for powering, especially if the access seeker is required to provide emergency service access over the unbundled sub-loop. The union understands that in the current ULLS situation, where competitors access the loop at the exchange/MDF level, ULLS users have access to Telstra power (i.e. mains power with battery back-up). A competitor seeking access to the loop at the node, however, would have to provide its own power supply.

Finally, as discussed in relation to RIMS, there is the question of backhaul from the node to the competitor's network. Again, while the problems here are chiefly economic, technical problems could also be encountered e.g. physical availability of duct space.

3.2. ***Is it possible for access to be provided at the exchange at the same time as access further along the communications cable..? Does this affect the quality of services supplied from either point?***

How would provision of access at multiple points on the communications cable affect the legitimate commercial interest of an access provider?

The CEPU understands that in some countries where carriers are rolling out or intending to roll-out FTTN networks, the provision of access to the copper loop at the exchange level will still be required. The intent of this policy is to provide regulatory support for operators whose businesses are built on ADSL (or, in cases where copper line lengths are short enough, ADSL2+).

Such access will be physically possible as long as the network owner retains both the current exchange locations at which ULLS is provided and the copper links between those locations and the nodes/cabinets. However, there are significant technical problems (cross talk/interference) associated with this requirement.

VDSL2, which Telstra now intends to deploy, operates in a very high frequency band At such frequencies, cross-talk between different copper pairs in the same cable is a major problem as is interference from external sources (RF signals from amateur radio, AM broadcast) and from some Customer Premises Equipment.

The CEPU understands that specific problems arise when ADSL and VDSL services are run in proximity to one another, with the nature of the cross-talk disturbance differing depending on the point at which the services are being offered in the network hierarchy. In the case of an FTTN deployment downstream VDSL signals (from the node) may generate an unacceptable degree of interference for the downstream ADSL signal, because at that point the ADSL signal will already be attenuated. This problem can be addressed by regulating the strength of the VDSL signal at the node/ONU[8] but to the extent that this will affect bandwidth it will run

[8] Belgacom, for instance, has been required by the national regulatory authority to reduce its power output for VDSL services to limit interference with other DSL services. See European Regulators

counter to the purpose of the VDSL deployment. In countries where FTTN roll-out is occurring, such interference issues are a subject of ongoing contention between VDSL and ADSL2+ providers.[9]

The Union is aware that the issue of coordinating the use of different DSL systems within networks is being addressed through a number of methods. In the UK, Ofcom (then Oftel) developed an Access Network Frequency Plan (ANFP) for both the British Telecom and Kingston networks in 1999/2000. The Plan was updated in 2005 to allow the deployment of ADSL2+ systems and VDSL on a trial basis and will, according to Ofcom, be adapted to fully accommodate VDSL systems in future.

The plan seeks to reduce interference between such systems by regulating both the "spectrum and power that can be launched into both the Exchange end and the Customer premise end of the wire-pair"[10] Implementation has involved BT and KTH being obliged to identify the lengths of all potential ULLS lines so that appropriate Power Spectral Density (PSD) masks can be specified for both different technologies and different loops.

Similar code and standard based initiatives have occurred in other countries. In Japan, spectrum management standards for multiple DSL deployments were first developed in 2001 and have been most recently updated in 2005.

In Australia, the Communications Alliance's ACIF Code C599:2006, issued last year, establishes criteria for the deployment of different DSL systems within the PSTN.

The CEPU is not aware of any assessment of the efficacy of these measures, but notes that they are subject to certain intrinsic problems i.e.

- They may not, in themselves, be sufficient to overcome all technological problems. The 2005 versions of the UK ANFP did not fully address deployment of VDSL2 nor does the current ACIF standard. (The publication of the ITU VDSL2 standard last year has, however, laid the basis for such future work.)
- They do not, in themselves, resolve the conflicting commercial objectives and interests of network users. Industry agreement on standards can be difficult to achieve and the resulting compromise may disadvantage some operators (and their equipment suppliers).
- Ensuring enforcement.

Moreover, the union questions to what degree such initiatives can resolve all the real-time challenges of operators dealing with what appear to be increasingly complex issues of quality assurance that appear to be associated with very high bandwidth DSL. Various solutions are being developed to address the VDSL interference

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Group (ERG) *Consultation Document on Regulatory Principles of NGA (ERG (07) 16)* Undated (May?) 2007, p.53

[9] Yves Blondeel, T-REGS, *Prospects for he Roll-Out of Alernative Technologies Across Europe,* March 2007, p.16

[10] *Specification of the Network Access Frequency Plan applicable to transmission systems used on the KCH network,* Network Interoperability Consultative Committee, Ofcom, 2006, p.7

problems. However, in a ULLS environment, their application in overall network management will be complicated by the fact that each operator will only be receiving partial information about total network performance.

This is turn raises the more fundamental question of the cost and purpose of prolonging the use of different DSL technologies within a given network. As the CEPU has argued above, the logical direction for wireline network evolution is the extension of fibre ever closer to the premises and as that process unfolds, competitive models based on earlier network architectures will become obsolete. In a dynamic industry such as telecommunications, such technological obsolescence is a well recognised commercial risk and there is a limit to the degree to which regulation can usefully protect individual operators against it. To attempt to do so is to run the risk of inducing inefficiencies and delaying innovation in the industry as a whole.

This is especially the case if regulation designed to avoid access seekers' being left with stranded assets effectively deters investment in network development by undermining the business case of the network provider. In the case of FTTN deployments, this case typically relies on savings achieved through the closure and sale of those exchange sites no longer required by the incumbent. Indeed as WIK argues

> The discontinuation of the Central Office is a **necessary condition** for the incumbent to fully exploit the potential cost savings of VDSL.[11]

KPN, for instance, plans to more than cover the capex costs of its proposed VDSL/FTTN network (0.9 billion Euros) through the sale of local exchange buildings (estimated revenue 1.0 billion Euros).[12] A similar strategy has been outlined by Telecom Italia. Recovered copper, where it has been replaced with fibre, could also be expected to help fund roll-out. Of course, such strategies spell the end of access at the exchange MDF (except where short line lengths allow the delivery of VDSL from the exchange).

3.3. What has been the overseas experience in sub-loop access?

As indicated above, it is the CEPU's understanding that sub-loop access is, in practice, something of a dead letter.

In some jurisdictions (the US, Germany) access "holidays" have been granted to protect fibre investments and thus speed the rate of fibre deployment. In Europe generally, SLU is mandated (EU Regulation of 5 December 2005) and SLU access offers have been made by incumbents but the CEPU understands that they are not, in fact, being used by access seekers. BT's current SLU offer (Issue 3 2006) is not even accompanied by any formal ordering process because of lack of actual demand.

This circumstance may be explained, in part, by the fact that FTTN roll-outs are still in their relative infancy and have not yet definitively superseded (either technically or

[11] Kulenkampff *op cit* p.19.
[12] Remko Bos, NGN in the Netherlands: a regulatory perspective, OPTA, March 2007, p.12

commercially) ADSL-based solutions. However, the lack of demand can also be reasonably taken to reflect the economics of SLU. There is a growing consensus that no plausible business case has yet been developed based on physical interconnection at this level.

This point has been highlighted in the course of the regulatory discussion surrounding KPN's VDSL/FTTN roll-out. The report by Analysys prepared for the Netherlands regulator, OPTA[13], concluded that use of SLU by a competitor to KPN would only be commercially viable in very restricted circumstances (i.e. in the densest urban areas) and even then only on the basis of radical reductions (50%) in KPN's proposed charges for sub-loop access, co-location and backhaul. To succeed in the mass market, an operator using SLU would have to have at least 55% of all broadband lines (including cable) and to be achieving incremental revenue increases at the most optimistic end of Analysys' estimated range.

The results of such modelling will vary, of course, depending on the specific conditions of national markets (population density, income levels) and related local network topologies. However, a study conducted by JP Morgan over a number of European countries reached similar conclusions i.e. that

> .. at least double digit market shares and a large premium market would be required to justify a new entrant VDSL deployment whereas **low market share operators would have no VDSL business case.** For an average new entrant operator in a country with average network topology **VDSL would most likely be a loss maker**. Even a market share of 40% would not justify VDSL investment, unless there was an increase in ARPU.[14] (Emphasis in the original.)

4. Alternative approaches.

The CEPU considers that, given the doubtful future of SLU as an alternative to the current ULLS service, debate in Australia could more usefully be focussed on alternative forms of access to Next Generation Networks (including those based on Fibre-to-the Premises) and on the degree to which the transition to such networks needs to be managed actively by the regulator.

The chief alternatives which are being considered (and offered) overseas appear to be Wholesale Broadband Access (WBA) and continuing ULLS access at the exchange level. The Union notes that neither of these alternatives is unproblematic. With WBA there are questions as to the level at which access is offered. The technical and commercial issues surrounding continuing ULLS access at the MDF in a FTTN environment have already been canvassed. Such a requirement would impose considerable costs on the network operator (e.g. the opportunity costs of retaining exchange buildings) and regulation would be faced with the difficult task of deciding how such costs would be allocated.

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[13] Analysys, *Final report for OPTA:The business case for sub-loop unbundling in the Netherlands,* January 2007.
[14] ERG *op cit* p.78

In the worst case scenario, this transitional strategy could have the effect of delaying or deterring FTTN roll-out. For instance, KPN will not initially deploy FTTN in areas in which there is heavy use of ULLS. This is good news for ADSL-based competitors but not for bandwidth hungry customers. Finally, if the FTTN operator is required to bear all the costs of such a requirement, it could undermine the business case for FTTN altogether.

The CEPU notes, in this regard, that Telstra has signalled that an unfavourable regulatory treatment of FTTN may lead it to prioritise other platforms – wireless, HFC – for broadband service delivery, at least in the short-to-medium term. This may prove an empty threat. Nevertheless, it does raise the question of the degree to which the current regulatory focus on access to the CAN is skewing investment decisions.

On the one hand, there is the risk that the platform which ultimately will offer the greatest efficiencies in transmission i.e. fibre is not developed or not, at least, in a timely manner. On the other, there is the question of why Optus (together perhaps with the G9 consortium) does not invest in upgrading its own HFC network. The CEPU understands that new technologies (DOCSIS 3.0) allow the delivery of very high speed services (100Mb +) over cable. But such investment will be unlikely as long as regulation promotes access-based competition which shields competitors as far as possible from commercial risk.

The CEPU believes these larger considerations, as well as the specific questions posed in the ACCC's *Discussion Paper*, need to be borne in mind when considering the merits of access regulation options in an FTTN environment.