Australian
Competition &
Consumer
Commission

ACCC Advice to Government

National Broadband Network Points of Interconnect

Public Version

November 2010

Contents

Abbreviations

ACCC	Australian Competition and Consumer Commission
ADSL	asymmetric digital subscriber line
ATUG	Australian Telecommunications Users Group
AVC	access virtual circuit
BES	Broadcasting Engineering Services (Australia) Pty Ltd
CACS Bill	*Telecommunications Legislation Amendment (Competition and Consumer Safeguards) Bill 2010*
CBD	central business district
CCA	Telstra call charging area
CCC	Competitive Carriers' Coalition
CSA	connectivity serving area
CVC	connectivity virtual circuit
DSLAM	digital subscriber line access multiplexer
DTCS	domestic transmission capacity service
EFS	Ethernet Fanout Switch
ESA	exchange service area (copper network)
FAN	fibre access node/fibre exchange
FSA	fibre serving area
FTTP	fibre-to-the-premises
GPON	Gigabit Passive Optical Networking
HFC	hybrid fibre-coaxial cable
LCS	local carriage service
LSS	line sharing service
LTIE	long-term interests of end-users
NBN	National Broadband Network

NNI	network to network interface
OLT	optical line terminating unit
OSS	operations support systems
POI	point of interconnect
POP	point of presence
RBBP	Regional Backbone Blackspots Program
RKR	record keeping rule
RSP	retail service provider
SAU	special access undertaking
SDH	synchronous digital hierarchy (transmission protocol)
TDM	time-division multiplexing
TPA	*Trade Practices Act 1974* (Cth)
ULLS	unconditioned local loop service
UNI	user network interface
UNWP	uniform national wholesale pricing
VHA	Vodafone Hutchison Australia Pty Limited
WLR	wholesale line rental

1. Overview

1.1. Introduction

This paper has been developed by the Australian Competition and Consumer Commission (ACCC) in response to a request from the government for the ACCC and NBN Co Limited (NBN Co) to undertake a process, including public consultation, to seek to agree upon the number and location of initial Points of Interconnect (POI) for the National Broadband Network (NBN) that will best meet the long-term interests of end-users (LTIE).

The ACCC prepared a discussion paper to provide relevant stakeholders with an opportunity to provide their views on these issues. The discussion paper, *ACCC Discussion Paper: National Broadband Network – points of interconnect* (Discussion Paper) was released on 21 October 2010. NBN Co prepared its own public position paper, *NBN Co Public Position Paper: Proposed NBN Co Points of Interconnect* (NBN Position Paper), as part of this consultation process. The NBN Position Paper was attached to the Discussion Paper. Feedback in response to this consultation has been important in assisting the ACCC in forming the following advice as to the appropriate number and location of initial POIs that would best meet the LTIE.

The ACCC notes that the timeframe under which this advice has been developed (approximately seven weeks) has been considerably shorter than for a standard regulatory process. The consultation period was therefore also necessarily short, a concern which was raised by a number of respondents to the Discussion Paper. Consequently, this advice relies upon the best information which was available to the ACCC, much of which was quite limited or relatively untested.

1.2. Executive Summary

1.2.1. ACCC views

The ACCC considers that a semi-distributed approach to the initial POI location (also referred to by NBN Co as Option 2) is likely to best meet the LTIE.

The ACCC is concerned that the implementation of either a composite or centralised approach would represent a significant degree of 'mission creep' in relation to NBN Co's objective to "occupy as small a footprint as possible in the overall value chain".[1] The extension of NBN Co's network beyond the access network (which is generally considered to be a natural monopoly or a "bottleneck") to also include a transmission network (which otherwise demonstrates competitive characteristics in some geographical areas) would represent a considerable departure from regulatory

[1] NBN Co, 'Fibre, Wireless and Satellite', at www.nbnco.com.au/our-network/fibre-wireless-and-satellite, viewed 5 November 2010.

orthodoxy – namely that regulation should only focus upon markets where competition is not effective.

Summary of ACCC findings

The ACCC has reached the following conclusions in relation to the various approaches which could be used to determine the location of NBN Co's POIs.

The implementation of a semi-distributed approach is likely to best promote retail and wholesale competition across all geographic markets.

- Overall, a centralised or composite approach would reduce the effectiveness of competition between retailers as the scope for differentiation on the basis of innovation and price would be reduced by the increased reliance they would be required to have upon NBN Co's services (i.e. dynamic competition).
- In geographical markets that are served by competitive transmission – competition in the relevant retail and wholesale markets is likely to be promoted under both a fully and semi-distributed approach compared with the detrimental effects that would be likely to occur to dynamic competition under a centralised or composite approach.
- In geographical areas that are served by natural monopoly routes (i.e. regional areas) - a semi-distributed approach (and, to a certain extent a consolidated or composite approach) is likely to result in some enhanced retail and wholesale competition. This is due to the potential for improved price and non-price terms for natural monopoly transmission services as a result of the substitution of NBN Co for Telstra as the supplier of those services (which would not occur under a fully distributed approach). That is, NBN Co should have less of an incentive to discriminate towards an individual access seeker than Telstra has had, which may lower the barriers to entry in some areas.
- Due to the likelihood that Telstra will remain in control of natural monopoly transmission routes there is a considerable prospect that its continued vertical integration could constrain the development of retail and wholesale competition in areas where it is the sole provider of transmission under a fully distributed approach. Therefore, the efficient use of NBN Co's access network is likely to be improved under a semi-distributed approach as there is likely to be increased demand for services which utilise that infrastructure.

The implementation of a semi-distributed approach (as articulated by the ACCC) would be likely to result in optimal outcomes for competition in transmission markets.

- Both a fully or semi-distributed approach would effectively preserve existing competition in transmission markets.
- Although a fully distributed approach would theoretically provide the maximum opportunity for future competition to develop in transmission markets, the implementation of a semi-distributed approach as proposed by the ACCC would provide substantially the same benefits.
- A centralised or consolidated approach would have a detrimental effect on competition in transmission markets as it would result in the removal of existing

competition and the foreclosure of opportunities for future competition in the relevant markets.

- A fully or semi-distributed approach are both likely to promote the efficient use of and investment in transmission infrastructure on competitive routes, whereas a centralised approach would result in a needless bypass of that infrastructure.

A uniform national wholesale price can be achieved independently of decisions regarding NBN Co's network design.

- Although a centralised or composite approach (as articulated by NBN Co) appear to deliver a relatively neat method to address the government's uniform national wholesale pricing (UNWP) objective, and are in turn argued by NBN Co to lower barriers to entry for access seekers in regional areas, there are likely to be significant, potentially irreversible, negative implications for competition in various sectors of the telecommunications industry should either of these approaches be implemented.
- The ACCC considers that the government's UNWP objectives – and in turn a lowering of the possible barrier to entry in regional areas that current transmission pricing may pose – can be achieved through alternative mechanisms which are not dependent upon the design of NBN Co's network. These are outlined in section 1.3.2, and reflect the ACCC's preference for differential service costs (including any cross-subsidies) to be as transparent as possible if these subsidies are not external.

A semi-distributed approach is likely to have other potential benefits.

- Under a fully or semi-distributed approach, the potential for Layer 1 unbundling will remain in areas where a POI is located with the local exchange. The option for future Layer 1 unbundling would be substantially foreclosed under a centralised approach.
- The extent of asset stranding will be substantially reduced under a semi-distributed approach than that which would be likely to occur under a centralised or composite approach. The natural monopoly transmission assets owned by Telstra are the assets which are most likely to be impaired under this approach. However the value of such impairment is likely to be taken into account by Telstra in its negotiations with NBN Co in relation to the use of that infrastructure.

Implementing a semi-distributed approach

The ACCC considers that a semi-distributed approach should be implemented by locating POIs where competitive transmission services are currently available from that location, or where there is sufficient evidence regarding the likelihood of competition.

In order for the NBN Co and industry to have guidance regarding how a semi-distributed approach is to be implemented, the ACCC intends to develop a set of guiding principles, or a "rule of thumb" as a useful screening device to indicate whether a particular transmission route is competitive. However, these principles will require further consideration and refinement.

The ACCC considers that this rule of thumb approach could be adopted as an initial starting point for identifying the location of POIs under the semi-distributed approach, and that the precise POI locations could be determined following an assessment of other evidence that the particular route is effectively competitive. This approach broadly reflects that which was recommended by the Australian Competition Tribunal (discussed further in section 5.2.1). As an initial starting point, the ACCC's view is that NBN Co's POIs should be located where:

(a) it is technically and operationally feasible for NBN Co to allow interconnection (this will usually be at the fibre exchange for each FSA);

(b) there are at least two competitors with optical fibres within a nominated distance from that location which:

  (i) connect that site to an optical fibre network which is connected to a capital city; and

  (ii) deliver wholesale transmission services which are suitable for use by service providers who wish to connect to the NBN at that location; and

(c) there is other evidence that the particular route is, or is likely to become, effectively competitive,

(the 'competition criteria').

The ACCC intends to further consider what factors or method for assessment could be used to clarify what evidence would be considered under limb (c). These could, for example, include evidence of existing long-term contractual arrangements for the acquisition of transmission services.

An important part of the approach recommended by the ACCC is the ongoing review of the location of the POIs in order to:

- address any failure by the market to deliver competitive outcomes (for example, through price based competition); and
- enable competitive transmission to develop downstream of the POI where market conditions change to make new entry feasible.

The ACCC proposes that the process for any subsequent relocation of POIs be incorporated into NBN Co's special access undertaking (SAU). An additional safeguard is the ACCC's ongoing regulation of particular transmission services (i.e. the domestic transmission capacity service) which provides the mechanism for the ACCC to set price and non-price terms of access on regulated routes which serve the NBN POIs.

1.2.2. Reconciling ACCC recommended approach to NBN Co network architecture

It is NBN Co's view that in implementing a semi-distributed approach, POIs should only be located in designated locations within geographical areas that it terms 'connectivity service areas' (CSAs). Most relevantly, these locations within CSAs may

act as aggregation points for network traffic from multiple fibre serving areas (FSAs) – each of which will have a fibre exchange which is technically able to operate as a POI.

The ACCC's preferred approach is for the assessment of where POIs should be located to initially commence with consideration of all locations of the network where interconnection is technically and operationally feasible. In general terms, this would require an assessment of the transmission facilities which would be present at every fibre exchange. In contrast, by only considering POIs at CSAs, NBN Co's proposed approach may overlook potential POIs which would be located closer toward the end-user.

However, the two approaches will align where:

- the CSA overlays a single FSA (i.e. there is only one fibre exchange and therefore only one potential POI for that geographical region, so the CSA construct does not foreclose opportunities for interconnection at a point which is closer to the end-user) – this is most likely to occur in metropolitan areas where population density is high; and
- the POI for the CSA acts as an aggregation point for multiple downstream fibre exchanges (i.e. where the CSA comprises multiple FSAs and there are therefore multiple potential POIs) which would not be served by competitive transmission services This is most likely to occur in regional areas.

The ACCC expects that these circumstances will apply to the majority of the CSAs currently proposed by NBN Co. However, where there are FSAs downstream of a CSA which would be served by competitive transmission services, the ACCC would be concerned that linking the POI location to the CSA construct would result in the foreclosure of transmission competition in some areas. Based on its preliminary analysis, the ACCC believes that it is likely that only approximately 15% of the proposed mainland state capital city CSA POI locations will require further examination to ascertain whether these CSAs should be served by multiple POIs (i.e. at the downstream FSAs which meet the competition criteria as described in section 1.3.1).

The ACCC's preliminary analysis is that the application of the semi-distributed approach as proposed by the ACCC is likely to amount to a total number of mainland state metropolitan CSA POIs in the range of 108 – 130. The ACCC does not expect that the implementation of a semi-distributed approach would result in a significant increase in the number of CSA POIs for the proposed 81 regional CSAs and 6 non-mainland state metropolitan CSAs (i.e. for the capital cities of the Northern Territory, ACT and Tasmania).

In addition to the above, the ACCC also considers that NBN Co should consider a number of additional factors in designing its network to enable a semi-distributed approach to be best implemented. In particular, the ACCC would expect that NBN Co would design its network to ensure that there are a sufficient and appropriate number of points in its network where it would be technically and operationally feasible to construct a POI (i.e. "potential" POIs). Based on the ACCC's current understanding of NBN Co's proposed network design, all fibre exchanges will be capable of being "potential" POIs.

The ACCC expects that NBN Co will have some degree of flexibility regarding where it locates its fibre exchanges, as there are likely to be multiple existing copper exchanges available in each FSA which could be selected for that upgrade. In determining where fibre exchanges are located, the ACCC considers that NBN Co should consider which available location would:

- be likely to be served by the maximum amount of transmission competition (i.e. this would require consideration of which location is best served by existing transmission services and the likelihood for future development); and
- have the minimum physical requirements for it to operate as a POI. This would require consideration of whether the selected copper exchange would actually have sufficient space for it to act as a POI for the NBN or, if there is not sufficient space, whether it would be feasible for the POI to be virtually co-located to the exchange.

The ACCC has conducted some preliminary analysis in relation to the first requirement and is available to further develop this with NBN Co. The ACCC understands that NBN Co is currently performing some analysis in relation to the second requirement.

1.3. Suggested next steps

If the government endorses the principles for locating POIs as proposed by the ACCC, the ACCC considers that the appropriate next steps could include those which are set out below.

1.3.1. Determining POI locations

The ACCC's initial starting point for the assessment of when a location should be determined to be served by competitive transmission is outlined above. However, whilst the existence of two suppliers on a particular route may be used as an initial screening device for the preliminary assessment of whether competitive transmission services are likely to be available, this is not wholly determinative. To this end, the ACCC believes that an empirical assessment of other competitive indicators should be included in order to ensure that the route is sufficiently competitive.

Therefore, whilst recognising the need for the location of POIs to be determined quickly, the ACCC proposes that it consults with NBN Co in order to refine the competition criteria and to ensure that the identified transmission routes are sufficiently competitive. This could include:

- identifying a geographical range from the proposed fibre exchange site within which transmission infrastructure must be located in order for the likelihood of effective competition to be considered to be sufficiently high; and
- any other technical characteristics that should be required of the relevant transmission infrastructure (for example, that the network must meet a minimum availability service level) in order to ensure that it is capable of providing effective competition.

The mechanisms for reviewing the location of the POIs, including when and how they may be moved to be either further away from or closer to the end-user, will need to be developed in conjunction with the initial competition criteria in order to ensure that these safeguards are able to be effectively implemented in the future.

Following the refinement of the criteria (or in conjunction with that process), NBN Co could then prepare a list of all the fibre exchange locations (i.e. street level address), noting which of those it believes would also act as POIs in accordance with its assessment against the competition criteria.

The ACCC is of the view that the identification of POIs through a competition test using a semi-distributed approach should be straight forward in the vast majority of instances. This could enable finalisation of NBN Co's business plan. Even where not straight forward, application of the approach may be able to be resolved relatively quickly depending upon the outcome of further discussions between the ACCC and NBN Co.

The ACCC considers that the final identification of the number and location of initial POIs could be subject to a short period of public confirmation, in order to avoid unintended consequences. The ACCC believes that it is important that this process is conducted by an independent party, rather than NBN Co in order to allow industry stakeholders to submit confidential information regarding the precise location of their transmission assets and their plans for future investment. The ACCC would be available to fulfil this role should it be requested to do so.

The ACCC believes that this process (or processes) could be completed relatively quickly. This will assist by giving NBN Co and industry sufficient guidance regarding how the ACCC will consider this matter in the future. However, it should be noted that if NBN Co were to lodge an SAU, the ACCC would need to conduct an assessment of the terms and conditions of that SAU afresh and in accordance with the relevant provisions of the TPA.

If there are amendments to NBN Co's proposed fibre exchange or POI locations during the roll-out, further consultation will be required. The process for this consultation is ultimately expected to be included in NBN Co's SAU.

1.3.2. Uniform national wholesale pricing

The ACCC acknowledges that the pricing and product constructs created by NBN Co based upon a centralised or composite approach were aimed at addressing the government objective of achieving a UNWP.

On the information received to date, the government does not appear to have fully defined the scope of its UNWP objective. There is a spectrum of different ways of interpreting UNWP, and in turn a spectrum of different ways of implementing it, depending on the problem the government is seeking to address.

What problem needs to be solved?

Historically, the government's pricing parity objectives have focussed on achieving broad parity between the retail prices charged for a basic telephone service across

regions, under the Universal Service Obligation (USO). To the extent that this has created revenue shortfalls for the USO provider – Telstra – these have been funded via the external mechanism of the Universal Service Fund. The Universal Service Fund has been sourced via a levy on all licensed telecommunications carriers in proportion to their 'eligible revenues'.

Until the recent commencement of the government's Regional Backbone Blackspots Program (RBBP), the government had not sought to directly address the issue of what are understood to be high transmission prices in regional areas (relative to less remote and more densely populated metropolitan areas) and the implications for entry into retail broadband markets in these areas. These higher prices are likely to have been driven by several issues, including:

- the higher cost per end-user of providing transmission in regional areas, which is driven by longer distances and lower population densities;
- vertical integration and the incentives it creates for the incumbent to charge higher prices to, and therefore foreclose entry by, potential retail market competitors; and
- the limitations of the negotiate-arbitrate access regime in addressing monopoly pricing.

The ACCC notes that its recommendations on initial NBN POI location, as well as the just-passed amendments to the telecommunications access regime, will go some way to alleviating the second and third issues. However, it would not necessarily on its own affect higher prices of transmission on current monopoly routes (or in the 'non-competitive' footprint), to the extent the costs of supply on those routes are higher than on competitive routes. The ACCC considers that this problem can be solved without having to adopt a centralised approach to POIs.

If the issue of parity in transmission pricing *between* competitive and monopoly routes is resolved (along the lines proposed below), the issue of non-uniformity in transmission pricing is narrowed to the pricing of transmission on competitive routes (i.e. *within* the 'competitive footprint'). That is, there may be differences in the price of transmission to *reach* NBN Co's POIs which could prevent access seekers from being able to deliver uniform prices. In these circumstances, even though prices for NBN Co's services from the POI to the end-user would be uniform, prices from the POI back to access seekers' core networks might not be uniform.

How big are these problems?

The ACCC notes that transmission cost differentials in the competitive footprint (i.e. where there is more than one transmission supplier) are a feature of competition in telecommunications today, and that this was not raised in this process as being a driver of any significant degree of geographic non-uniformity in retail prices in the competitive footprint. Furthermore, on the information the ACCC has available to it, it is likely that where transmission competition exists, the price of this transmission is likely to represent less than 10% of total input costs for Retail Service Providers (RSPs). Having said this, increased demand for transmission as a result of the upgrade of the access network from copper to fibre could put upwards pressure on transmission

prices, making these costs a higher proportion of RSPs' total costs. On the other hand, the per end-user cost of transmission could fall to the extent that the increased traffic drives efficiencies from economies of scale.

The ACCC does however consider it likely that there will be larger differences in transmission pricing in the non-competitive footprint relative to the competitive footprint, which could continue without further intervention.

Possibly reflecting this, the bulk of submissions on the issue of UNWP did not express major concerns around pricing disparity across competitive routes, but rather, focussed on approaches to delivering lower pricing on monopoly transmission routes.

How can the problems be fixed?

In formulating this advice, the ACCC has given preliminary consideration to alternative mechanisms for delivering UNWP. At the outset however, the ACCC notes its consistent position has been that external funding mechanisms (direct government subsidisation), implemented in such a way as to avoid distortions to competition, are the preferable mechanism for funding the provision of uneconomic services. However, the ACCC recognises that other policy objectives may constrain the adoption of such an approach.

If the government's objective for a UNWP only applied to NBN Co's basic product (e.g. 12 Mb/s plus voice capability), with revenue shortfalls in high cost regions to be recovered from higher data rate products, the ACCC considers that the need for any further intervention and funding mechanisms might be obviated. This is because the transmission requirements for providing a basic service would be relatively low and the potentially higher cost of backhaul across both or either of the competitive or non-competitive footprints would be recovered from higher data rate services.

On the other hand, if the UNWP objective was defined to apply across all of NBN Co's products (i.e. including higher data rate products), there may be a need for a funding mechanism to support this objective.

Addressing the costs of monopoly transmission

In this report, the ACCC considers one approach to dealing with the problem of high prices for NBN Co's supply of transmission in the non-competitive footprint.

A price cap could be applied on NBN Co supplied transmission services with subsequent revenue shortfalls to be recovered through a surcharge on the price of the access component of NBN Co's product. The cap and uplift could be set in such a way as to ensure that access seekers pay a uniform price for NBN Co's products, from the POI to the end-user, at any POI location. Effectively, this implements a cross-subsidy from access seekers in metropolitan areas to those in regional areas.

A price cap approach was broadly endorsed by submissions to the Discussion Paper (albeit a number of these recommended shortfalls be funded via direct subsidies), and

reflects a similar approach to that recommended in the Implementation Study (the Study).[2]

Addressing differential costs in competitive transmission

Whilst such an approach would address the issue of high transmission pricing in the 'non-competitive footprint' relative to the 'competitive footprint', transmission prices from the CBD to the POI (the 'competitive footprint') could be non-uniform, and if there were large differences in these prices, this could lead to non-uniform retail pricing.

As noted above, the ACCC considers that the size of transmission price differentials in the competitive footprint is not likely to be significant. However, if the government nonetheless has concerns regarding the potential for these differentials to drive non-uniform retail pricing under a semi-distributed POI model, an approach described in this report as an 'equalisation model' could be adopted, where differential prices for NBN Co's products (i.e. the bundled transmission and FTTP access components) are adopted at different POIs to account for different transmission prices on competitive transmission routes to those POIs.

The ACCC acknowledges that NBN Co's initially proposed solution of a composite or centralised POI approach, with UNWP applying from the centralised POI to and end-user in any location (supported by internal cross-subsidies), would address both of the problems outlined above. However, the ACCC considers that alternative approaches to dealing with these problems could achieve the same outcomes, but without the deleterious consequences for competition and efficiency outlined above.

Should it be required, the ACCC remains available to consult further with government and NBN Co in relation to how the government's objective of a UNWP could best be achieved.

[2] KPMG/McKinsey, *Implementation Study for the National Broadband Network*, prepared for the Department for Broadband, Communications and the Digital Economy (DBCDE), May 2010, (Study).

1.4. Structure of this report

The remainder of this report is structured as follows:

- Section 2 provides a brief overview of POIs and each of the POI location options proposed by NBN Co. It also outlines the legislative and policy framework that has guided the ACCC's assessment of each of these options against the LTIE, and provides an overview of the markets which are likely to be affected.
- Section 3 provides detail on the current state of competition in the transmission market and the ACCC's approach to regulation in this area. This section also includes information on pricing and the location and value of assets that may be stranded as a result of a decision regarding the number and location of initial POIs.
- Section 4 discusses the ACCC's LTIE assessment for each of the different POI approaches. The POI approaches are identified as the 'fully distributed', 'semi-distributed' and 'centralised and composite' approach to POI location.
- Section 5 provides the ACCC's recommendation regarding the initial approach to POI location that best meets the LTIE and how that approach could be implemented. This section also discusses how POI locations should be reviewed in the future.
- Section 6 discusses the relationship between the government's objective of UNWP and the location of POIs and the ACCC's preliminary thinking on ways in which UNWP may be achieved under a semi-distributed POI option.
- Section 7 discusses the implications of initial POI location for potential future Layer 1 unbundling.
- Attachment A provides further detail on the ACCC's approach to assessing the LTIE.
- Attachment B provides further detail around the ACCC's understanding of NBN Co's current proposed network architecture and product offerings.

2. Background

2.1. POIs and different POI location options

A POI is the inter-network location where traffic is exchanged between one network and another. The initial NBN POIs are the points in the network that will allow access seekers to connect and exchange traffic with the NBN. The different approaches proposed by NBN Co in relation to the location of its POIs are summarised in the table below.

Table 1: NBN Co proposed POI location options

Option	Number and location	Rationale
Option 1: Fully distributed (No consolidation)	718 - 950 POIs [3]	POIs are fully distributed and located at every FSA
Option 2: Semi-distributed (Low consolidation)	Indeterminate, depending on definition of contestable transmission	POIs are partially distributed, at the edge of where contestable transmission exists
Option 3: Consolidated (High consolidation)	14 Aggregation POIs (4 x Sydney, 4 x Melbourne, 2 x Brisbane, 2 x Adelaide, 2 x Perth)	Traffic is carried to 'Aggregation POI' locations. POIs are centralised at five capital cities
Option 4: Composite	14 Aggregation POIs + up to ~195 CSAs	POIs available at five mainland state capital city locations, plus additional interconnection at up to ~195 Connectivity Serving Areas (CSAs)

Source: NBN Co, *Public Position Paper – Proposed NBN Co Points of Interconnect (POIs)*, October 2010, (NBN Co Position Paper).

Table 1 demonstrates there are a number of alternatives regarding the approach which could be adopted for determining the number and location of POIs for the NBN. At one end of this spectrum, NBN Co could offer interconnection at every FSA (described in section 2.1.1), before any aggregation of that network traffic has occurred (that is, the fully distributed/no consolidation POI option). At the other end, NBN Co could offer interconnection only at limited locations where nearly all of the network traffic is aggregated in some way (that is, centralised or highly consolidated POIs).

Within that range, NBN Co could potentially offer POIs with a low to medium level of consolidation (i.e. semi-distributed POIs). The number of POIs as a result of this

[3] NBN Co indicates that the 718 FSAs in its initial plan may change as its detailed network planning progresses. NBN Co currently predicts that approximately 950 FSAs may be provided in its final design.

approach could span between the minimum number canvassed under the consolidated option (i.e. 14 POIs) to the maximum number available where POIs are fully distributed as far as is technically feasible (i.e. 718 – 950 POIs).

Under the composite model, interconnection would be available at the limited state capital locations (i.e. as for the consolidated option) and at the CSAs proposed in the NBN Position Paper (CSAs are described in section 2.1.1). Access seekers would be able to request interconnection at those CSAs subject to timing constraints and the business rules set out by NBN Co governing when such interconnection would be permitted. Whilst the business rules are yet to be determined, NBN Co has stated that it initially considered that interconnection would only be available at CSAs in limited circumstances, such as for technical reasons (such as latency, avoidance of tromboning), or to provide interconnection for applications or content distribution.[4]

2.1.1. Technically feasible POIs in a copper versus fibre access network

In the copper based network, local exchanges in each exchange service area (ESA) operate as potential POIs for access seekers. In the NBN context, the ESAs will be replaced by FSAs. In any particular geographical region NBN Co's fibre access network will link each premises with fibre to a centralised local location which houses Gigabit Passive Optical Networking (GPON) equipment (i.e. Optical Line Terminating Units - OLTs). This point is known as the Fibre Access Node (FAN)[5] and the footprint of premises that are connected to it is known as a FSA. Interconnection is likely to be technically feasible at each FAN/FSA. Therefore, FAN sites in the fibre network can be considered the equivalent of local exchanges in the copper network (i.e. "fibre exchanges").

Currently, approximately 550 copper exchanges actually operate as POIs for access seekers who utilise unconditioned local loop service (ULLS) and line sharing service (LSS) facilities. There will be significantly fewer FSAs (700 – 1 000) than there are current ESAs (5 000). This is driven both by technology differences (the GPON network has a greater operational reach than that which is currently used for the metropolitan copper network), and the fact that NBN Co's fibre network will cover only 93 per cent of premises, which overlays approximately 1 900 of today's ESAs. Further technical detail on the difference between ESAs and FSAs is provided in Attachment B.

A CSA is a construct developed by NBN Co which defines a geographic area on the basis of it including a minimum addressable end-user market. A CSA may consist of one or more FANs/FSAs. If a CSA includes multiple FANs/FSAs and a single POI were offered for that CSA, this would mean that interconnection would only be permitted at one of the potentially multiple technically feasible POIs.

---

4 NBN Co, *Public Position Paper – Proposed NBN Co Points of Interconnect (POIs)*, October 2010 (NBN Co Position Paper).

5 A FAN is described by NBN Co as the facility that houses the active electronic equipment for the Fibre Access Node (the OLTs and Ethernet Fanout Switches - EFS). NBN Co notes that it may or may not be the POI location. NBN Co, *Product Overview – Fibre Access Services*, August 2010.

Further details on these concepts, including diagrams, are included at Attachment B.

2.1.2. Relationship between POI location and NBN Co product offering

NBN Co has proposed to provide access seekers with essentially one wholesale product that is made up of four components - but which will need to be acquired together (bundled). The two key 'logical' (as opposed to physical) components are:

- an access virtual circuit (AVC) from the user-network interface (UNI) at an end-user premises to an OLT, then on to the first Ethernet Aggregation Switch;[6] and
- a connectivity virtual circuit (CVC) which aggregates many AVCs at the Ethernet Aggregation Switch and transports them to a network-network interface (NNI) at a POI (to connect with the access seekers network).[7] The amount of capacity allocated to a CVC is aligned to the aggregate needs of the related AVCs and access seekers are able to specify and purchase CVC capacity according to their individual requirements.

Under NBN Co's current product proposal, the AVC and CVC products are logical constructs which do not bear a direct relationship to underlying network infrastructure – that is, different network elements cannot be clearly linked to the different product components. This arises from the logical constructs reflecting a Layer 2 Ethernet service rather than the network elements. This means that figures B2 and B3 in Attachment B are representations of an Ethernet service. In practice, the AVC is not directly linked to infrastructure just on the GPON side of the network; and the CVC is not directly linked to infrastructure on the transmission and switching side of the network.

The amount of infrastructure (fibre in particular) used to provide the bundled AVC and CVC product components will vary depending on the degree of consolidation of FSAs which occurs at the POI. The greater the consolidation of FSAs at the POI, and therefore the further the likely distance of the relevant FSA from the POI, the greater the length of the fibre link to that POI. The number and location of POIs will therefore determine the length of the fibre link that is required by NBN Co to supply its AVC and CVC bundle – that is, the extent of transmission required by access seekers that is provided by NBN Co; as opposed to provided by another transmission supplier, or self supplied.

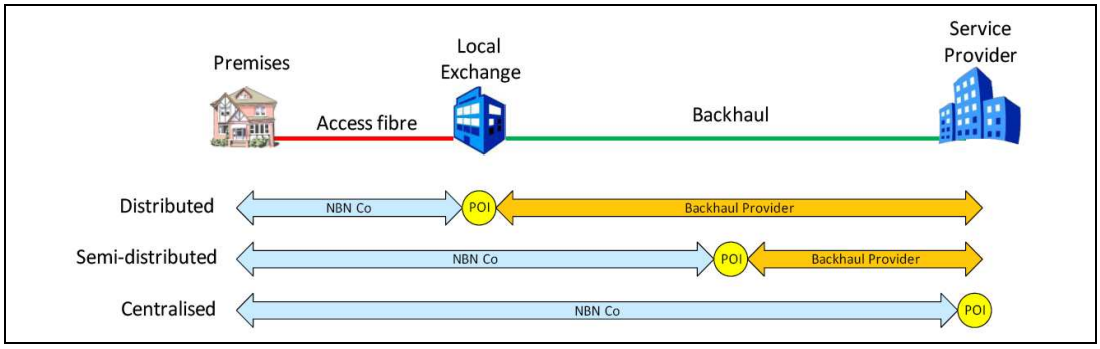
Figure 1 provides a simplified form of this. The 'local exchange' in this figure would be a FAN (some existing local exchanges may become FANs with the FTTP upgrade, others may not).

---

6 The NNI is a physical, aggregated Ethernet interface, directly accessed by the access seeker within the POI. NBN Co, *Product Technical Specifications – Fibre Access Services*, August 2010, (NBN Co Product Technical Specifications).

7 NBN Co Product Technical Specifications.

Figure 1 – NBN Co's depiction of the approaches to POI location



Source: NBN Co Position Paper.

Under a fully distributed approach, NBN Co would not provide a point to point transmission service to make its product available remotely from the fibre exchange. Instead, access seekers would purchase transmission capacity from existing suppliers (or self supply) to transport their traffic to and from the fibre exchange. A large number of distributed POIs will mean that, from the POI to access seekers' main point of presence (POP) in the network, each access seeker will provide more non-NBN transmission (either purchased from existing suppliers or self-supplied) than it obtains from NBN Co. In this case, the CVC would be presented at the NNI port of the Ethernet Aggregation Switch directly serving the OLTs within a single FAN at a single location.

Where POIs are located further away from the end-user at an aggregation point, NBN Co would provide protected transmission interconnecting all FAN sites served by that aggregation point with the POI aggregation point itself. In this case, NBN Co's CVC would be presented at the NNI port on the Ethernet Aggregation Switch at the POI. The centralisation of POIs would have the effect of replacing part of the transmission component that individual access seekers would otherwise provide for themselves in a decentralised POI model. POI centralisation or decentralisation does not alter the bundled nature of the AVCs and the CVC components. As Figure 1 shows, the more consolidation of traffic associated with the POI location, the greater the extent of NBN Co's supply of the transmission service within the provision of the AVC and CVC bundle.

2.2. Framework for assessment

2.2.1. Long Term Interests of End-Users

The ACCC has been asked by government to provide advice regarding the approach for the initial number and location of POIs for the NBN that will best meet the LTIE. In considering the concept of the LTIE the ACCC has applied that criterion as it is set out under Part XIC of the *Trade Practices Act 1974* (Cth) (TPA); that is, the ACCC has had regard to the extent to which something achieves the following objectives:

- promoting competition in markets for listed services;

- achieving any-to-any connectivity in relation to carriage services that involve communication between end-users; and
- encouraging the economically efficient use of, and the economically efficient investment in: (i) the infrastructure by which listed services are supplied; and (ii) any other infrastructure by which listed services are, or are likely to become, capable of being supplied.[8]

These objectives are interrelated. In many cases, the LTIE may be promoted through the achievement of two or all three of these matters simultaneously. In other cases, there may be some trade-off between the different aspects and the ACCC will need to weigh up the different effects. In this regard, the ACCC will interpret 'long-term' to mean a balancing of the flow of costs and benefits to end-users over time in relation to the objectives. Thus, it may be in the LTIE to receive a benefit for even a short period of time if its effect is not outweighed by any longer term cost.

Further detail of the ACCC's approach to assessing the LTIE is at **Attachment A**.

The ACCC notes that it is unable to formally 'approve' an agreed number and location of POIs through this process. It is anticipated that the outcome of this process will provide guidance to NBN Co and industry regarding how the ACCC is likely to handle this issue if it is later required to consider POIs as a part of an assessment of NBN Co's Special Access Undertaking (SAU). However, it should be noted that if NBN Co were to lodge an SAU, the ACCC would need to conduct an assessment of the terms and conditions of the SAU in accordance with section 152CBD of the TPA. This provision requires the ACCC to consider whether NBN Co's SAU is 'reasonable', which requires consideration of a broader set of factors than the LTIE.[9] The ACCC would be required to assess NBN Co's SAU on its merits in accordance with the 'reasonableness' criteria and any such assessment would include consideration of any proposal by NBN Co regarding the location of its POIs and other relevant information before the ACCC at that time.

The ACCC has also outlined its initial views on whether and how the location of POIs should be reviewed over time in order to ensure that the recommended approach continues to meet the LTIE over time (see section 5.3).

2.2.2. Other matters considered

The government has requested that the advice also address the following issues:

- short and long-term competition impacts of the initial number and location of POIs on the backhaul and retail markets;
- current and prospective state of competition in the backhaul market including pricing and the location of and value of any assets that may be stranded by the

[8] Section 152AB(2) of the Trade Practises Act (TPA).

[9] In determining whether particular terms and conditions are reasonable, regard must be had to the (non exhaustive) set of factors outlined in section 152AH (1) of the TPA.

agreed number and location of POIs and options for addressing any adverse implications (if any) for existing backhaul asset owners;

- implications (if any) for potential future Layer 1 unbundling and home-run topology; and
- stakeholder response to the consultation process.

An assessment of the promotion of competition limb of the LTIE test requires consideration of the impact of each approach to the location of POIs on the short and long-term competition impacts on the transmission and retail markets. Therefore, these matters are considered as part of the ACCC's LTIE assessment in section 4.

The current and prospective state of competition in the transmission market including pricing, location and value of any assets that may be stranded, is outlined in section 3. As the ACCC has not recommended an approach to POI location that would result in the significant stranding of existing transmission assets (with the possible exception of Telstra's), it has not included an assessment of options for addressing any adverse implications for existing transmission asset owners in this report.

The implications of POI location for potential future Layer 1 unbundling and home-run topology is discussed at section 7.

Although the government has not directly sought the ACCC's views on the issue, a discussion of how a uniform cost structure could be provided to RSPs independent of the approach taken for POI location is included in section 6.

Stakeholder responses to the consultation process are included throughout this report in the relevant sections.

2.3. Markets affected by location of POIs

In order to conduct an assessment of which approach to POI location best meets the LTIE, the relevant markets which are likely to be affected by POI location need to be identified. In accordance with the Discussion Paper, the ACCC believes that the relevant markets include those relating to transmission capability, retail and wholesale services.

The ACCC's general approach to defining markets is outlined in its Merger Guidelines.[10] However, it is important to note that for the purposes of this advice, in assessing the LTIE it is not necessary for the ACCC to make precise findings regarding the boundaries of the relevant market(s).

The ACCC has been asked to consider which approach to POI location would best meet the LTIE. The ACCC is therefore required to conduct a long range forward looking assessment of the impact each approach would be likely to have on the relevant markets, were it to be adopted by NBN Co.

[10] ACCC, *Merger Guidelines*, November 2008, (Merger Guidelines).

In order to make this assessment, the ACCC must forecast the impact each POI approach will have on markets which are likely to develop significantly over the next 8-10 years as the NBN is rolled out and significant regulatory reforms are implemented. The amendments proposed in the *Telecommunications Legislation Amendment (Competition and Consumer Safeguards) Bill 2010* (CACS Bill), including the structural or functional separation of Telstra and changes to the operation of the access regime in Part XIC of the TPA, are likely to affect the structure of the relevant markets. The assessment of the relevant markets, and the potential impact each POI option may have on them once the NBN has been rolled out, is by its very nature speculative. Due to this uncertainty, the ACCC can only meaningfully consider market definition (and the likely effects on those markets) based upon its current understanding of how these market structures will evolve in the future.

2.3.1. Transmission capability

Broadly speaking, transmission capability refers to links (also referred to as 'backhaul') which are used to connect service providers' core networks with points of service delivery (such as exchanges). These links are usually provided using optical fibre, but can be provided using digital microwave or satellite systems.

Service providers can obtain transmission capability by:

- building and installing their own physical infrastructure in order to self supply;
- acquiring services in an 'unconditioned' state (i.e. dark fibre) and providing their own electronics to condition the fibre; or
- acquiring services in a 'conditioned' state, such as managed transmission services, which includes the declared domestic transmission capacity service (DTCS).

The ACCC considers that these services are functionally substitutable and form part of a broader 'transmission capability' market. The ACCC has previously identified different types of transmission services (in the context of its decisions relating to DTCS) including:[11]

- inter-exchange transmission – this includes transmission routes between exchanges which are within the same call charging area;
- inter-capital transmission – this includes transmission routes between capital cities; and
- transmission between different call charging areas – this includes transmission provided along capital-regional and inter-regional routes.

In the context of the regulation of the DTCS, the ACCC has found that the geographic dimensions for the various transmission markets are relatively narrow. For example, "a

[11] ACCC, *Telstra's Domestic Transmission Capacity Service Exemption Applications: Final Decision*, November 2008, (DTCS Exemption Final Report). Note that "tail-end" transmission is not relevant for the purposes of this advice.

point to point capital-regional route is not likely to be demand side substitutable for another route."[12]

As is noted below in section 3, the extent of competition for transmission services varies between geographic regions.

For the purposes of this report, the ACCC believes that it is appropriate for it to separately consider the effects the various POI approaches will have upon transmission routes that are considered to be competitive (i.e. this would include routes that are currently competitive and routes which are likely to become competitive over the relevant time horizon) and transmission routes that exhibit enduring natural monopoly characteristics.

Within the category of routes that are considered to be competitive, the level of competition may vary. Whether any particular route will satisfy a test of workable or effective competition will turn upon whether the commercial actions of the supplier (or suppliers) in that market are constrained by rival suppliers or the threat of new entry.

Transmission routes which are not competitive may exhibit natural monopoly characteristics. Generally speaking, a natural monopoly will occur where a single transmission facility is able to supply demand for transmission services in that area at a lower cost than more than one facility. As a result, it is unlikely that more than one supplier of transmission services will emerge on those routes if the same market conditions prevail. In determining which routes comprise natural monopolies it is informative, but not conclusive, to identify routes that are currently served by only one supplier. It may be that not all of these routes are actually enduring natural monopolies, as it there may be that there are other factors have meant that competition has not developed.

2.3.2. Retail markets

Transmission capability is a necessary input for service providers to be able to provide retail services in the downstream markets. The location of the POIs for the NBN may therefore have an effect upon competition within those relevant retail markets.

The relevant retail markets in this context are primarily those which relate to services which will be supplied over the NBN (or which will be capable of being supplied over the NBN). Therefore, at least initially, the greatest impact is likely to be in relation to the retail market(s) for business and consumer grade products based on the wholesale services that will be supplied by NBN. This would include fixed-line broadband and voice services. As transmission is also relevant to the supply of other downstream services, such as mobile and corporate and government services, there may also be an effect on those markets.

For the purposes of this report, the ACCC considers that it is appropriate to focus its consideration upon the effects upon a national retail market or markets for broadband and voice services.

---

[12] DTCS Exemption Final Report, p.40.

2.3.3. Wholesale markets

The network design for the NBN may impact the way in which markets for the provision of wholesale services develop during the transition from the copper network to the fibre network. Even though NBN Co will be a provider of wholesale services, these services are expected to be at a sufficiently low enough layer in the supply chain to allow other service providers to offer 'value-added' wholesale services to RSPs. These wholesale services could include the supply of services for use or resale by those RSPs which could range from a small addition to the service which is provided by NBN to a complete product which is readily able to be resold with minimal intervention by the RSP.

For the purposes of this report, the ACCC considers that it is appropriate to consider the effects each of the approaches to POI location is likely to have on a broad market or markets for the supply of wholesale 'resale' services. This market could include wholesale services which support the delivery of voice (i.e. Wholesale Line Rental – WLR, Local Carriage Service - LCS) and broadband services (i.e. Layer 2 or Layer 3 bitstream services). The ACCC believes that vibrant wholesale markets are an important input for ensuring vigorous competition in the downstream retail markets.

As there is significant uncertainty regarding how the relevant wholesale markets will develop over the NBN, it is not possible for the ACCC to further define the boundaries of the relevant wholesale market (or markets) with any degree of precision. The ACCC also considers that a prescriptive market definition is not necessary for the purpose of the analysis required in this report.

3. State of competition in transmission markets

The government has requested that the ACCC provide advice in relation to the current and prospective state of competition in the transmission market including pricing and the location of and value of any assets that may be stranded by the agreed number and location of POIs. This section addresses these matters to the extent possible given the information currently available to the ACCC.

3.1. ACCC regulation of transmission markets

3.1.1. DTCS declaration and exemptions

The DTCS is a type of managed transmission service, and it was deemed to be a declared service in 1997.[13] Only specific types of transmission services which can be supplied over a transmission network will fall within the service description for DTCS (i.e. services must be supplied via symmetric network interfaces on a permanent uncontended basis in order to be considered 'DTCS'). The DTCS is an important input into the ability of service providers to provide downstream retail and wholesale services, particularly on geographic routes which are considered to be natural monopolies or which are otherwise uncompetitive.

Importantly, the ACCC has never had to arbitrate a dispute to complete resolution regarding price or non-price terms in relation to the DTCS. Therefore, the ACCC has not previously made any final arbitration decisions which set prices for the DTCS. The ACCC has previously issued guidance regarding the pricing principles for the DTCS,[14] and has recently released a position paper on a proposed new approach to pricing the DTCS (released on 23 November 2010).[15]

3.1.2. Exemptions from declaration

Whilst some parts of the transmission network remain natural monopolies or are otherwise uncompetitive, where there is empirical evidence of multiple providers in addition to Telstra building alternative transmission networks, the ACCC has exempted those transmission routes from the DTCS declaration. In those circumstances, the ACCC has considered that the evidence of actual competition, or the credible threat of new entry (i.e. potential competitors), in the relevant markets meant that the routes were sufficiently competitive for that regulation to be removed.

---

13 ACCC, *Deeming of Telecommunications Services: A Statement Pursuant to Section 39 of the Telecommunications (Transitional Provisions and Consequential Amendments) Act 1997*, June 1997.

14 ACCC, *Pricing Principles for Declared Transmission Capacity Services: Final Report*, September 2004.

15 ACCC, *Domestic Transmission Capacity Service: An ACCC Discussion Paper Reviewing Pricing of the Domestic Transmission Capacity Service*, April 2010; ACCC, *An ACCC Position Paper on Pricing the Domestic Transmission Capacity Service*, November 2010, (ACCC Position Paper DTCS Pricing).

Broadly speaking, the following types of transmission routes have been exempted or excluded from the DTCS declaration based on the presence of effective competition on those routes:

- capital-regional routes: The ACCC has exempted 23 routes on which two or more competitors to Telstra have fibre infrastructure that passes within 1 km of the GPO of a regional town;
- inter-exchange transmission routes in metropolitan areas: Those routes on which two or more competitors to Telstra have a POI at a Telstra exchange and a connection to a CBD. The ACCC has granted Telstra exemptions in relation to 72 metropolitan exchange service areas;
- inter-exchange transmission in CBD areas: The ACCC has exempted 16 capital city areas where two or more competitors to Telstra had a POI at a Telstra exchange in a CBD which connects to another exchange in a CBD; and
- inter-capital routes: All inter-capital routes (between Melbourne, Sydney, Canberra, Brisbane, Adelaide and Perth) are unregulated. The ACCC exempted these routes from regulation based on evidence of at least three infrastructure competitors and at least two carriers/carriage service providers that had secured long-term contractual arrangements with surplus capacity to resell transmission capacity services on those routes.

Telstra noted in its submission that if the same criteria for exemption were to be applied today, additional transmission routes would be deemed to be effectively competitive.[16]

3.2. Current state of competition in transmission markets

Typically when the ACCC is assessing the state of competition in a particular market, it will look at a number of factors including (but not limited to): [17]

- structural factors, including the level of concentration in the market;
- the potential for the development of competition in the market (including planned entry, the size of the addressable market and the existence and height of barriers to entry, expansion or exit in the relevant markets);
- the dynamic characteristics of the market, including growth, innovation and product differentiation, as well as changes to costs and prices over time; and
- the nature and extent of vertical integration in the market.

The ACCC has not been able to conduct a detailed analysis of the existing state of competition in transmission markets for the purposes of this report due to the timeframes associated with this process, however some key points are noted below.

---

16 Telstra, *Response to the ACCC Discussion Paper on Points of Interconnect to the National Broadband Network – Public Submission*, p.11, (Telstra public submission).

17 ACCC, *Fixed Services Review: A Second Position Paper*, April 2007.

In summary, the transmission capability markets are dominated by Telstra - a vertically integrated incumbent with ubiquitous coverage and generally a higher availability of service (i.e. most routes are geographically diverse). Competition has emerged in CBD and some metropolitan areas, as well as on inter-capital and some capital-regional routes. There are still many areas which are characterised by ineffective competition. However, there is the potential for the NBN, due to the upgrade of the access network from copper to fibre, to change the market dynamics in a way which will promote further investment. In particular, this is likely to increase the volume of traffic that transmission networks will carry. This should increase the ability for prospective entrants to achieve the economies of scale that would make entry more economically viable.

3.2.1. Market structure

The transmission capability market is characterised by a dominant incumbent (Telstra) with two second tier transmission capability providers (Optus and Nextgen). Prior to 1991, Telstra was the primary access provider of all telecommunications services in Australia, including transmission. Following the introduction of full competition more substantial competing transmission infrastructure has been constructed in some areas.

Telstra's transmission network is the only ubiquitous carrier grade network and has the most extensive geographic coverage. Optus' transmission network is the next largest and comprises a combination of fibre and radio backbone which it owns/operates and transmission capacity which it leases from other service providers. Optus' transmission network plays an important role in supporting its mobile network.

Nextgen owns Australia's third largest fibre network[18] and was the successful tenderer to receive funding to build transmission links under the government's RBBP.[19]

Other providers of transmission capability include AAPT, Amcom, PIPE and a number of smaller providers who have limited (both in terms of capacity and geography) transmission networks (e.g. Basslink, Ergon) or utility providers who sell spare capacity on the fibre networks they operate to support their business.

While there have been a number of entrants in the transmission markets in metropolitan regions, outside of those areas competition is much less developed. Several submissions to the Discussion Paper (including Telstra, TPG, PIPE, Optus and VHA) noted that competition exists in many metropolitan and inter-capital markets and some regional markets.[20] Due to the geographical distribution of Australia's population, the vast majority of premises are served by competitive transmission routes. Nextgen

---

18 Nextgen Networks, 'About Nextgen, Nextgen Networks', at http://www.nextgennetworks.com.au/about.htm, viewed 2 September 2010.

19 See press release: http://www.dbcde.gov.au/funding_and_programs/national_broadband_network/national_broadband_network_Regional_Backbone_Blackspots_Program .

20 Telstra public submission, p.11; TPG, *NBN POI Consultation*, p.4, (TPG submission); Optus, *Optus Submission National Broadband Network Points of Interconnection – Public Submission*, p.12, (Optus public submission); VHA, *National Broadband Network Points of Interconnect Submission to the ACCC*, p.10, (VHA submission); PIPE Networks, *National Broadband Network Points of Interconnect ACCC Discussion Paper*, p.3, (PIPE submission).

estimates that 87% of Australia's population are served by those routes,[21] however the ACCC believes that the actual figure is likely to be much lower than this estimate.

Whilst market share is often a useful indicator regarding the state of competition in a particular market, it is perhaps not as instructive in the case of transmission markets due to complexities in the way transmission services are provided and used. For example, the ACCC has previously considered that transmission markets should be considered to have a limited geographic dimension – therefore, whilst market shares on a particular route may be a useful indicator of the competitiveness on that route, combined market share figures would not be particularly instructive of the state of competition in the transmission capability markets as a whole.

Differences regarding the transmission products which are acquired and the degree to which they are substitutable would also be an important consideration in determining relevant market shares. In addition, the extensive levels of 'self supply' of transmission capability and a lack of clarity regarding how firms compete in the market (i.e. whether they own their own infrastructure, lease dark fibre or buy managed) also means that defining market shares in a meaningful way is difficult. For example, acquiring dark fibre services may be the competitive equivalent to building alternative infrastructure, depending on the terms for the supply of that dark fibre (i.e. there may be technical or contractual limitations).

In any event, the ACCC does not have sufficient information to make conclusive assessments about the market shares in transmission capability markets.

However, the ACCC believes that the following information regarding the location of competing fibre infrastructure is informative in terms of the distribution of competitive fibre amongst different geographical areas. Tables 2 and 3 below show exchange service areas with competing fibre and digital subscriber line access multiplexer (DSLAM) infrastructure.

[21] Nextgen Networks, *Response to the ACCC Discussion Paper National Broadband Network Points of Interconnect*, public submission, p.19, (Nextgen public submission).

Table 2: Exchange Service Areas with competing fibre providers

	NUMBER OF EXCHANGE SERVICE AREAS			
Number of competing fibre providers (not including Telstra) in each ESA	**Band 1 (CBD)**	**Band 2 (Metro)[22]**	**Band 3 (Regional)**	**Band 4 (Rural)**
5 competing providers	11	4	0	0
4 competing providers	5	18	0	0
3 competing providers	1	56	0	0
2 competing providers	0	141	17	1
1 competing provider	0	151	48	67
TOTAL WITH COMPETING PROVIDERS	**17**	**370**	**65**	**68**
TOTAL NO. OF EXCHANGE SERVICE AREAS	**17**	**585**	**749**	**3718**

Source: ACCC, *Telstra Customer Access Network Record Keeping and Reporting Rules* (CAN RKR), March 2009; ACCC, *Audit of Telecommunications Infrastructure Assets – Record Keeping Rule 2007 (Infrastructure RKR)*, 2009. (Note: This is the most recent available data in an appropriate form for this analysis.)

Table 2 indicates that:

- competing fibre providers are located in all CBD areas and there is substantial amounts of competitive fibre present in metropolitan areas;
- there is a very small amount of competition in regional areas, with most of the fibre likely to be associated with long haul fibre which connects major towns;
- no regional exchanges have three or more competing fibre providers (in addition to Telstra); and
- there is virtually no fibre competition in rural and remote areas.

[22] Note: Band 2 can include non-metropolitan areas, such as large regional centres.

Table 3: Exchanges where access seekers have competing ULLS/LSS infrastructure

	NUMBER OF EXCHANGES			
Number of ULLS/LSS access seekers (i.e. not including Telstra) in each exchange	**Band 1 (CBD)**	**Band 2 (Metro)[23]**	**Band 3 (Regional)**	**Band 4 (Rural)**
10-12 access seekers	6	15	0	0
6-9 access seekers	10	124	0	0
4-5 access seekers	0	128	3	0
2-3 access seekers	0	114	26	0
1 access seeker	0	69	54	12
TOTAL NO. OF EXCHANGES WITH AN ACCESS SEEKER	**16**	**450**	**83**	**12**
TOTAL NO. OF EXCHANGES	**16**	**585**	**749**	**3717**

Source: CAN RKR 2010 data

Table 3 indicates that:

- investment in infrastructure by access seekers in order to self supply using Telstra's wholesale ULLS and LSS services is predominantly in metropolitan areas, with minimal investment outside these areas;
- there are no regional exchanges where 6 or more access seekers have equipment installed; and
- while there may be multiple access seekers with equipment installed in an exchange, it is important to note that does not correspond to the amount of competing fibre that may be present.

3.2.2. Recent investment in transmission markets

Evidence regarding industry investment in transmission capability markets is not typically information that is publicly available.

In 2007, the ACCC made the *Audit of Telecommunications Infrastructure Assets – Record Keeping Rule 2007* (Infrastructure RKR) which requires specific carriers to report the locations of their core network and Customer Access Network infrastructure. The Infrastructure RKR gathers information from transmission operators of optical and microwave network assets and is updated annually.

[23] Note: Band 2 can include non-metropolitan areas, such as large regional centres.

The ACCC notes that there are difficulties in using information gathered by the Infrastructure RKR to understand investment trends, such as the number of kilometres of optical fibre transmission installed each year, as the Infrastructure RKR does not facilitate this kind of quantitative analysis. Furthermore, the Infrastructure RKR does not gather information on other kinds of investment in transmission capability, such as upgrades in capacity.

Given the limitations of the current Infrastructure RKR, evidence of investment in transmission markets is usually of an anecdotal nature and subject to debate. For example, submissions to the ACCC's 2008-09 DTCS declaration inquiry provided opposing, anecdotal views about the occurrence and likelihood of future investment in new transmission links.[24]

Some investment in transmission markets has been reported in the media. For example, this year Optus announced additional investment in transmission to its mobile base stations as a part of the $1.2 billion it planned to spend on its mobile network over the next 12 months.[25] More recently it was reported that Vodafone/Hutchison Australia (VHA) has awarded contracts to PIPE and Nextgen for backhaul capacity to link its mobile phone tower sites as part of its plans to increase the capacity and footprint of its mobile network. PIPE has also indicated that it plans to deploy an additional 900km of dark fibre over two years to link sites in Queensland, New South Wales and Victoria, representing a 60 per cent increase in PIPE's existing network footprint.[26]

The ACCC notes that there has been increasing interest by state and federal governments in funding the building of transmission assets on routes that have thus far proved to be natural monopolies. Examples of this funding include:

- up to $250 million from the government in the RBBP;[27] and
- investment by the Victorian government in its VicFibreLINKS project.[28]

Where investment by alternative transmission operators on transmission routes has produced evidence of actual competition, or the credible threat of new entry (i.e. potential competitors) in the relevant markets, the ACCC has acted to grant exemptions from the DTCS declaration on these routes (see section 3.1.2).

3.2.3. Potential for the development of competition

In considering the likelihood that competition will develop on routes which are currently uncompetitive, the ACCC believes that it is relevant to consider whether there

---

24 ACCC, *Domestic Transmission Capacity Service Declaration Review: Final Report*, March 2009.

25 Winterford, B., 'Optus gets mobile data boost as fixed broadband stalls', in *IT News for Australian Business*, May 13 2010, at http://www.itnews.com.au/News/174656,optus-gets-mobile-data-boost-as-fixed-broadband-stalls.aspx, viewed 1 September 2010.

26 'VHA taps Pipe and Nextgen for Vodafone backhaul upgrade' in *Exchange Daily*, 18 November 2010.

27 See press release: http://www.dbcde.gov.au/funding_and_programs/national_broadband_network/national_broadband_network_Regional_Backbone_Blackspots_Program .

28 See press release: http://www.premier.vic.gov.au/component/content/ article/4377.html; and press release: http://www.premier.vic.gov.au/component/ content/article/12273.html .

is any planned entry, the size of the addressable market (including population density, demographic factors and customer switching possibilities) and the size of any barriers to entry.

The ACCC does not have specific information available regarding plans by industry participants to enter into currently uncompetitive transmission markets. However, in general terms, the ACCC notes that when a potential entrant is considering whether to build transmission infrastructure, the two most relevant factors would be:

- the size of the market that could be served by the proposed infrastructure (including the number of premises and the volume of traffic) and the share of that revenue that it expects to obtain; and
- the cost to build the route, which will ordinarily be a function of its length.[29]

Due to the spread of population across Australia, it is ordinarily the case that the longest backhaul routes service the least densely populated areas (regional hubs are an obvious exception to this rule), making it arguably economically unfeasible for facilities based competition to ever occur in some places.

Following the roll out of the NBN, it could be expected that the feasibility of entry to some areas will improve, due to the increase in the number of premises which will be served by any one fibre exchange (compared with the number of premises currently served by each copper exchange) and the increased traffic which is expected to be generated by the NBN. However, there are likely to still be areas that will remain unattractive to new entry by commercial suppliers and which will therefore be natural monopolies for the foreseeable future.

In terms of the market share that could be captured by a new entrant, this would depend upon the extent to which acquirers of the existing service are readily able to change providers (i.e. whether they are locked into long term contracts).[30]

The presence of excess capacity on the existing fibre on the route is also likely to affect whether a new entrant will attract market share. While a transmission network may operate at close to full capacity in terms of 'lit' fibre (i.e. active, in use fibre) most routes also contain extensive 'unlit' fibre (i.e. unused dark fibre). For example, AAPT has indicated that it only uses two strands of its current 24 core fibre running through central NSW.[31] During the course of its review into the DTCS in 2004, the ACCC also found that transmission networks are generally constructed to accommodate traffic requirements that are far in excess of current demand for the purposes of offering redundancy and to cater for future bandwidth needs.[32]

In addition to utilising spare fibres, incumbent fibre providers on a particular route are also able to upgrade the electronic components at each end of the fibre strand in order

---

29 Study, p.327.

30 Internode, *Internode Submission on NBN POI Paper*, pp.2-5, (Internode submission); PIPE submission, p.3.

31 Lohman, T., 'NBN won't make money: AAPT CEO', in *Computer World*, 28 May 2010.

32 ACCC, *Transmission Capacity Service: Review of the Declaration for the Domestic Transmission Capacity Service – Final Report*, April 2004 (DTCS 2004 Declaration Review).

to increase the available capacity. The ACCC understands that technical upgrades such as 2.5 Gb/s to 10 Gb/s are possible and therefore likely to substantially increase the available capacity on a route without the need for additional fibre to be laid.

These kinds of upgrades are likely to be substantially cheaper and easier to complete than the costs faced by a new entrant in building alternative infrastructure. Therefore, the risk to any new entrant is that the incumbent provider will substantially upgrade their network at marginal cost, and reduce the price of their services, therefore damaging the expected business case for the new entrant.

The ACCC considers that while barriers to entry to the transmission market have been reduced over time (for example, by facilities access arrangements being reached in relation to access to ducts in metropolitan areas), generally speaking they remain relatively high in both metropolitan and regional areas. Potential entrants face significant sunk costs in the capital works which are required to establish new infrastructure, which must then compete against existing infrastructure owned by incumbent suppliers where that investment may have been sunk many years ago and an adequate return received.

3.2.4. Dynamic characteristics

The ACCC recognizes that markets are generally not static over time. Therefore, any consideration of the state of competition in a particular market should include considerations of how that market has developed over time.

Evidence of reductions in the price for transmission services may suggest the emergence of effective competition in the relevant transmission market or an increase in the efficiency of providers of those services (i.e. due to advancements in technology). In its submission to the Discussion Paper, Nextgen noted that:

> **[c-i-c]**[33]

Whilst this information may suggest that prices may have reduced over time this statement is unable to be verified. Due to the imperfect nature of other pricing information which is available to the ACCC (i.e. the ability to compare 'like for like') and the absence of further analysis regarding the causality of the change in price, the ACCC believes that the findings that can be made in relation to this information are limited. However, the ACCC is expected to receive substantially more information on transmission pricing in the coming months as a result of the DTCS pricing review following the position paper released on 23 November 2010. [34] As part of this pricing review, the ACCC will be seeking extensive pricing information from a number of providers across a range of transmission services.

---

33 Nextgen, *Response to the ACCC Discussion Paper National Broadband Network Points of Interconnect - Confidential Submission*, p.35, (Nextgen confidential submission).

34 See: ACCC, *Domestic Transmission Capacity Service: An ACCC Discussion Paper Reviewing Pricing of the Domestic Transmission Capacity Service*, April 2010; ACCC, *An ACCC Position Paper on Pricing the Domestic Transmission Capacity Service*, November 2010, (ACCC Position Paper DTCS Pricing).

As is noted above, it may be that the roll out of the NBN will affect the development of competition in the transmission capability markets. However, the Study found that there is reason to believe that today's backhaul bottlenecks will persist without direct intervention by NBN Co.[35]

3.2.5. Vertical integration

The transmission market is dominated by suppliers who are vertically integrated, although some new entrants (at least initially) have operated only as wholesalers (i.e. Nextgen).

Telstra is most likely to be the sole supplier of transmission services on natural monopoly routes, which is where its vertical integration is likely to have the most impact. As was noted in the Study, Telstra's vertical integration provides it with incentives to set higher prices for its transmission services to reduce the competition it faces in the relevant downstream retail markets.[36]

3.3. Potential for asset stranding or impairment

The extent to which transmission assets are likely to be stranded or impaired will depend upon the approach to POI location that is implemented by NBN Co. For any approach other than the fully distributed option, there is the potential that existing transmission assets will be stranded or impaired. The more distributed the POI locations are, the extent to which existing transmission assets are likely to be stranded or impaired will be reduced.

A distinction can be made between assets that will be stranded or impaired by virtue of the upgrade of the access network from copper to fibre, and those assets which are stranded or impaired by different POI location options. As is noted in section 2.1 and Attachment B, due to the superior operational distances of fibre versus copper between the premises and the exchange, it is likely that NBN Co's access network rollout would bypass some of Telstra's local exchanges. If this was to occur there may be the potential for some of Telstra's (or potentially other) transmission assets linking these exchanges to larger exchanges to be stranded or impaired. The ACCC cannot comment with precision about the extent to which this will occur because the ACCC does not currently have access to NBN Co's proposed fibre access network rollout design. However, these impacts would occur under all approaches to POI location and hence should not affect the choice of one POI approach over another. Further, to the extent that assets which serve these ESAs do not form part of the NBN and are therefore stranded or impaired, it is difficult to assert that this outcome has adversely affected competition, provided that GPON is a more efficient delivery mechanism than copper. That is, the transmission to ESAs that do not form a part of the NBN is no longer required as a result of an effect of dynamic efficiency rather than a deliberate stranding or impairment.

---

35 Study, p.327.

36 Ibid., p.326.

The ACCC notes that complete stranding of transmission assets by a particular POI location option will only occur if existing fibre assets are either not:

- able to be used for other purposes (such as to service mobile base stations or dedicated high capacity links for large businesses); or
- substantially redeployed for use in the NBN (for example, if they are acquired by NBN Co or if NBN Co acquires services using that infrastructure).

For mobile operators, such as Telstra and Optus, it is unlikely that any of their transmission assets will be completely stranded by any particular POI approach, as these operators will have an ongoing need for transmission services to support their mobile networks. However, the value of these operators' assets could be significantly affected – i.e. their use could be 'impaired'. There are likely to be cost implications for such operators if they are not able to use certain assets for fixed-line traffic, as the amount of the capacity used on these networks could decrease substantially. As such, the operational costs (and required return on these investments) would be recoverable through a smaller base of customers.

Based on these considerations and the discrepancies and limited information provided in submissions, the ACCC is unable to advise on the value and extent of assets that would be completely stranded, or impaired, under each POI option. However, the following sections of the report provide a qualitative assessment of likely impacts of each POI option.

3.3.1. Potential for asset stranding under fully distributed approach

For the reasons described above, the ACCC considers that under a fully distributed POI approach, where every fibre exchange also acts as a POI, there is likely to be little or no stranding or impairment of existing transmission assets.

3.3.2. Potential for asset stranding under semi-distributed approach

The potential for stranding or impairment of transmission assets under a semi-distributed approach will depend on the definition of 'competitive transmission' that is adopted (that is, the 'competition condition'). There may be quite large differences between the amount and value of assets that may be stranded under an approach where two transmission providers are considered to constitute competitive transmission, as compared with a three provider approach. However, the ACCC considers that if a semi-distributed POI approach was adopted, such an approach could be implemented whereby no non-Telstra transmission assets would be at risk of stranding or impairment.

The ACCC considers that under a two provider approach to defining competition the only transmission operator whose assets would potentially be subject to stranding or impairment would be Telstra. As noted above, it is unlikely that Telstra's assets would be completely stranded, as Telstra also uses these assets to provide mobile services, as well as high-capacity business services.

The ACCC also notes that, if finalised, a binding agreement between NBN Co and Telstra regarding access to these transmission assets could substantially limit the amount of Telstra's transmission which would be at risk of stranding or impairment.[37] As was recommended by the Study,[38] NBN Co may be able to negotiate the leasing of dark-fibre from Telstra in order to be able to provide transit transmission services at a lower cost than overbuilding Telstra's assets. Having said this, there are two aspects to stranding: the fibre and the electronics. Electronics from different vendors would not be able to be managed by the one Operations Support System (OSS), so while fibre might not be stranded, the electronics might be. That is, while NBN Co might rent dark fibre under an agreement, it might not be convenient to rent the existing electronics. On the other hand, NBN Co renting a managed transmission service from Telstra would not raise the issue of stranding electronics.

With regard to the possible value of Telstra's transmission assets in question, it is useful to note the analysis undertaken by the Study. The Study investigated the cost of NBN Co deploying a new transmission network in areas where "contestable" transmission services are not available, so that NBN Co could provide transit for its traffic between fibre exchanges (i.e. FANs) and a point where transmission services were either available from:

- the government (e.g. via the RBBP); or
- multiple transmission providers (not including NBN Co) – in practice, Telstra and another operator.[39]

The Study estimated that the cost of overbuilding Telstra's existing transmission network to one of these points (approximately 70 000 km of transmission network) would be approximately $3.5 billion.[40] This figure could be considered an upper limit to the value which Telstra might seek in compensation payments for assets potentially stranded by a semi-distributed, 'two provider' POI approach (as beyond this value it could be more cost-effective for the government/NBN Co to duplicate Telstra's transmission assets).

The ACCC notes that if the criterion to ascertain where competitive transmission is located requires more than two competing providers to serve each POI location, there would be a greater potential for other operators' transmission assets to be stranded or impaired by a semi-distributed approach. This could also be the case if some transmission assets were not considered fit to be included as competitive infrastructure for the purpose of determining the contestability of a transmission route, and as such were bypassed.

---

37 Kevin Rudd, Lindsay Tanner & Senator Stephen Conroy, joint press release, 'Agreement Between NBN Co and Telstra on the Rollout of the National Broadband Network', 20 June 2010, at http://www.minister.dbcde.gov.au/media/media_releases/2010/060.

38 Study, Recommendation 49, p.332.

39 Ibid., Recommendation 48, p.332.

40 Ibid., p.331.

3.3.3. Potential for asset stranding under a centralised approach

Under a centralised POI approach, there is much greater potential for existing transmission assets to be stranded or impaired than under any of the distributed approaches. Of the submissions that raised the issue of asset stranding, the stranding of assets under the centralised option was the most common point of concern.

While the extent of potential stranding or impairment is unknown at this stage it would likely include assets belonging to the key owners of transmission assets including Telstra, Optus, TPG, PIPE, Nextgen, Amcom and AAPT. Most of these entities made submissions expressing concerns regarding the potential stranding or impairment of assets particularly under the centralised POI approach and noted the potential for compensation claims.

Telstra, TPG, PIPE and AAPT did not provide an estimated value of assets stranded. TPG noted its investment of hundreds of millions of dollars in establishing physical infrastructure to compete in the retail and wholesale telecommunications market.[41] PIPE stated that the majority of its backhaul networks would be stranded, with the exception of inter-capital backhaul and backhaul between the CBD of the capital cities and NBN Co POI sites.[42]

AAPT expressed its concern that a significant proportion of its network assets would be stranded, including **[c-i-c]**.[43]

Telstra noted that existing infrastructure may still be able to serve other purposes, however it asserts that a large proportion of current capacity is likely to become surplus to requirements.

Optus and Nextgen confidentially provided the potential value of stranded assets under the centralised approach. Optus estimated the value of its assets stranded to be **[c-i-c]**.[44] Nextgen noted that their stranded assets relate to all network facilities, except those relating to the inter-capital routes nominated by NBN Co as being excluded from their network design. These are predominantly located in Melbourne, Adelaide, Perth and regional Australia. **[c-i-c]**.[45] However, the managing director of Leighton's telecommunications division (Mr Peter McGrath) has recently been reported as stating that the RBBP network constructed by Nextgen was unlikely to be stranded, as it is effectively government owned.[46]

---

41 TPG submission, p.1.

42 PIPE submission, p.2.

43 AAPT, *Submission by AAPT Limited in Response to the Australian Competition and Consumer Commission's Discussion Paper titled National Broadband Network Points of Interconnect – Confidential Version*, p.19, (AAPT confidential submission).

44 Optus, *Optus Submission National Broadband Network Points of Interconnection – Confidential Submission*, p.13, (Optus confidential submission).

45 Nextgen confidential submission, p.14.

46 *Communications Day*, issue 3876, 12 November 2010, p.1.

In NBN Co's POI Modelling report, provided to the ACCC on a confidential basis on 18 November 2010, **[c-i-c]**.[47]

The ACCC does not have sufficient information to test the validity of claims as to the dollar amount of assets claimed to be stranded or impaired, but notes that the value of the assets that would be assessed by the ACCC for cost based regulatory pricing purposes may be different from the businesses' perception of the value of those assets (which would be based on the expected cash flows from the asset into the future). Where a party is seeking compensation for their assets, it may be difficult to ascertain the true value which has been lost from those assets.

In summary, as the ACCC has not recommended an approach to POI location that would result in the significant stranding of existing transmission assets, with the exception of Telstra's, it has not included an assessment of options for addressing any adverse implications for existing transmission asset owners in this report. The ACCC re-iterates that, if finalised, a binding agreement between NBN Co and Telstra regarding access to its transmission assets could substantially limit the amount of Telstra's transmission which would be at risk of stranding or impairment.[48]

47 NBN Co, *Points of Interconnect Modelling*, 18 November 2010, p. 10, (NBN Co POI Modelling).

48 Kevin Rudd, Lindsay Tanner & Senator Stephen Conroy, joint press release, 'Agreement Between NBN Co and Telstra on the Rollout of the National Broadband Network', 20 June 2010, at http://www.minister.dbcde.gov.au/media/media_releases/2010/060.

4. Assessment of options against the LTIE

4.1. Overview

4.1.1. Approach to conducting the LTIE assessment

The ACCC has conducted its LTIE assessment by considering the expected market dynamics in the relevant markets and the impact each approach to POI location could have upon those dynamics following the completion of the roll-out of the NBN.

This LTIE assessment is by its nature a comparative exercise between the different future states of competition which are expected to arise under each approach. Therefore, whether a particular approach would promote competition is in effect a question of whether that particular approach would promote competition more or less than the other approaches to POI location. It is important to note that in this particular LTIE assessment, the ACCC is only considering the effects that NBN Co's POI location, in isolation, may have on the LTIE. The ACCC is therefore not required to consider any other effects that the implementation of the NBN will have on the relevant markets irrespective of the approach taken in relation to POIs.

Whether a particular POI approach will achieve 'any-to-any connectivity' requires an assessment of the degree to which that POI approach affects the ability of end-users of particular services to communicate with end-users who are supplied with the same (or similar) service on the same or a different telecommunications network. The ACCC considers that none of the POI approaches raise concerns regarding the fulfilment of the 'any-to-any connectivity' requirement. Hence, the ACCC has not considered this limb of the LTIE test in detail for the purposes of this report.

4.2. Fully distributed approach (NBN Co's Option 1)

4.2.1. Summary

Under Option 1, POIs will be 'fully distributed' and located at every FSA.[49] NBN Co has stated that this model would result in up to 718 - 950 POIs (depending on the final design of its network). Further detail on this proposal is provided in section 2.1.

Principal industry support for the fully distributed approach came from Telstra, who stated that:

> NBN Co should provide interconnection at any technically and operationally feasible points within its network requested by an access seeker, including the option of POIs within FSAs. [50]

[49] NBN Co Position Paper, p.13.
[50] Telstra public submission, p.6.

Non-industry stakeholders also provided some support for this approach.[51] In particular two energy providers highlighted the potential for this option to assist with the deployment of smart grid systems.[52]

The main opposition to this option from industry stakeholders came from Optus and VHA who both cited problems arising from the lack of competitive backhaul from many (regional) POIs.[53]

4.2.2. Promotion of competition

Transmission capability markets

The ACCC considers that the fully distributed approach is likely to have the effect of promoting competition in transmission capability markets.

The basis for this conclusion is that providing fully distributed POIs is likely to preserve the maximum amount of existing competition in transmission markets and allow for competition to further develop in the future.

For competitive transmission routes, this approach would allow competition to be preserved, and perhaps be enhanced due to the roll-out of the NBN and the expected increase in demand for transmission capacity.[54] For routes which are considered to be natural monopolies, it is likely that the implementation of this approach will not materially affect the market structures on those routes. The incumbent supplier will remain a supplier of monopoly services.

For those natural monopoly routes, this option also preserves the option for the further development of competition as market conditions change following the roll-out of the NBN. For example, some natural monopoly routes may become competitive due to the expected increase in demand for transmission capacity and the anticipated increase in the number of premises which will be served by each distributed POI. However, the ACCC acknowledges that high barriers to entry to these transmission markets are still likely to remain.[55]

Retail markets

The ACCC believes that the implementation of the fully distributed approach is likely to go some way toward promoting competition in retail markets within regions where competitive transmission services are (or will be) available to service providers. The

---

51 Energex, *Response to ACCC Discussion Paper on Points of Interconnect to the National Broadband Network*, p.8, (Energex submission); Ergon Energy, *Response to ACCC Discussion Paper National Broadband Network Points of* Interconnection, p.2, (Ergon submission); Western Australian Government (Great South Development Commission), *Response from the Great Southern Development Commission to the ACCC Discussion Paper on Points of Interconnect to the National Broadband Network*, p.2, (WA Govt submission).

52 Energex submission, p.8; Ergon submission, p.2.

53 Optus public submission, p.6; VHA submission, p.3.

54 AAPT public submission, p.12; Telstra public submission, p.11.

55 VHA submission, p.9.

fully distributed approach allows service providers to engage in more dynamic competition than what would be possible under a centralised approach.

However, for regions that are served by natural monopoly transmission services, retail competition is not likely to be enhanced as a result of this approach as the barriers to entry to those markets (including but not limited the cost of acquiring transmission services from a vertically integrated monopoly provider and economies of scale) are likely to remain the same .

The ACCC believes that the benefits received by end-users as a result of effective competition include lower prices, better quality and a better range of services over time. The ACCC considers that the fully distributed option allows service providers to exercise maximum possible discretion regarding the way in which they choose to deliver services to end-users, thereby reducing their dependence upon the NBN. This in turn maximises the scope that service providers have to differentiate their services by the products that they offer (i.e. quality and quantity, service delivery innovation) and the price at which those products are offered.

Both Optus and VHA[56] argue that a distributed approach is likely to be detrimental to competition in retail markets (particularly in regional areas), due to the "unfair advantage"[57] which is enjoyed by Telstra as the owner of natural monopoly transmission assets. The ACCC considers that these concerns may be addressed if:

- Telstra was no longer a vertically integrated owner of those transmission assets competing in the same retail markets; or
- NBN Co (or other entities, most likely to be those who are funded by government) elects to build transmission infrastructure and offer services on those routes in competition with Telstra.

However, in the absence of firm evidence regarding the removal of Telstra's incentives or ability to procure an advantage over its retail competitors through the price and non-price terms it offers in relation to use of its monopoly transmission infrastructure, the promotion of retail competition under a fully distributed option is likely to be less than under a semi-distributed option.

Wholesale markets

The ACCC considers that, relative to a semi-distributed approach, the fully distributed approach is less likely to promote competition in the relevant wholesale markets and is likely to entrench the existing market structure, where Telstra is the dominant provider of wholesale services. Competition in the relevant wholesale markets in the current environment exists, but has been slow to develop outside metropolitan areas.

The ACCC considers that one of the more significant barriers to entry to the relevant wholesale markets is the availability of transmission capability at a cost which allows both the wholesaler and the end retailer to make a sufficient margin. In addition, wholesale providers can be readily distinguished by their ability to provide services

[56] Optus public submission, p.6; VHA submission, pp. 3 & 11.
[57] VHA submission, p.11.

almost ubiquitously across Australia. Under a fully distributed approach, Telstra is likely to retain its significant advantage as a 'one stop shop' supplier of wholesale services, as its ongoing ownership of a ubiquitous transmission network (including many natural monopoly routes) would give it an advantage over other wholesale service providers.

4.2.3. Encouraging efficient use of and investment in infrastructure

In considering this limb of the LTIE test, it is worth re-iterating the points in section 3.3 that – for all POI approaches – fibre assets which were installed to service the copper access network may not continue to be used for transporting fixed line traffic, by virtue of the fibre access network upgrade. This is because it is unlikely that fibre exchanges will be located at every existing copper exchange. The extent of this bypass will depend on the fibre access network architecture that NBN Co ultimately adopts in different regions. The ACCC has not considered the implications of this bypass in its assessment of efficient investment in and use of infrastructure for any of the POI options, as this bypass will occur independent of decisions relating to POI location.

The ACCC also notes that under the fully distributed POI option, NBN Co would not supply a transmission service to service providers. It would only provide, and access seekers would only use, infrastructure which relates to the access network (i.e. from the fibre exchange to the end-user).

Several submissions proposed that a fully distributed POI approach will promote efficient use of, and investment in, infrastructure. AAPT argued that fully distributed POIs will encourage efficient investment in transmission markets.[58] Optus submitted that enabling interconnection at a lower level within the NBN is likely to promote opportunities for further efficient investment in additional alternate infrastructure over time.[59] Optus also stated that leveraging existing sunk infrastructure investments necessarily avoids the costs associated with building duplicate infrastructure such as asset stranding.[60] VHA stated that economic efficiency is best achieved if competition exists in as many elements of the value chain as possible.[61]

Telstra submitted that POIs located at any technically and operationally feasible points within the NBN requested by an access seeker, including the option of POIs within FSAs, will allow for investment in transmission where it is economically efficient;[62] and will ensure choice in inputs for upstream operators, thereby promoting product innovation (i.e. dynamic efficiency).[63] Telstra also noted that where the costs of a new POI are large, it may not be economically efficient to establish a new POI.[64]

---

58 AAPT public submission, p.15.
59 Optus public submission, p.11.
60 Ibid., p.12.
61 VHA submission, p.4.
62 Telstra public submission, p.10.
63 Ibid., p.15.
64 Ibid., p.7.

Competitive routes

On competitive transmission routes, if a network with fully distributed POIs is adopted, this is likely to maintain the current degree to which the efficient use of and investment in infrastructure is promoted on these routes.

Under a fully distributed POI approach, most (if not all) of the existing transmission infrastructure on competitive routes will continue to be used as it currently is.

Fully distributed POIs will also ensure that the same level of competition on existing routes is maintained, and competition on these routes is further likely to encourage the efficient use of these assets. Prices for transmission services on these routes would adjust to reflect changes in market conditions (including changes in demand for transmission capacity by access seekers) and ensure that prices are reflective of cost. Cost-reflective prices encourage the efficient use of these assets, as access seekers will use the service if, and only if, it values it (and is willing to pay) more than the cost of providing it. In this regard, the retention of competition is likely to promote efficient use of infrastructure and allocative efficiency.

Cost-reflective pricing of transmission services would also promote efficient investment. This is noted by the Competitive Carriers Coalition (CCC) in its submission, where it submits that efficient investment was best encouraged by prices that reflected actual costs as closely as possible.[65] If a transmission route is competitive and there is an increase in demand for transmission capacity, this would (all else constant) lead to a natural increase in the price of transmission on this route. This would provide incentives to transmission providers to invest in transmission capacity, either as an upgrade to existing transmission links or through entry of a new transmission operator on that route. Similarly, a decrease in demand on a competitive route would lower the price and provide signals to operators to downgrade or defer investment in assets on that route, thereby directing resources to more efficient purposes.

Dynamic efficiency would also be promoted by retaining competition in transmission. Operators would be able to compete on non-price elements of their products, thereby providing incentives to innovate and adapt to the needs of end-users. Some examples of innovations in the transmission sector include the ongoing development of dark fibre (for example by Amcom and PIPE) [66] and multicasting.

Monopoly routes

On monopoly routes, adopting fully distributed POIs will also be unlikely, of itself, to change the current degree of efficiency on these routes.

Monopoly transmission routes would continue, at least initially, to be owned and operated by Telstra. Due to its vertical integration Telstra will continue to have the ability and incentive to favour its retail business over wholesale customers of its

---

65 CCC, *Response to National Broadband Network Points of Interconnect Discussion Paper*, p.8, (CCC submission).

66 PIPE submission, p.1; Amcom, 'Dark Fibre' at http://www.amcom.com.au/solutions/FibreNetworking/DarkFibre.aspx, viewed 15 November 2010.

transmission services (i.e. it may charge high prices on transmission routes in order to increase the costs to its retail competitors). Whilst this may maintain the current benefits for Telstra in terms of the efficiency of its operations and its commercial interests, relative to the semi-distributed approach it may not promote the efficient use of NBN Co's access network by access seekers other than Telstra in areas which are only served by this monopoly transmission infrastructure. The semi-distributed approach overcomes most of the effects that Telstra's vertical integration is able to have upon competition in downstream retail and wholesale markets under a fully distributed approach. Therefore, the efficient use of NBN Co's access network is likely to be improved under this approach as there is likely to be increased demand for services which utilise that infrastructure.

In the absence of competition on monopoly routes, the efficient use of infrastructure and investment on these routes will depend on whether cost-reflective prices are achieved through other means, such as through price regulation.

Costs to NBN Co

While NBN Co is likely to operate the same number of fibre exchanges regardless of the number of POIs, the ACCC notes that a fully distributed POI approach may result in higher costs of supply for NBN Co for some aspects of its operations compared to other POI location options. The extent to which the amount of fibre exchanges also operating as POIs increases the costs to NBN Co is unclear, but it may require the use of additional resources within NBN Co.

This option may raise costs for administering initial interconnection as NBN Co would have to manage a large number of sites for initial collocation and handover. However, the ACCC notes that whilst any change in a copper network will usually require a visit to the local exchange, for a GPON network most changes should be able to be done remotely without a site visit (as what is being configured is a Layer 2 virtual circuit). Consequently, the portion of the ongoing cost of managing the GPON network is likely to be independent of the number of POIs which are included in the network.

Further, in considering the design for the GPON network, cost considerations might generally favour a greater number of POI sites rather than fewer. Regardless of the number and location of POIs, for a GPON solution it is necessary to have the OLT no further from the end-user than about 20 km (due to optical attenuation). In practice the distances are likely to be shorter than this as there should be cost advantages in aggregating traffic quite quickly rather than taking many individual GPON optical fibres further back into the network. That is, rather than aiming at the minimum possible number of sites (using the full 20 km optical allowance) it might be cheaper to build the GPON network by locating the OLT and Ethernet aggregation equipment closer to the end-user. Once there is an Ethernet aggregation switch it is technically feasible to construct a POI.

In summary, the ACCC considers that the fully distributed approach is likely to maintain current incentives for the efficient use of and investment in transmission infrastructure through the retention of competition. Efficiency on monopoly routes would also not change significantly relative to the current environment, but would continue to be affected by related matters such as structural separation and price

regulation. Other POI options which eliminate or minimise the existence of a vertically integrated monopoly transmission supplier might better promote efficient use of NBN Co's fibre access network in areas which are served only by monopoly transmission routes. For this reason, the ACCC does not consider that fully distributed POIs would be the best option for promoting efficient use of and investment in transmission infrastructure.

4.3. Semi-distributed approach (NBN Co's Option 2)

4.3.1. Summary

Within this approach there are a range of possibilities for the number and location of POIs. NBN Co has explained that under a semi-distributed approach, POIs would be located where transmission is competitive. Therefore, the actual number of POIs will depend upon the criteria which is applied to determine whether particular routes are competitive. This spectrum could include approaches that involve a high amount of distributed POIs (i.e. where there is some limited consolidation, resulting in less POIs than would be available under a fully distributed option) or lower levels of distribution (i.e. where there is a higher level of consolidation but less than would occur under the highly consolidated option proposed by NBN Co). In other words, the range of possibilities is technically from as few as 14 to as many as 950 POIs.

NBN Co has recommended that an appropriate model to implement this option would be to place POIs "at the edge of where contested backhaul currently exists".[67] This approach received strong support from a number of key industry players, including Optus,[68] AAPT,[69] VHA,[70] iiNet,[71] TPG[72] and PIPE.[73] Other support for a semi-distributed approach came from industry representative bodies including the CCC[74] and the Australian Telecommunications Users Group (ATUG).[75]

NBN Co noted that it was not in a position to ascertain the points at which competitive transmission exists and that it would expect a third party, such as the ACCC to assist with this process. Submissions in favour of this option were also supportive of the ACCC taking on this role.[76] As is noted above, an assessment of whether a particular market is competitive requires a detailed analysis of the constraints (or lack thereof) on supplier(s) within a particular market.

The ACCC's analysis below assumes that whatever method is used to implement a semi-distributed approach it will result in POIs being established in all locations where

---

67 NBN Co Position Paper, p.12.
68 Optus public submission, p.3.
69 AAPT public submission, p.5.
70 VHA submission, p.5.
71 iiNet, *Response to ACCC NBN POI Discussion Paper*, p.4, (iiNet submission).
72 TPG submission, p.3.
73 PIPE submission, p.3.
74 CCC submission, p.9.
75 ATUG, *Submission NBN Points of Interconnect ACCC Discussion Paper*, p.3, (ATUG submission).
76 AAPT public submission, p.5; CCC submission, pp.4-5; Optus public submission, p.9.

transmission services are workably competitive and it is technically and operationally feasible.

4.3.2. Promotion of competition

Transmission capability markets

The ACCC considers that whether NBN Co intends to build or buy transmission capacity between the FSA and a semi-distributed POI (i.e. on natural monopoly routes) will affect whether competition in transmission capability markets is likely to be promoted by this option.

In either case, competition will be promoted as this option will allow existing competition on competitive transmission routes to continue and future new investment and market entry on those routes.[77]

If NBN Co buys transmission capacity on currently uncompetitive routes

If NBN Co buys capacity from Telstra on routes which are currently uncompetitive or considered to be natural monopolies (i.e. between every fibre exchange and the 'competitive' aggregation point higher in the network) and offers semi-distributed POIs, the ACCC considers that competition in the transmission capability market would be promoted more so than under a fully distributed approach.

Under this approach, NBN Co will effectively displace Telstra as the monopoly provider of transmission services (for consumer retail services) on those routes that are natural monopolies. This change may result in improved outcomes for competition on those routes, depending upon the extent to which Telstra's vertical integration is currently resulting in negative competition outcomes in the transmission markets.

If NBN Co builds transmission capacity on currently uncompetitive routes

For the purposes of this assessment, the ACCC considers that NBN Co would be considered to have "built" transmission capability if it acquired dark fibre from the existing owner (Telstra) (if NBN Co was technically and contractually able to compete with Telstra in the provision of managed transmission services over that route) or if it built its own competitive infrastructure.

If NBN Co builds capacity on the relevant routes, it would then be a competitor (or a potential competitor) to Telstra in relation to the supply of managed transmission in those areas. Therefore, that particular route is likely to no longer exhibit natural monopoly characteristics. In other words, NBN Co will have created the conditions for competition to be able to occur.

However, if NBN Co refuses to allow interconnection at the fibre exchange, it will effectively be bundling its access product with its backhaul service, which will prevent Telstra from being able to compete with it for the supply of the relevant transmission service. In effect, this would be an equivalent outcome for competition in transmission

[77] AAPT public submission, p.16; iiNet submission, p.4.

markets as the case above where NBN Co leases and resells that capacity. In these circumstances, NBN Co's conduct may be considered to be anti-competitive.

Retail markets

The ACCC considers that competition in retail markets is likely to be best promoted under a semi-distributed approach. For areas that are served by competitive transmission, competition in the relevant retail markets is likely to be promoted to the same extent as would occur under a fully distributed approach (due to the benefits of dynamic competition) and more so than would arise under a centralised or consolidated approach.

For areas that are served by natural monopoly routes, the semi-distributed approach is likely to result in some enhanced competition in associated retail markets. This is due to the likelihood that there will be improved price and non-price terms for natural monopoly transmission services as a result of the substitution of NBN Co for Telstra as the supplier of those services, resulting in lower barriers to entry in some, but not all, areas. This would be similar to the effect that a centralised or consolidated approach would have in these areas. However, unlike the centralised or consolidated approach, the semi-distributed approach minimises the deleterious effects that could concurrently occur to retail competition as a result of the reduction in the potential scope for service providers to provide differentiated service offerings (both in relation to price and innovation).

As has been noted above, the ACCC believes that minimising service providers' reliance upon the NBN and maximising the amount of the network that they can exercise control over will result in optimal outcomes in the downstream retail markets. This will provide scope for service innovation, allowing service providers to further differentiate their services. For example, where service providers retain control over the majority of their network, they are able to differentiate their services through the characteristics of their network design including the levels of resilience and security.

VHA and AAPT noted that the semi-distributed option will allow service providers to compete on price[78] without entrenching the problems experienced under the fully distributed option in relation to the lack of competition in retail markets which are served by uncompetitive transmission. In other words, this approach will overcome some of the existing barriers to entry in relation to entering regional retail markets, to the extent that those barriers to entry relate to acquiring transmission on uncompetitive routes.

Wholesale markets

The ACCC considers that competition in wholesale markets will be promoted under a semi-distributed option as it provides the scope for competition to develop in the provision of wholesale services over the NBN. This contention was supported by the major industry stakeholders including Optus,[79] Telstra,[80] VHA[81] and AAPT.[82]

---

78 VHA submission, p.10; AAPT public submission, p.16.

79 Optus public submission, p.9.

80 Telstra public submission, p.20.

Under a semi-distributed option, wholesale competitors will be able to differentiate their products through the differences they can create in the resilience, scalability, coverage and aggregation capabilities of their networks.[83]

Whilst a semi-distributed POI option theoretically provides less scope for wholesale providers to differentiate their services than under a fully distributed option, the ACCC believes that those potential benefits are outweighed by the benefits that will flow from addressing the disparities regarding access to transmission on natural monopoly routes. In particular, under a semi-distributed option it will be easier for wholesale service providers to achieve near ubiquitous coverage which will enhance competition in the relevant markets.

4.3.3. Encouraging efficient use of and investment in infrastructure

Several submissions noted that the semi-distributed POI approach will promote efficient use of, and investment in, infrastructure. Optus submits that enabling interconnection at a lower level within the NBN is likely to promote opportunities for further efficient investment in additional alternate infrastructure over time.[84] Nextgen submitted that allowing access seekers to obtain lower priced and competitive backhaul to the NBN POIs would take advantage of cost efficiencies by using pre-existing network facilities. Nextgen also submitted that this would send the correct investment signals to industry to continue to fund the development of Australia's national information infrastructure, especially to regional areas.[85]

A semi-distributed POI approach would allow most current service providers to continue to use their assets as they do currently in the provision of services in transmission markets, depending on the degree of distribution of POIs. The number, value and identity of the fibre asset owners who would be unable to continue to use their transmission assets for current purposes may depend, to some extent, on the criteria which is used to ascertain the location of the semi-distributed POIs and the amount of fibre which would be bought or leased by NBN Co.

The exception to this is the monopoly transmission routes currently operated by Telstra which would be affected regardless of the criteria used. Under all approaches for implementing semi-distributed POIs, these routes could be taken over by NBN Co, or shared by NBN Co through the leasing of dark fibre.

Competitive routes

For transmission routes that are currently competitive, a network with semi-distributed POIs would have similar efficiency implications as a fully distributed POI option if none of that transmission infrastructure is bypassed by NBN transmission infrastructure (see section 4.2.3) (e.g. where POIs are located wherever Telstra faces at least one competitor in the provision of transmission services).

---

81 VHA submission, p.10.
82 AAPT public submission, p.16.
83 Telstra public submission, p.20.
84 Optus public submission, p.11.
85 Nextgen public submission, p.28.

However, any bypass of existing competitive assets by NBN supplied transmission (e.g. by POIs being located where Telstra faces at least two competitors) would impact upon the current use of that infrastructure. A significant part of transmission infrastructure is sunk investment, which means it has little or no value outside of its use in providing transmission services. The ACCC notes that any bypassed infrastructure – whilst unable to be used for the transport of NBN traffic – could still be used for the transport of, for example, mobile network traffic. However, to the extent that existing operators wish to maintain current rates of return on that infrastructure, this may entail higher prices being charged by existing suppliers for these alternative transmission services.

Further, bypass of assets by NBN Co transmission that removes competition from a particular route is likely to remove the market signals that promote efficient use and investment in infrastructure. Although this may be addressed through regulation of NBN Co, these incentives are better provided through a market mechanism, especially where those markets already exist.

Monopoly routes

For current monopoly transmission routes, as noted above there are two likely scenarios under the semi-distributed POI option. The first is that ownership and operation of monopoly routes will be transferred from Telstra to NBN Co. The second is that Telstra will continue to own and operate the existing transmission links and NBN Co will compete with Telstra on these routes, either by building its own transmission links or by leasing existing dark fibre from Telstra.

Compared to a fully distributed POI approach, in the scenario where NBN Co takes over monopoly transmission routes from Telstra, a semi-distributed POI approach is likely to be more effective in promoting the efficient use of NBN Co's fibre access infrastructure. This is because concerns about vertical integration between retail and transmission are likely to be eliminated or minimised. Further, to the extent that there may be economies of scope for NBN Co in supplying both fibre access and transmission services, this may lower costs to retailers.

The second scenario under semi-distributed POIs, where NBN Co competes with Telstra on current monopoly routes, is also likely to be more effective in promoting efficiency in use and investment compared to a fully distributed POI approach. On monopoly routes where competition is considered feasible in the future, the establishment of competing infrastructure, either through a new transmission link or the leasing of dark fibre by NBN Co from Telstra, will promote competition and hence cost-reflective pricing and incentives for efficient use of and investment in infrastructure.

Having said this, on routes that are considered to be enduring natural monopolies with no scope for future competition, it would be inefficient for NBN Co to duplicate existing transmission assets to compete with Telstra. It would be less costly (productively efficient) to carry all traffic on the existing link than to split the traffic over two links. As such, the duplication of all transmission links is unlikely to best promote efficiency in use and investment. However, it may be feasible for competition to be established on these routes if dark fibre is available and leased to NBN Co. The

leasing of dark fibre by NBN Co to secure transmission routes was also recommended in the Study.[86]

Costs to NBN Co

Of note, in NBN Co's POI Modelling report,[87] provided to the ACCC on a confidential basis, it indicated that it would cost **[c-i-c]**. As noted above, the Study estimated the cost of NBN Co deploying a new transmission network in areas where competitive transmission services are not available (approximately 70 000 km of transmission network) at approximately $3.5 billion.[88]

In summary, the ACCC considers that a semi-distributed POI approach is likely to best promote the efficient use of and investment in infrastructure out of all the POI approaches.

On competitive routes, incentives for the efficient use of and investment in transmission infrastructure are likely to be maintained relative to today through continued competition. If any existing transmission assets on currently competitive routes were to be bypassed under a semi-distributed approach, efficient use of and investment in infrastructure would only be promoted if that bypass delivers benefits to NBN Co in terms of cost savings or efficiency improvements which outweigh those which would have been delivered by existing competition in transmission markets.

In areas served by monopoly routes, efficient use of NBN Co's fibre access network is also likely to be best promoted under this approach, as the detrimental impact upon the downstream retail and wholesale markets which arises from Telstra's vertical integration will be removed or lessened through either NBN Co effectively displacing Telstra on these monopoly routes, or through the introduction of competition between Telstra and NBN Co.

4.4. Centralised and composite approach (NBN Co's Options 3 and 4)

4.4.1. Summary

The centralised POI approach is a 'high consolidation' model under which large scale 'Aggregation POIs' will be located in five capital cities (Option 3).[89] The composite POI approach proposes that in addition to the five capital cities, POIs will be made available at CSAs "upon request" and "subject to (NBN Co) business rules" (Option 4).[90] The composite approach was the option initially preferred by NBN Co.

The ACCC considers that, as was initially articulated by NBN Co, the composite POI option is essentially a variant of the centralised POI option - an interpretation which

86 Study, Recommendation 49, p.332.
87 NBN Co POI Modelling, p.3.
88 Study, p.331.
89 NBN Co Position Paper, p.12.
90 NBN Co Position Paper, p.12.

was supported by respondents.[91] This is because the composite POI approach proposed by NBN Co does not appear to materially differ from the centralised POI approach due to the discretionary nature and lack of clarity concerning the proposed business rules and NBN Co's proposal to price interconnection at the semi-distributed and aggregated POIs at the same rate.[92]

For these reasons, the ACCC has considered the LTIE assessment for both the centralised and the composite POI options together (for ease of reference in this section, the ACCC will refer to both approaches as the 'centralised' POI option in the LTIE assessment below).

It is important to note that the ACCC's assessment of the composite POI option is limited to the specific proposal as it was formulated by NBN Co. The ACCC's views on an alternative composite POI option (i.e. where there is a pricing differential between the different types of POIs and no limitations on the ability for interconnection at a more distributed POI) would likely be different.

The centralised POI approach was supported by Primus Telecom.[93]

Submissions which provided unqualified support for the composite approach were Broadcast Engineering Services (BES)[94] and Powerlink Queensland.[95]

A number of other stakeholders provided qualified support for a form of the composite approach (i.e. their support was conditional upon certain amendments being made to the proposal that was articulated by NBN Co). These stakeholders include Internode,[96] the Internet Society of Australia,[97] FOXTEL,[98] the South Australian Government[99] and Platform Networks.[100] Many of these stakeholders expressed reservations over the lack of clarity concerning the business rules that would govern NBN Co's decision to provide interconnection at CSAs.[101] Further concern was expressed over the potential disincentive for service providers to seek access at CSAs that are priced at the same rate as the capital city Aggregation POIs.[102]

---

91 Telstra public submission, p.14; VHA submission, p.3.

92 TPG submission, p.3.

93 Primus Telecom submission, p.1.

94 Broadcast Engineering Society, *Submission to Australian Competition and Consumer Commission on National Broadband Network Points of Interconnection Discussion Paper*, p.3 (BES submission)

95 Powerlink Queensland, *Powerlink Queensland Submission: National Broadband Network Points of Interconnect (ACCC Discussion Paper)*, p.1, (Powerlink submission).

96 Internode submission, p.4.

97 Internet Society of Australia, *National Broadband Network: Points of Interconnect*, p.5 (ISOC-AU submission).

98 FOXTEL, *Response to the ACCC Discussion Paper on POIs to the NBN*, p.2, (Foxtel submission).

99 Government of South Australia, *Response to the Australian Competition and Consumer Commission Discussion Paper: National Broadband Network Points of Interconnect and NBN Co's Public Position Paper: Proposed NBN Points of Interconnect*, p.2 (SA Government submission).

100 Platform Networks, *NBN POI Public Submission*, p.1, (Platform submission).

101 ISOC-AU submission, p.4; FOXTEL submission, p.3.

102 Foxtel submission, p.3.

Other stakeholders appeared to support the composite approach on the basis that NBN Co would provide unconditional access at all or most of the 195 CSAs.[103] Others supported the concept of centralised POIs as long as "each capital city" had one.[104] This support was qualified by statements in support of a degree of distribution that would allow access seekers to exercise greater control over how and where they access the NBN.[105]

Ergon Energy and Energex also stated that though their first preference is for the fully distributed approach, the composite POI approach would be "acceptable with appropriate business rules in place to govern access arrangements."[106]

4.4.2. Promotion of competition

Transmission capability markets

The ACCC believes that the centralised POI approach will have a detrimental impact upon competition in the relevant transmission capability markets as it will remove existing competition in these markets and foreclose the potential for future entry.

The ACCC believes that competition in the provision of transmission services has provided a number of benefits for the industry and end-users, through the benefits that competition has brought to the downstream wholesale and retail markets. This was acknowledged by a number of respondents, including Optus,[107] AAPT[108] and Telstra.[109]

Under a centralised approach, the location of the POIs would potentially impair the viability of much of the existing transmission capacity, as it will remove a large proportion of traffic from that infrastructure. Even if NBN Co were to buy, rather than build, transmission on some of those existing routes, this would not address the fact that competitive tension between suppliers of transmission services will be removed.

Although transmission capacity would still be used to provide transmission services for mobile networks and some corporate and government services, the effective monopolisation by NBN Co of transmission from the FSA to the centralised POI would have a significant impact upon the economic viability of that infrastructure. As was noted by Nextgen[110] and Telstra,[111] the traffic from the NBN is likely to make up a substantial portion of all demand for transmission capacity.

This reduction in demand for transmission capacity on non-NBN utilised infrastructure on those bypassed routes may mean that the cost of transmission capacity for non-NBN

---

103 Platform submission, p.1; SA Govt submission, p.2.
104 Internode submission, p.4.
105 Internode submission, p.4; SA Govt submission, p.2.
106 Energex submission, p.8; Ergon submission, p.2.
107 Optus public submission, p.10.
108 AAPT public submission, p.3.
109 Telstra public submission, pp.11-12.
110 Nextgen public submission, p.5.
111 Telstra public submission, p.11.

services will increase. This may cause increases in the costs for downstream mobile[112] and corporate and government services.

Retail markets

Overall, the ACCC believes that a centralised approach will have a detrimental impact upon competition in the relevant retail markets relative to a fully or semi-distributed approach, as the reduction of competition within transmission markets is likely to have a significant flow on effect in the downstream markets. In particular, a centralised approach is likely to lead to less retail (and wholesale) based competition due to the lack of flexibility that this approach allows service providers in relation to the way in which they deliver their retail services. The increased reliance by service providers upon wholesale services which are provided by NBN Co will lead to a more limited range of retail products being made available and therefore an increased commoditisation of telecommunications services.

However, as is noted above, the centralised approach is likely to provide more benefits for retail competition than the fully distributed approach in areas which are not served by competitive transmission services as this approach would help overcome some of the relevant barriers to entry. The semi-distributed approach would also provide these benefits – and potentially more, due to the increased ability for retail providers to more effectively compete in the downstream markets.

In addition to the points discussed below, the detrimental effects upon competition in the relevant wholesale markets (discussed in the next section) will also flow through to the vigour of competition in the relevant retail markets. A healthy wholesale market is expected to be required following the roll-out of the NBN in order to support vibrant competition and innovation at the retail level.[113]

In advocating a centralised POI option, NBN Co has argued that this approach to POI location, particularly when combined with NBN Co's proposed mechanism to achieve UNWP is likely to result in:

> …[G]reater retail competition and innovation in the provision of services to end users.[114]

NBN Co has argued that its proposal will result in the lowering of barriers to entry for service providers, thereby facilitating higher numbers of competitors in retail markets, especially regional retail markets where retail competition has not yet fully developed.[115] The lowering of barriers to entry is argued to be caused as a result of both the simplicity and ease of interconnection where POIs are consolidated and the lowering of costs associated with accessing regional markets due to the implementation of the UNWP. The ACCC considers that to the extent that the complexity involved in managing numerous POIs is a barrier to entry, this barrier to the retail markets can be addressed through the provision of aggregation (and other) services by wholesale providers, rather than through the design of NBN Co's network. The ACCC

---

112 Ibid., p.12.
113 Nextgen public submission, p.23; AAPT public submission, p.15; Internode submission, p.4.
114 NBN Co Position Paper, p.9.
115 NBN Co Position Paper, p.5.

acknowledges that lower prices in regional areas would be likely to lower barriers to entry in those areas, but is of the view that, as noted in section 6, lower prices can be delivered in a range of alternative ways which do not foreclose competition in transmission markets.

Furthermore, the ACCC notes that the 'level' of competition in a particular market is not assessed as a numerical exercise by tallying the number of firms in the market. Rather, the level of competition is assessed by reference to the vigour of competition between firms, regardless of their number.

The ACCC believes that the removal of competition in the upstream transmission markets will be likely to remove the vigour of competition in the downstream retail markets as the scope for competition between retail (and wholesale) service providers will be reduced. A number of respondents supported this contention, including Telstra which stated that:

> Highly centralised POIs drive NBN Co towards a large scale layer 2 network, escalating the dependence of downstream wholesale and RSPs on the NBN. All services, from the simplest to the most complex, become much more dependent on NBN Co's network design, service performance, characteristics and pricing.[116]

RSPs will also have less scope in which to differentiate their service by price (as NBN Co intends that this proposal will ensure that retailers face uniform wholesale costs) or by differentiating their services. As was noted by Telstra, RSPs will be limited in the choices they are able to make regarding how and where they will deliver services to their customers.[117]

The lack of flexibility for service providers in the transmission services they acquire has the potential to limit innovation in the development of products.[118] Submissions also noted that a centralised POI approach will place technical limitations upon the retail services that can be provided over the NBN.[119]

Submissions expressed concern that the implementation of a centralised POI approach would result in service providers becoming mere resellers,[120] encouraging "'no-frills – low cost retail providers"[121] to emerge over the NBN.

Respondents also noted that a centralised POI approach would threaten the viability of current regional retail providers and providers of local networks (i.e. greenfields providers), due to the requirement that traffic be 'tromboned' through the centralised POIs.[122] This would also be likely to foreclose the future potential for regionally based retail providers to operate effectively over the NBN.

---

116 Telstra public submission, p.12.
117 Ibid.
118 VHA submission, p.10.
119 Telstra public submission, p.12; Optus public submission, p.9; AAPT public submission, p.16.
120 AAPT public submission, p.3.
121 VHA submission, p.10.
122 Telstra public submission, pp.3 & 20.

Smaller service providers, who act as mere resellers of carriage services and who have no desire to invest in significant infrastructure, will still be able to compete over the NBN if centralised POIs are not adopted. Regardless of the POI proposal adopted, at the very least these service providers will need to acquire an aggregation service from a wholesale provider. The only impact of the various POI proposals for these providers is the identity of their supplier – either NBN Co (under a centralised POI option) or another wholesale provider (under a fully distributed or semi-distributed POI option).

There is also the potential for irreversible and unintended consequences by the inhibition of dynamic retail competition in existing and prospective services that require interconnection closer to the end-user.

Wholesale markets

The ACCC believes that a centralised POI option would be detrimental to competition in wholesale markets, which in turn will be detrimental to competition in the relevant retail markets.

By providing consolidated POIs, NBN Co will effectively be providing an aggregated service, which is typically a feature of Layer 3 wholesale services.[123] Telstra's submission contends that this will drive NBN Co towards being a standalone national network (minus the links between the capital cities).[124] Optus concurs, stating that a centralised option will mean that:

> NBN Co will become the default carrier for all voice traffic within each state, including local, long distance, calls to special services, fixed to mobile and mobile to fixed calls.[125]

The ACCC believes that it is likely that a centralised option will reduce the potential margins available to wholesale providers and limit the scope in which they can add value through their wholesale offerings. A centralised option will be likely to foreclose opportunities for the development of competitive wholesale markets in the provision of high-speed voice and broadband services.[126]

It is therefore less likely that a sustainable and vigorous wholesale services market will emerge over the NBN.[127]

4.4.3. Encouraging efficient use of and investment in infrastructure

Under a centralised POI approach, operators of most non-intercapital transmission routes will be unable to use their existing assets for the transport of NBN traffic.[128] The ACCC considers that the implications for efficiency in investment and use as a result of NBN Co's bypass of existing infrastructure is likely to be the most significant under

---

123 Ibid., p.12.
124 Ibid., p.17.
125 Optus public submission, p.16.
126 Optus public submission, p.2; VHA submission, p.11; AAPT public submission, p.14.
127 Optus public submission, p.11.
128 Infrastructure which is used to provide transmission services for large business, corporate and government customers requiring a high level of capacity is likely to continue to be used.

this option of all the POI options, particularly given that most investment in infrastructure has been in the metropolitan areas of the mainland capital cities.

Many submissions (including those from Optus,[129] PIPE,[130] TPG,[131] AAPT,[132] VHA,[133] ATUG,[134] CCC,[135] Communications Alliance,[136] WA government[137] and Michael S Cox[138]) agreed that the centralised approach would reduce or foreclose backhaul competition and subsequently any further investment or development of transmission markets. As outlined in section 3.3, key fibre providers (including Telstra,[139] Optus,[140] TPG,[141] PIPE,[142] Nextgen[143] and AAPT[144]) expressed concern in their submissions over the potential stranding of assets under this approach.

Competitive routes

The ACCC considers that the bypass by NBN Co of existing transmission infrastructure on currently competitive routes would represent an inefficient use of existing infrastructure, as transmission links are largely sunk investments and have little or no value outside of their use in providing transmission services. As noted above, existing assets could still be used for the transport of, for example, mobile network traffic, but this may result in higher prices being charged for these services.

Further, to the extent that a centralised POI approach will eliminate competition from many routes, this would remove the market signals that promote efficient use of and investment in infrastructure. Although this may be addressed through regulation of NBN Co, these incentives are better provided through a market mechanism, especially where a market already exists.

Monopoly routes

The efficiency implications of this approach to POI location for current monopoly routes are likely to be similar to those outlined in section 4.4.3 – that is, this approach would be unlikely to deliver any efficiency gains or losses on current monopoly routes over and above those outlined in section 4.4.3.

---

129 Optus public submission, p.12.
130 PIPE submission, p.5.
131 TPG submission, p.4.
132 AAPT public submission, p.3.
133 VHA submission, p.4.
134 ATUG submission, p.2.
135 CCC public submission, p.8.
136 Communications Alliance, *ACCC consultation on: National Broadband Network – Points of Interconnect Submission by Communications Alliance*, p.5, (Comms Alliance public submission).
137 WA Govt submission, p.1.
138 Michael S Cox, *Response to: ACCC/NBN Co Discussion Paper on: National Broadband Network Points of Interconnect*, p.7, (Michael S Cox submission).
139 Telstra public submission, pp.4-5.
140 Optus public submission, p.12.
141 TPG submission, p.3.
142 PIPE submission, p.2.
143 Nextgen confidential submission, p.14.
144 AAPT public submission, p.3.

Costs to NBN Co

Relative to a semi-distributed approach, NBN Co may benefit through increased economies of scale through adopting centralised POIs. Of the options in which NBN Co supplies transmission, this option would be most likely to promote NBN Co's commercial interests and the efficiency of its operations to the extent that there are economies of scale in transmission supply.

For example, in NBN Co's POI Modelling report,[145] it indicated that it would cost **[c-i-c]**.

Although a centralised POI approach may best meet NBN Co's commercial interests, and of the POI options in which it supplies transmission, enhance its efficiency in a productive sense, to the extent that NBN Co did not face competitive pressure to invest efficiently and encourage efficient use of its transmission infrastructure over time, these short term benefits to NBN Co could be outweighed by a loss of dynamic efficiency over the longer term. Dynamic efficiency is also likely to be diminished as there will be limited (if any) scope for competition through non-price means, which may stall innovation.

In summary, the ACCC considers that a centralised POI approach is the least likely of all the POI options to promote efficient use of and investment in infrastructure. Although – relative to a semi-distributed approach – centralised POIs would be likely to promote NBN Co's commercial interests and its efficiency in the short term by allowing it to take advantage of economies of scale in transmission supply, over the longer term, the losses to dynamic efficiency due to the detrimental impact on transmission market competition would be likely to outweigh these gains.

[145] NBN Co POI Modelling, p.3.

5. Recommendation

5.1. Initial POI location option that best meets the LTIE

The ACCC notes that its recommendation is based upon the information it has been able to obtain and analyse within the relatively short timeframe in which it was requested to provide this advice. The ACCC also notes that its recommendation in this advice is only intended to provide guidance in relation to how it would consider this issue in an SAU provided by NBN Co.

In light of the information it has received and the analysis which is outlined in section 4, the ACCC considers that the semi-distributed approach to the initial POI location is the option which is likely to best meet the LTIE. The basis for this conclusion is as follows.

Competition in retail and wholesale markets – The ACCC's view is that the semi-distributed approach is the one which is most likely to promote competition in retail and wholesale markets due to the enhanced ability for service providers to compete in relation to price and service innovation over a greater range of products.

Whilst the fully distributed approach is also likely to promote competition in retail and wholesale markets, due to the likelihood that Telstra will remain in control of natural monopoly transmission routes there is a considerable prospect that its continued vertical integration could constrain the development of retail and wholesale competition in areas where it is the sole provider of transmission. The ACCC believes that overall the centralised approach will have a detrimental effect on the development of competition in retail and wholesale markets.

Competition in transmission markets – The ACCC's view is that the centralised approach is likely to have a detrimental effect upon competition in the transmission markets, as it would result in the removal of existing competition in those markets. The ACCC believes that the semi-distributed approach (as articulated further below) can be implemented in a way which preserves existing competition in the relevant transmission markets and allows for future viable competition to develop.

Whilst the fully distributed approach theoretically provides the maximum opportunity for future competition to develop in transmission markets, the ACCC believes that this future competition can be sufficiently facilitated and encouraged through the semi-distributed approach proposed by the ACCC.

Efficient use of and investment in infrastructure – The ACCC's view is that the semi-distributed approach would best promote the efficient use of and investment in infrastructure. Under this approach, transmission assets on competitive routes would continue to be capable of being utilised for all traffic and existing competition would be maintained, which would provide incentives for efficient use of and investment in infrastructure. Furthermore, as traffic volumes increase, this approach is likely to promote investment in infrastructure upgrades (i.e. to increase capacity) on existing routes. Although competition on these routes would also be retained under a fully

distributed approach, the semi-distributed approach would likely lead to better efficiency outcomes on monopoly transmission routes. This is because NBN Co would either take over monopoly routes or compete with Telstra on these routes, thereby potentially minimising the impact that Telstra's vertical integration could have on the efficient use of NBN Co's fibre access network through reducing competition in the relevant downstream retail and wholesale markets.

The centralised POI approach would bypass existing transmission assets for the carriage of NBN traffic, which would be likely to result in inefficient use of that infrastructure. Existing competition between suppliers of transmission services would also be eliminated under this approach, with subsequent implications for the efficient use of that infrastructure and future investment in the transmission infrastructure which is incorporated into the NBN.

5.2. Implementing a semi-distributed approach

5.2.1. Criteria for POI location

As is noted in section 2.1, a semi-distributed approach could be implemented in a range of ways meaning that there is a spectrum of potential outcomes for the number and location of the initial POIs. The ACCC believes that the semi-distributed approach should be implemented by locating POIs where competitive transmission services are available from that location, or where the prospects of such competitive entry is high.

Views of stakeholders

Service providers that supported the semi-distributed approach were generally unanimous that POIs should be located where there is 'competitive backhaul'.[146] However, the criteria that each considered applicable to determining what constitutes 'competitive backhaul' differed.

For example, Optus states that there should be a 'minimum of 2 competing backhaul providers close to the POI.'[147] Optus clarified that this criterion would be satisfied wherever Telstra and one other transmission provider are present.[148] Qualified support for this approach was provided by Telstra.[149] Telstra suggested that the existing ACCC rule that effective competition only be found on routes that are Telstra plus two other transmission providers is too restrictive.[150]

On the other hand, PIPE and VHA suggested a 'minimum of three *infrastructure-based* backhaul providers' (not resellers) as the appropriate test.[151] VHA defined 'functional competition' for the purposes of POI location as a market with at least three players

146 Optus public submission, p.3; Nextgen public submission, p.10; AAPT public submission, p.5; PIPE Networks, p.3; VHA submission; p.2; Telstra public submission, p.8.
147 Optus public submission, p.18.
148 Ibid., p.5.
149 Telstra public submission, p.22.
150 Ibid., p.8.
151 PIPE submission, p.3; VHA submission, p.2.

with 'unconstrained infrastructure access'.[152] PIPE suggested that a POI be located no further than a 5km radius from where such competition exists.[153] VHA emphasised the need to focus on (existing) "contested rather than (future) contestable markets" as the determinative criteria.[154]

AAPT and TPG stated that 'POIs should be located at (or where that is not possible at least near) existing Telstra exchanges where many access seekers already have established POIs for the purposes of voice service interconnection and access to ULLS and LSS services'.[155] AAPT cited the ACCC's assessment of the FANOC SAU in support of this position,[156] however, it clarified that this approach should not result in a POI at every FSA.[157] TPG suggested that for all exchanges where there is no existing competition, POIs should be brought back to capital cities or 'any other point along that path at which an RSP may seek to interconnect at its own expense.'[158]

TPG added that if more consolidation is favoured, then 'proximity to independent backhaul provision should be the primary consideration' when determining POI location.[159] To this end, TPG noted that if the relevant backhaul provider is vertically integrated, then there would also need to be an alternative backhaul provider present to justify the location of the POI.[160]

Optus suggests that 'POIs with similar scale in terms of the number of premises served should be one of the criteria resulting in consolidation of smaller FSAs.'[161] AAPT agreed with this proposal.[162]

ACCC views

In previous regulatory decisions regarding applications for exemptions from declaration, the ACCC has adopted a 'rule of thumb' approach to more readily enable the practical application of its decisions.[163] The Australian Competition Tribunal (the Tribunal) has acknowledged that such rules of thumb could be useful as screening devices, however in order for those rules to be determinative of a regulatory process, they should be based on in-depth research and sound economic principles.[164] The Tribunal found that the application of a simplistic rule of thumb ignored issues

---

152 VHA submission, p.2.
153 PIPE submission, p.3.
154 VHA submission, p.5.
155 AAPT public submission, p.5.
156 Ibid., p.7, as cited in the ACCC Discussion Paper, p.11 – "POIs should be located as close to the end user as is appropriate and efficient and that this was likely to mean that POIs should be located at or near existing local access switches and other POIs for current ULLS and LSS products."
157 AAPT public submission, p.7.
158 TPG submission, p.4.
159 Ibid., p.5.
160 Ibid.
161 Optus public submission, p.18.
162 AAPT public submission, p.5.
163 See for example, the approach adopted by the ACCC in relation to WLR, LCS and PSTN OA (ACCC, *Variation of WLR, LCS and PSTN OA Class Exemptions Final Decision*, November 2009) and DTCS (DTCS Exemption Final Report).
164 *Application by Chime Communications Pty Ltd* [2008] ACompT 4 (December 2006), p.58.

requiring further investigation, and concluded that to properly determine the state of actual and potential competition in the market, an empirical assessment of other competitive indicators should also be undertaken.

The ACCC considers that a rule of thumb approach could be adopted as an initial starting point for identifying the location of POIs under the semi-distributed approach, and that the precise POI locations could be determined following an assessment of other evidence that the particular route is effectively competitive.

The ACCC has previously considered what criteria should be used to assess whether transmission routes are competitive in the context of the DTCS. As is outlined in section 3.1.2, in decisions regarding the exemption of particular transmission routes from the DTCS declaration, the ACCC has only allowed exemptions where there is evidence that the particular route is competitive. The relevant 'rule of thumb' approach adopted by the ACCC in relation to whether capital-regional routes could be considered competitive broadly required that there be at least two distinct capital-regional routes in addition to Telstra which meet the following criteria:

- optical fibre within a 1 km radius of the GPO of the relevant regional town; and
- connection to an optical fibre network which connects that town with a capital city.

In that decision, the ACCC did not require the additional optical fibre networks to also be offering transmission services to that market, as it reasoned that the presence of the optical fibre was a strong indication that those transmission services would be capable of being provided without the supplier incurring prohibitive costs. However, if it could be demonstrated that a particular network could not be used to provide wholesale services (i.e. due to technical or contractual reasons) that network would not be counted as a potential competitor to Telstra.

The ACCC does not consider that this test should be adopted as the 'competition criterion' for the purposes of determining POI location under a semi-distributed approach. The above test was developed in the context of the removal of regulation. In that context, the test is directed toward ensuring that regulation is only removed where the ACCC is confident that it is no longer required. In relation to the DTCS, the ACCC considers that the risks associated with under-regulation are more significant than those which are associated with over-regulation. If regulation remains on a route which is actually delivering competitive outcomes, it is unlikely that access seekers will need to rely upon regulated access to the declared service as the competitive market will provide alternatives. Therefore the impact to the supplier of the declared services is likely to be minimal. However, if regulation is removed from a route which is not actually delivering competitive outcomes (despite being theoretically capable of doing so), this could have a significant effect on the ability of access seekers to compete in the relevant downstream markets.

In the context of determining the location of semi-distributed POIs, the ACCC must consider different matters. In particular, the ACCC believes that it is important that interconnection to NBN Co's network is permitted at locations where existing competition in the provision of transmission services is preserved and the potential for future competition in transmission services to develop is maximised. The ACCC

believes that there are greater risks if a POI is placed in a location which disrupts or displaces existing competitive markets than if it is placed in a location where competitive outcomes were expected, but not realised.

If competitive outcomes (e.g. efficient prices) are not actually delivered to access seekers in locations which were expected to be competitive, two alternative mechanisms that could be utilised to address those concerns are:

- *Price regulation of declared services*: The regulation of DTCS on relevant routes, including the setting of indicative prices or issuing access determinations (under the regulatory reforms proposed under the CACS Bill) could help ensure that competitive pricing is delivered on these routes;165 or
- *Re-locating the POI*: A decision could be made to shift the POI higher up into the network (i.e. further away from the end-user) to where competitive outcomes have been realised (this is discussed further at section 5.3).

The ACCC therefore believes that the criteria for determining whether transmission routes are competitive for the purposes of determining the location of a semi-distributed POI should be a lower threshold than that which was used in the DTCS exemption decision.

In order for the ACCC, NBN Co and industry to have guidance regarding how the semi-distributed approach is to be implemented, the ACCC intends to develop a set of guiding principles, based on a "rule of thumb" in order to assist in the assessment of whether a transmission route is actually competitive.

As an initial starting point, the ACCC's view is that NBN Co's POIs should be located where:

(a) it is technically and operationally feasible for NBN Co to allow interconnection (this will usually be at the fibre exchange for each FSA);

(b) there are at least two competitors with optical fibres within a nominated distance from that location which:

  (i) connect that site to an optical fibre network which is connected to a capital city; and

  (ii) deliver wholesale transmission services which are suitable for use by service providers who wish to connect to the NBN at that location; and

(c) there is other evidence that the particular route is, or is likely to become, effectively competitive,

(the 'competition criteria').

Whilst the existence of two suppliers on a particular route may be used as an initial screening device for the preliminary assessment of whether competitive transmission

---

165 As noted, on 23 November 2010 the ACCC issued a position paper setting out its approach to setting prices of DTCS. See: ACCC Position Paper DTCS Pricing.

services are likely to be available, this is not wholly determinative. To this end, the ACCC believes that an empirical assessment of other competitive indicators should be included in order to ensure that the route is sufficiently competitive. The ACCC intends to further consider what factors or method for assessment could be used to clarify what evidence would be considered under limb (c). These could, for example, include evidence of existing long-term contractual arrangements for the acquisition of transmission services.

Therefore, whilst recognising the need for the location of POIs to be determined quickly, the ACCC proposes that it consults with NBN Co in order to refine the competition criteria and to ensure that the identified transmission routes are sufficiently competitive. This could include:

- identifying a geographical range from the proposed fibre exchange site within which transmission infrastructure must be located in order for the likelihood of effective competition to be considered to be sufficiently high; and
- any other technical characteristics that should be required of the relevant transmission infrastructure (for example, that the network must meet a minimum availability service level) in order to ensure that it is capable of providing effective competition.

In addition, the ACCC would also be interested in ascertaining the extent to which the assessment regarding whether particular locations meet the competition criteria should also include infrastructure which is not yet complete but is expected to be operational in the near future (for example, this may include infrastructure to which is planned to be completed under the Regional Backbone Blackspots Program by the end of 2011).

The ACCC believes that the final identification of the number and location of initial POIs could be subject to a short period of public confirmation, in order to avoid unintended consequences. The ACCC believes that it is important that this process is conducted by an independent party, rather than NBN Co in order to allow industry stakeholders to submit confidential information regarding the precise location of their transmission assets and their plans for future investment. The ACCC would be available to fulfil this role should it be requested to do so.

The ACCC believes that this process (or processes) could be completed relatively quickly. This will assist by giving NBN Co and industry sufficient guidance regarding how the ACCC will consider this matter in the future. However, it should be noted that if NBN Co were to lodge an SAU, the ACCC would need to conduct an assessment of the terms and conditions of that SAU afresh and in accordance with the relevant provisions of the TPA.

The ACCC also notes that some service providers may require interconnection below the POIs implemented under a semi-distributed approach in order to deliver services which require the service provider to interconnect closer to the end-user (i.e. due to technical issues such as the provision of services which require low latency).

The ACCC understands that allowing this type of interconnection is important to not foreclose the opportunity for service providers to deliver innovative retail services to regional customers using the NBN. The extent to which this additional, limited form of

interconnection is required will depend upon the final number of FSAs which will also act as POIs and the level of aggregation which will occur between FSAs which do not act as POIs. The ACCC suggests that this be further explored through the next stage of industry consultation.

5.2.2. Reconciling ACCC recommended approach to NBN Co network architecture

In order to apply the criteria outlined above, the ACCC would need to conduct an assessment of all the locations that NBN Co proposes will act as fibre exchanges (approximately 718 - 950) to assess which ones should also operate as POIs.

However, NBN Co has developed a product construct that requires interconnection with the defined CSAs, rather than at FSAs (see section 2.1.1 and Attachment B for a further description of these concepts). As the CSAs proposed by NBN Co are a result of a product overlay, rather than due to the technical requirements of the network design, there is no direct correlation between any one CSA and a number of FSAs. Rather, CSAs have been designed by NBN Co to ensure that a minimum number of end-users can be reached through one location in order to simplify access for service providers and encourage them to offer ubiquitous retail services. For some locations, a CSA may encompass multiple FSAs and traffic from the fibre exchanges will be aggregated to the one location (i.e. those FSAs are 'downstream' to the CSA).

It is NBN Co's view that in implementing a semi-distributed approach, POIs should only be located in designated locations within geographical areas that it terms 'connectivity service areas' (CSAs). Most relevantly, these locations within CSAs may act as aggregation points for network traffic from multiple fibre serving areas (FSAs) – each of which will have a fibre exchange which is technically able to operate as a POI.

The ACCC's preferred approach is for the assessment of where POIs should be located to initially commence with consideration of all locations of the network where interconnection is technically and operationally feasible. In general terms, this would require an assessment of the transmission facilities which would be present at every fibre exchange. In contrast, by only considering POIs at CSAs, NBN Co's proposed approach may overlook potential POIs which would be located closer toward the end-user.

However, the two approaches will align where:

- the CSA overlays a single FSA (i.e. there is only one fibre exchange and therefore only one potential POI for that geographical region, so the CSA construct does not foreclose opportunities for interconnection at a point which is closer to the end-user) – this is most likely to occur in metropolitan areas where population density is high; and
- the POI for the CSA acts as an aggregation point for multiple downstream fibre exchanges (i.e. where the CSA comprises multiple FSAs and there are therefore multiple potential POIs) which would not be served by competitive transmission services This is most likely to occur in regional areas.

The ACCC expects that these circumstances will apply to the majority of the CSAs currently which have been proposed by NBN Co. However, where there are FSAs downstream of a CSA which would be served by competitive transmission services, the ACCC would be concerned that linking the POI location to the CSA construct would result in the foreclosure of transmission competition in some areas. Based on its preliminary analysis, the ACCC believes that it is likely that only approximately 15% of the proposed mainland state capital city CSA POI locations will require further examination to ascertain whether these CSAs should be served by multiple POIs (i.e. at the downstream FSAs which meet the competition criteria).

The ACCC has also conducted some preliminary analysis based on information it has received through the Infrastructure Record Keeping Rule (data is from 2009) and the information regarding CSA and FSA locations it has derived from information publicly provided by NBN Co in the NBN Position Paper and earlier documents. As a result, the ACCC believes that it is likely that only approximately 15% of the proposed mainland state capital city CSA POI locations will require further examination to ascertain whether these CSAs should be served by multiple POIs located at the downstream FSAs.

The ACCC preliminary analysis indicates that the application of the competition criterion for the semi-distributed approach is likely to amount to a total number of mainland state metropolitan CSA POIs in the range of 108 – 130. For the proposed 6 CSAs proposed for the capital cities of Northern Territory, ACT and Tasmania and the 81 regional CSAs the ACCC considers that the prospects of the any proposed downstream FSAs also meeting the competition criteria is likely to be quite low, given the low levels of competition in existing ESAs located in these areas.[166] Therefore, there the ACCC does not expect that the implementation of a semi-distributed approach would result in a significant increase in the number of proposed regional POIs. However, it may be that there are some regional CSAs where the downstream FSA is served by competitive transmission, resulting in a potential increase in the number of regional POIs.

The ACCC notes that public consultation will be extremely important in ascertaining the precise number of downstream FSA locations that will be served by competitive transmission and therefore the number of additional POIs that will be required.

In addition to the above, the ACCC also considers that NBN Co should consider a number of additional factors in designing its network in a manner which enables a semi-distributed approach to be best implemented. In particular, the ACCC would expect that NBN Co would design its network to ensure that there are a sufficient and appropriate number of points in its network where it would be technically and operationally feasible to construct a POI (i.e. "potential" POIs). Based on the ACCC's current understanding of NBN Co's proposed network design, all fibre exchanges will be capable of being "potential" POIs.

The ACCC expects that NBN Co will have some degree of flexibility regarding where it locates its fibre exchanges, as there are likely to be multiple existing copper

[166] See Table 2 in section 3.2.1, which notes that only 133 exchanges in regional or rural areas are served by more than one provider of transmission services.

exchanges available in each FSA which could be selected for that upgrade. In determining where fibre exchanges are located, the ACCC considers that NBN Co should consider which available location would:

- be likely to be served by the maximises the amount of existing transmission competition which is present at sites which will operate as potential POIs. In essence, this means that where possible, NBN Co should locate its fibre exchanges where they will be best served by existing transmission competition; and
- have the minimum physical requirements for it to operate as a POI. This would require consideration of whether the selected copper exchange would actually have sufficient space for it to act as a POI for the NBN or, if there is not sufficient space, whether it would be feasible for the POI to be virtually co-located to the exchange.

The ACCC has conducted some preliminary analysis in relation to the first requirement and is available to further develop this with NBN Co. For example, if NBN Co is technically able to locate its fibre exchange in one of three different existing copper exchanges (i.e. as multiple ESAs will make up one FSA), it should select the copper exchange which is currently served by the most amount of competitive transmission. This approach will result in the most efficient use of existing infrastructure and will minimise the amount of stranding of competitive transmission assets that will occur through the transition from copper to fibre.

A preliminary analysis of the application of this approach suggests that the proportion of FSAs which have currently been located by NBN Co in areas which are not competitive, could be reduced from more than 25% to about 12%. This will also reduce the amount of aggregation which NBN Co will need to undertake in order to ensure that POIs are only offered at FSAs which are served by at least two service providers. The ACCC can provide NBN Co with advice in this regard.

The ACCC understands that NBN Co is currently performing some analysis in relation to the second requirement

5.3. Reviewing the location of POIs

The ACCC considers that a process for reviewing the location of NBN Co's POIs would ensure that the LTIE continues to be met. A mechanism for reviewing POI locations was recommended in the Study in order to permit new investment below the POIs and to ensure that the objectives of affordability and a level playing field are met above the POIs.[167] The ACCC has also previously endorsed a review process as part of the FANOC SAU review. [168]

Submissions broadly supported a process for reviewing POIs over time. Internode did not, however, noting:

---

[167] Study, Recommendation 51, p.334.

[168] ACCC, *Assessment of FANOC's SAU in relation to the Broadband Access Service*, Draft Decision, December 2007.

> Given that access seekers are likely to enter in to multi year contracts for backhaul any sort of uncertainty is going to be fatal for NBN Co and the backhaul market. It is very undesirable for an NBN Co POI to ever move.[169]

Submissions provided a range of views as to the principles on which POIs should be reviewed. Optus, Nextgen and TPG suggested that the location of POIs should be reviewed based on the expansion of, or existence of, competitive transmission infrastructure to an NBN fibre service area.[170] Nextgen also stated that, from a planning perspective, a review of the initial number of POIs should relate to a consideration of a number of further parameters, including: baseline population and demographic data relating to new Greenfields developments or large scale industry schemes, traffic profile and growth in the demand for bandwidth, and the evolving technical and business requirements of RSPs.[171]

Telstra suggested that one approach could be that NBN Co should not have to provide a new POI until it has received requests from at least two transmission providers. However, Telstra noted that any pre-determined principle may not be appropriate as competition usually develops incrementally and an 'at least two requests policy' is likely to encourage co-ordination or collusion between transmission providers.[172] On the other hand, AAPT suggested that the location of POIs may be taken higher into the network if the presence of multiple transmission providers did not deliver affordable pricing on selected routes.[173]

Submissions also provided views on the process by which POIs should be reviewed. Many submissions (including Optus, Nextgen and TPG) suggested that any review of POI location should be done on a fully transparent and consistent basis and with extensive consultation performed, and TPG stated that it should ensure that no one provider is advantaged over other providers.[174] Nextgen also stated that arrangements for the review of POIs should be set out as contractual obligations on NBN Co through its formal agreements with access seekers.[175] ATUG argued that the location of POIs in terms of the outcomes for end-users, should be monitored annually and NBN Co should be required to respond if outcomes are not meeting policy objectives.[176] Internode stated that a new POI must be provided and made operational before the old POI is decommissioned to ensure zero disruption to subscribers.[177]

The ACCC's view is that whether or not a POI should be relocated should be evaluated with reference to the principles which have been used to determine the initial location of POIs, specifically, an assessment of the promotion of the LTIE and a consideration of the market dynamics in retail, wholesale and transmission markets.

---

169 Internode submission, p.5.
170 Optus public submission, p.19; Nextgen public submission p.31; TPG submission p.5.
171 Nextgen public submission p.31.
172 Telstra public submission p.8.
173 AAPT public submission p.9.
174 Optus public submission, p.19; Nextgen public submission p.32; TPG submission p.5.
175 Nextgen public submission p.32.
176 ATUG submission, p.41.
177 Internode submission, p.5.

In the context of the approach proposed by the ACCC (as set out in section 5.2), this would necessitate consideration of whether competitive outcomes were being delivered in the transmission markets, particularly where the POI is only served by two providers (i.e. duopoly routes). If competitive pricing on duopoly routes does not eventuate, consideration might need to be given to moving the POI further away from the end-user. Optus suggested a similar approach whereby the ACCC could set a benchmark price for transmission services and existing providers could tender to meet that price point; if they were unwilling to do so then NBN Co could be permitted to consolidate the POI at the location where the specific concern arises.[178] This approach would require NBN Co to make further investment on that route. However, the ACCC has regulatory tools in the form of either an access determination or the arbitration of access disputes (depending on the regulatory regime in place at the time) which would be alternative mechanisms by which competitive pricing could be facilitated on those duopoly routes before a POI is relocated.

On the other hand, if there was evidence of the prospects for competition in transmission markets increasing (e.g. increased investment in transmission infrastructure above the POI and/or increased demand for capacity at a POI) this might lead to consideration of a POI being moved closer to the end-user.

The ACCC agrees with submissions that the review process should be transparent and consistent, in order to give the highest possible degree of certainty to NBN Co, transmission providers and access seekers. In this regard, the ACCC is of the view that any review of POI locations should involve public consultation with interested parties.

One process by which POIs could be reviewed over the long term would be for NBN Co to incorporate a POI review process within any SAU it submits. The SAU could set out the criteria for determining the location of POIs, the circumstances that would trigger a review of the POI location (e.g. changes in market conditions, or a certain time period lapsing), the principles by which a POI review would be conducted and the process to be undertaken, e.g. public consultation. Any POI review process included in an SAU would be considered by the ACCC as part of its assessments of the reasonableness of the SAU.

[178] Optus public submission, p.14.

6. Uniform pricing and POIs

A key reason NBN Co put forward in support of a centralised POI approach was that it allowed the delivery of uniform national wholesale pricing (UNWP). Given the ACCC's preference for a semi-distributed POI approach, this section considers how this relates to the issue of uniform pricing.

Historically, the government's pricing parity objectives have focussed on achieving broad parity between the retail prices charged for a basic telephone service across regions, under the USO. To the extent that this has created revenue shortfalls for the USO provider – Telstra – these have been funded via the external mechanism of the Universal Service Fund. The Universal Service Fund has been sourced via a levy on all licensed telecommunications carriers in proportion to their 'eligible revenues'.

Until the recent commencement of the government's Regional Backbone Blackspots Program (RBBP), the government had not sought to directly address the issue of what are understood to be high transmission prices in regional areas (relative to less remote and more densely populated metropolitan areas) and the implications for access seeker entry into retail broadband markets in these areas. These higher prices are likely to have been driven by several issues, including:

- the higher per user costs of providing transmission in regional areas, which is driven by longer distances and lower population densities;
- vertical integration and the incentives it creates for the incumbent to charge higher prices to, and therefore foreclose entry by, potential retail market competitors; and
- the limitations of the negotiate-arbitrate access regime in addressing monopoly pricing.

The CCC noted this in its submission, stating that the price disparity on transmission routes has two components; firstly, there is some cost differential based on capacity and distance and secondly, there is a price difference based on the lack of competition on some routes.[179] The CCC recommended that regulated prices be established on uncompetitive transmission routes to remove monopoly rents from prices, and then public policy tools be applied to strip out the effects of geographic and capacity inequalities.[180]

The ACCC notes that its recommendations on initial NBN POI location, as well as the just-passed amendments to the telecommunications access regime, will go some way to alleviating the second and third issues noted above. However, it would not necessarily on its own affect higher prices of transmission on current monopoly routes (or in the 'non-competitive' footprint), to the extent the costs of supply on those routes are higher than on competitive routes. The ACCC considers, though, that this problem can be solved without having to adopt a centralised approach to POIs.

---

[179] CCC submission, p.9.
[180] CCC submission, p.7.

If the issue of a lack of parity in transmission pricing between competitive and monopoly routes is resolved (along the lines proposed in section 6.2.2), the issue of non-uniformity in transmission pricing is narrowed to the pricing of transmission on competitive routes (ie, *within* the 'competitive footprint'). That is, even though prices for NBN Co's services from the POI to the end-user would be uniform, prices from the POI back to access seekers' core networks might not be uniform. In these circumstances, there may be differences in the price of transmission to *reach* NBN Co's POIs which could prevent access seekers from being able to deliver uniform retail prices.

This chapter discusses how the government's UNWP objectives may be achieved under the ACCC's recommended approach to POI locations. The ACCC notes though that on the information it has available, the government is yet to fully define its UNWP objective. Depending on the problem the government wants to solve, there is a range of different ways of interpreting this objective, and in turn a range of different ways of implementing it.

At the outset, the ACCC emphasises that – to deliver the social policy objective of pricing parity in the face of large cost differences across regions – its consistent position has been that external funding (direct government subsidisation), implemented in such a way as to minimise distortions to competition, is the preferable mechanism for funding uneconomic service provision. However, the ACCC recognises that other policy objectives may constrain the adoption of such an approach. In this context, the ACCC's comments in this section focus on other approaches to achieving UNWP objectives. The ACCC notes that its consideration of UNWP options is relatively preliminary.

6.1. Uniform pricing objectives

The ACCC notes that access seekers will need to purchase several products and inputs in order to provide services to end-users.

Under a semi-distributed POI approach, access seekers will be required to purchase a 'wholesale' product from NBN Co (this will provide a data connection between an end-user and an NBN POI) and wholesale transmission products from alternative suppliers (or self-supplied) (this will deliver traffic from the NBN POI back to the retailers' point of presence). Other access seeker cost inputs include the costs of transmitting traffic to international transmission routes; the cost of inter-capital transmission and international transmission itself and the costs of marketing, billing and servicing end-users.

As noted by Comms Alliance in its submission, NBN Co would be unable to limit or guarantee the number or size of any wholesale cost inputs an access seeker might incur from non-NBN Co wholesale component suppliers.[181] Nextgen also identified that a number of tools would need to be implemented to ensure that access seekers face the same *total* costs in supplying services to end users across regions.[182] Assuming though that costs such as transmitting traffic to international transmission routes do not affect

[181] Comms Alliance submission, p.11.
[182] Nextgen public submission, pp.36-37.

access seekers' ability to offer uniform retail prices, the delivery by access seekers of uniform retail pricing is more likely to occur if there is broad uniformity in prices for NBN Co's wholesale product as well as for transmission products supplied in the competitive footprint.

In terms of the wholesale product that NBN Co is proposing to offer, as noted in section 2.1.2, a wholesale product which consists of four bundled components (a UNI port, an AVC link, a CVC link, and an NNI port) is proposed to be offered. The ACCC's current understanding is that each of these components of NBN Co's wholesale product will be priced separately.

Under a semi-distributed POI approach, in areas where a POI is located at an FSA (that is where NBN Co would not be providing a transmission service between FSAs) its product is likely to be supplied using relatively short fibre links between the OLT and the first aggregation switch. On the other hand, in areas where NBN Co *would* be providing transmission in order to transport traffic back to a POI at which there is competitive transmission, its product could be transporting traffic over, and supplied using infrastructure which spans quite long distances from the OLT to the POI.[183] Hence, because different degrees of infrastructure will be used in the competitive footprint versus the non-competitive footprint to supply NBN Co's wholesale product, a geographically uniform price for the product would mean that its price is not directly linked to the costs to NBN Co of providing the product across different regions.[184]

A UNWP could apply:

- just to the AVC component of NBN Co's wholesale product (i.e. conceptually, just to a service which corresponds to the access portion of NBN Co's network – noting that the access component across the national footprint is proposed to ultimately consist of a mix of 93% FTTP, 4% fixed terrestrial wireless, and 3% satellite);
- to both the AVC and CVC components (i.e. conceptually, to both the service which corresponds to the access portion of NBN Co's network and the service which corresponds to the 'switching and transmission' portion of its network – noting that this may be a region interconnected with either short or quite long duplicated fibre, or in some cases microwave, links);
- to just NBN Co's basic product offer (i.e. on both the AVC and CVC components, but only at the capacity which facilitates provision of the basic product);
- to all of NBN Co's product set (i.e. on both the AVC and CVC components of all capacities); or

---

183 Importantly, the CVC links and AVC links are 'logical' constructs, as opposed to physical constructs – as noted in section 2, they are not directly linked to particular underlying physical infrastructure.

184 The Study found that the incremental capital costs to connect premises to the FTTP network will not vary significantly across regions for up to 93 percent of premises served – that is, it is likely to cost NBN Co broadly the same amount to build its FTTP access network across the competitive and non-competitive transmission footprint. See Study, p.209.

- in such a way as to ensure all access seekers face a uniform cost structure from the end-user to a capital city POI - in which case, the prices charged by all providers of transmission services, as well as the prices charged by NBN Co for its wholesale product - would need to be taken into account.

The nature of the problem that the government is trying to solve, and the way in which UNWP is interpreted, will impact on how UNWP is implemented.

Submissions' views of UNWP

In its submission, Telstra stated that a reasonable interpretation of UNWP is that NBN Co should supply access services and transmission services separately, and that access services must be supplied at uniform national prices, while transmission service can be priced on a differential basis, including distance-sensitive charges.[185] It also argued that the government's high level statements in favour of uniform wholesale pricing cannot be read as a categorical requirement that distance-sensitive pricing has to be excluded from every NBN Co input and every NBN Co price.[186]

Similarly, AAPT argued that NBN Co should consider pricing transmission on a separate basis (not bundled with the FTTP price) and that the FTTP access prices should be uniform.[187] Comms Alliance noted that some of its members believe that the UNWP provision should only apply for the access component of the service and not the long-distance transmission component.[188] VHA stated that NBN Co's transit backhaul services must be priced on a separate basis from its fibre access services.[189] However, it supported UNWP for fibre access services, stating that this layer of the network is the enduring bottleneck, and the pursuit of UNWP for the access layer must be viewed as distinct from pricing in the aggregation layer.[190]

Conversely, Internode stated that NBN Co's definition of UNWP, that access seekers should face the same total wholesale cost from any premises to a designated state capital city point of presence, was appropriate.[191] The WA government stated that NBN Co's definition of UNWP seems an adequate description of a flat rate.[192]

6.2. What problem needs to be solved?

The relationship between POI location and UNWP is that the location of POIs impacts the amount of transmission that access seekers must purchase from NBN Co versus other suppliers, and depending on the prices charged by those other suppliers, access seekers' subsequent ability to charge broadly uniform retail prices in different regions. NBN Co's preferred approach to POI location would allow it to control the supply of

185 Telstra public submission, p.6.
186 Ibid., p.5.
187 AAPT public submission, p.20.
188 Comms Alliance submission, p.11.
189 VHA submission, p.6.
190 Ibid., p.14.
191 Internode submission, p.5.
192 WA Govt submission, p.4.

all transmission – in both the currently competitive and non-competitive footprints – and in turn ensure that a uniform price was charged for that transmission nationally.

One of the problems that the government might be trying to solve is the high prices of transmission on current monopoly routes (or in the 'non-competitive' footprint) relative to prices on competitive routes. Solving this problem might increase the likelihood of retailers being able to enter regions served by traditionally highly priced transmission and charge broadly the same retail prices in these regions as in metropolitan regions.

Assuming this problem is solved, the government may have residual concerns regarding pricing of transmission on competitive routes (the 'competitive footprint'). That is, there may be differences in the price of transmission to *reach* NBN Co's POIs which could prevent access seekers from being able to deliver uniform retail prices.

6.2.1. How big are these problems?

Submissions to the Discussion Paper raised a number of views as to the nature of the problem and its size. However, the bulk of submissions on the issue of UNWP did not express major concerns around pricing disparity on competitive routes, but rather, focussed on approaches to delivering lower pricing on monopoly routes.

With regards to the problem on monopoly routes, Nextgen noted that market interventions such as the RBBP reduce the proportion of input costs that is made up by backhaul from **[c-i-c]**.[193]

Telstra's submission stated that creating more competition in transmission markets would lead to reduced transmission prices, thereby bridging the gap between rural and metro wholesale prices.[194]

With regards to the problem in the competitive footprint, Nextgen stated that, in highly competitive markets such as ADSL2+ service provision, inter-exchange transmission only represents 3% of the average retail price for a bundled Voice + Broadband offer.[195] **[c-i-c]**.[196]

Telstra stated that backhaul costs represent approximately **[c-i-c]** of average subscriber costs across urban and rural areas.[197] The ACCC notes that, as this figure reflects an average of the cost of transmission as a proportion of an average retail price across urban and rural areas, it does not necessarily provide an accurate indication of the contribution of the cost of transmission just in competitive transmission markets. It would however, represent an upper bound of likely costs in competitive markets (and a lower bound for its contribution in the non-competitive footprint).

Optus submitted that, whilst different access seekers might face slightly different cost structures for carriage of services above the POI, those cost structures are likely to be

193 Nextgen confidential submission, Appendix 1, p.35.
194 Telstra public submission, p.23.
195 Nextgen public submission, Appendix 1, p.35.
196 Nextgen confidential submission, Appendix 1, p.35.
197 Telstra confidential submission, p.5.

reasonably uniform across the country.[198] Optus also stated in its submission that the cost differentials on a per user basis associated with different POI locations should be no more significant than those that would arise from other costs inputs to an end-user service (such as inter-capital transmission, international capacity, provision of applications and back office systems and services).[199]

The following table summarises some of the information provided in submissions of the monthly cost per premise, and monthly price per mbps, of different transmission routes.

Table 4: Indicative transmission prices per month

	Per mbps per month	Per premise per month
	'Non-competitive' footprint	
Implementation Study		To Alice Springs: $30[200]
Regional Backhaul Blackspot Program	**[c-i-c]**[201]	
	'Competitive' footprint	
Nextgen – competitive ADSL2+ routes		**[c-i-c]**[202] [203]
AAPT	**[c-i-c]**[204]	

Source: Study; Nextgen confidential submission; AAPT confidential submission.

On the information the ACCC has available to it, it is likely that where transmission competition exists, the price of this transmission represents less than 10% of total input costs for RSPs. The ACCC has not been made aware throughout this process of information which suggests that a high degree of variability in transmission prices

198 Optus public submission, p. 14.
199 Ibid.
200 The Study stated that the capital cost of building transmission to Alice Springs has been estimated at $4,000 per premises, and that this cost equates to approximately $30 per premises per month assuming 100 percent market share. Study, p.328.
201 Nextgen confidential submission, p.13.
202 Ibid. **[c-i-c]**.
203 Ibid., p.45. **[c-i-c]**.
204 AAPT confidential submission, p.12.

across the competitive footprint drives non-uniformity in retail prices in areas supplied by competitive backhaul. That is, the ACCC considers that the size of the competitive footprint problem is unlikely to be large.

The ACCC does however consider it more likely that there will be larger differences in transmission pricing in the non-competitive footprint relative to the competitive footprint.

The ACCC also notes that increased demand for transmission as a result of the upgrade of the access network from copper to fibre could put upwards pressure on transmission prices, making these costs a higher proportion of RSPs' total costs. On the other hand, the per end-user cost of transmission could fall to the extent that the increased traffic drives efficiencies from economies of scale.

The remainder of this section outlines three broad options for delivering forms of UNWP under semi-distributed POIs. The first of these may not require any form of subsidisation.

The second two alternatives do – it should be noted, however, that achieving UNWP across all products in the face of large cost differences across regions will always require that some services are priced below cost, which can subsequently lead to the potential for shortfalls in revenues. Any resultant shortfalls would need to be recovered through either internal cross-subsidies or external funding mechanisms. As noted, the ACCC has previously and consistently expressed its preference for external funding mechanisms to achieve uniform pricing, but acknowledges that other policy objectives may constrain their adoption by government.

6.3. How can the problem be fixed?

This section of the report outlines three different options for addressing the government's UNWP objective.

The first option (section 6.2.1) would be adopted if the government did not wish to impose a UNWP constraint on all products supplied by NBN Co. In this case, any differentials in transmission costs within the non-competitive footprint would be absorbed by NBN Co in its pricing of higher data rate services. However, this may leave the problem of transmission price differentials on competitive routes which could drive differences in the retail prices charged for the basic retail service, albeit noting that transmission requirements for a basic service would likely be low.

If the government wants UNWP to apply across NBN Co's products of all data rates, the options outlined in section 6.2.2 address respectively the two problems outlined above – that is, firstly, differences in transmission pricing between the competitive and non-competitive footprint, and secondly, differences in transmission pricing within the competitive footprint.

6.3.1. Uniform national wholesale pricing for basic service offering

If UNWP was to apply just to a basic product (for example, a basic voice and 12 Mbp/s broadband product, but not broadband products with higher data rates) subsidies

(internal cross-subsides, or external ones) may not be needed to fund this objective. This is because prices for higher data rate products would not be subject to UNWP, and could therefore be varied by NBN Co in response to different costs and market conditions (e.g. degrees of competition) across its entire geographic footprint.

If there was minimal prospect of competition from other access networks to NBN Co's higher data rate products in low cost regions, NBN Co may be able to charge uniformly higher prices for higher data rate products across all regions to fund any losses incurred in providing the price capped basic product. This would effectively implement an internal cross-subsidy from users of higher data rate products in low cost areas to users of all products in high cost areas.

The likelihood of future infrastructure based competition in low cost regions is not clear. The Financial Heads of Agreement between Telstra and NBN Co provides for the decommissioning of Telstra's copper and HFC networks, thereby eliminating a significant source of competition. However, there may be some potential for competition from Optus' existing HFC network or by any competing network in future. Wireless broadband may also be a potential source of competition for low data rate products, but this is unlikely for faster products due to the constraints of wireless technology. Given the above, there are reasonable prospects that the market would essentially be permitted to operate and at the same time the cross-subsidy could be sustainable.

NBN Co could also in theory be able to recover revenue shortfalls associated with below-cost pricing of basic products in high cost areas, by charging higher prices for higher data rate products in those areas. This could decrease the likelihood of NBN Co making losses in supplying products in high cost regions and obviate the need to source subsidies from low-cost areas (but would mean prices for these products were not geographically uniform).

The appeal of applying UNWP to only basic product offerings is that the degree of intervention required by government to implement its policy objective would be minimal, particularly given that transmission requirements for a basic service are likely to be low. All that would need to be implemented would be a cap on NBN Co's access price for its basic product offer (the cap would apply to the provision of a basic product from the POI to the end-user). By minimising the degree of intervention required by the government, this approach would also maximise the extent to which the market is allowed to operate to determine the prices of higher data rate products (subject to an overall regulatory revenue cap or price cap, which could be established through NBN Co's SAU).

The government may, however, need to review the definition of the basic product over time in order to ensure the product remains that to which uniformity should apply.

6.3.2. Uniform national wholesale pricing for all services

If the government intends to require UNWP for all products (i.e. the basic product and products with higher data rates), additional intervention is likely to be required. There may be several options for implementing UNWP across all of NBN Co's products with semi-distributed POIs. For the purposes of this report, the ACCC has identified two

possible options, which address respectively the two different problems described above that the government may be trying to solve. [205]

Price cap on NBN Co's transmission supply on monopoly routes

Assuming that the cost to NBN Co of providing transmission on monopoly routes under a semi-distributed POI approach drives differences in costs per end-user across the competitive and non-competitive footprints, one approach to achieving UNWP could involve capping the prices that NBN Co can charge for the transmission component of its product at an aggregated POI (as opposed to at a local POI). The cap could be benchmarked (for transmission services of a given capacity) against transmission prices on competitive transmission routes.

To the extent that this cap led to a revenue stream over time that was below NBN Co's cost of providing the transmission component of its product, this would be likely to lead to shortfalls in revenues for NBN Co in its supply of the transmission component in the non-competitive (assumed to be high cost) footprint. This shortfall would need to be funded in some way.

Telstra provided broad support for a price cap and external subsidy approach, arguing that, if transmission prices remain a concern on particular routes, there would be merit in an affordability cap on transmission charges on monopoly routes, complemented by external subsidisation. It stated that the combination of a cap and a subsidy would avoid the investment disincentive effects which a cap alone might have.[206] It also suggested that the least distortionary approach for funding the subsidy would be through direct government funding rather than from industry or end-users, as already done through the RBBP.[207]

Comms Alliance also suggested that, to the extent that there is an issue of costs of long-haul transport being too high in regional areas, UNWP would be better achieved through using other more transparent approaches rather than using aggregated POIs, which could include capped prices set on routes where costs are too high and targeted subsidies applied.[208]

---

[205] The CCC proposed an alternative approach to "strip out the effects of geographic and capacity inequalities" on uncompetitive routes. It proposed that an equalisation levy could be considered to transparently cross-subsidise routes; or alternatively, the USO could be considered as one mechanism that could be used to subsidise routes for regional consumers. It noted that this approach need not preclude future entry into transmission routes, and that it could stimulate entry into potentially competitive markets by making transparent the cost to NBN Co of providing transmission services. It noted that an entrant that believed it was able to build alternative infrastructure and deliver the transmission service at a lower price should be entitled to claim a lower cross-subsidy levy, creating an incentive for NBN Co to encourage entry in order to lower its own costs. It summarised that there would therefore be a last mile access component price, a backhaul component cost, and a transmission/backhaul subsidy component; and that such transparency of cost and price would also better assist the ACCC in regulating the NBN Co within the framework of the expected SAU. CCC Submission, pp. 8-9.

[206] Telstra public submission, p.9.

[207] Telstra public submission, p.9.

[208] Comms Alliance submission, pp.11-12.

Similarly, PIPE noted that the UNWP policy goal could be accomplished by subsidising the wholesale cost of NBN services in regional areas, to ensure that (to the extent possible) the cost of NBN wholesale access in regional areas plus the cost of any necessary transmission was equivalent to the cost of NBN wholesale access in metropolitan areas.[209] Nextgen proposed that a universal ceiling price should be applied on monopoly transmission routes, and separately that NBN Co should provide a USO (or equivalent) funded service in those circumstances where market failure can be demonstrated to have resulted in lack of competition..[210]

This is broadly consistent with the ACCC's general position regarding external funding mechanisms and uneconomic service provision.

However, without funding from external mechanisms (such as general taxation revenues), NBN Co would need to recover this amount by pricing other product components above their costs of supply, in order to provide a source of revenues. In the absence of external funding, one approach might be to increase the price of NBN Co's AVC product component by an amount that would generate sufficient revenues to cover the shortfall in revenues from its supply of the price capped transmission component of its product. The 'uplift' required could be determined by first assessing the (e.g.) annual revenue shortfalls NBN Co would incur in its supply of the price capped transmission component; dividing this annual shortfall by the number of NBN Co AVC links; then converting to a monthly figure and adding it to the AVC price.

This approach would also only be possible if cherry picking by competitors in low cost regions was not possible or unlikely.

Ultimately, coupling this increase across all regions in the AVC price with the price cap on the transmission component of NBN Co's product in the non-competitive footprint could deliver a broadly uniform cost structure to access seekers from the POI to the end-user across the whole NBN fibre footprint. Conceptually, this approach might deliver the same outcome as an averaged price across regions for NBN Co's bundled product components from the POI to the end-user – that is, the price levels, and degrees of cross-subsidisation, in both approaches could be roughly the same.

The key distinction between the approach outlined by the ACCC in this section and the internal cross-subsidy approach is that under this approach, the size of the uplift required on AVC prices to fund the objective of lower transmission prices in the non-competitive footprint can be reviewed over time. If the objective of uniform pricing across regions changes over time, the price cap on NBN Co's transmission product component could be loosened and the uplift to AVC prices reduced (e.g. if it became desirable to encourage more take-up in metropolitan areas, if market conditions on monopoly transmission routes changed such that competitive entry came to be considered possible).

The Study made a similar recommendation relating to a price cap on NBN Co's supply of transit services, in particular that:

---

[209] PIPE submission, p.4.

[210] Nextgen public submission, pp. 28 & 36-37.

- NBN Co be permitted to apply differentiated wholesale pricing for each technology platform used in its customer access network, and that within each technology platform, uniform wholesale pricing be required for all access products.[211]

- NBN Co's transit backhaul bitstream product (ie, transmission) be specified as a separate product from the access bitstream product, allowing service providers to select their preferred combination of backhaul capacity and access services.[212] NBN Co be required to specify transit products that meet an affordability test, specifically that the price of transit transmission services attributable to a single premises' access service be not more than a certain percentage of a retail price of a typical entry-level NBN wholesale broadband product.[213]

However, the Study was not clear on the mechanism that would be used to fund any shortfalls driven by this price cap.

Access seekers would nonetheless still be required to purchase additional transmission from NBN Co's POIs to their POPs. As outlined above, the ACCC considers it possible that, in practice, access seekers would absorb any differences in the price of these competitive transmission services and therefore deliver uniform retail prices. However, to the extent that it was a concern to government that its UNWP pricing objective would not be met because transmission from the CBD to the POI (i.e. non-NBN transmission provided on competitive routes) might be non-uniform, the ACCC has also considered a model it terms the 'equalisation model'.

6.3.3. Equalisation model

If it was considered that cost differences in the supply of transmission to access seekers on competitive routes was a concern to government, one example of an approach that could be adopted to deliver uniformity is set out below.

Essentially the approach is aimed at ensuring that access seekers face a uniform cost structure from a CBD to an end-user, regardless of the location of the end-user. It does this by adjusting the prices charged by NBN Co for its product from the POI to the end-user upwards or downwards, depending on the cost of transmission to that POI. If the cost to an access seeker of transmission is above the national average cost of transmission to a POI, the price paid by the access seeker for NBN Co's product is reduced; if the cost to an access seeker for transmission is below the national average cost of transmission to a POI, the price paid for NBN Co's product is increased. The model could operate as follows:

- NBN Co acts as the agency which collects levies and distributes subsidies. It does this by establishing an average transmission cost per end-user. This is done by establishing the total cost that would be incurred for carriage between the CBD of each mainland state capital city and each physical NBN POI. This total cost is divided by the total number of end-users to determine the average cost per end-

[211] Study, Recommendation 24.
[212] Study, Recommendation 52.
[213] Study, Recommendation 53, p.338.

user of transmission between the capital city and the actual NBN POI (expressed in $ per Mb/s per month).

- Once the average is determined, then the UNWP can be split into two components. The first is the average transmission cost per end-user determined above and the other is a uniform access price. This access price is charged to each access seeker acquiring a like service.
- NBN Co will publish a table of POIs with the average transmission cost per end-user to each POI. At each POI, access seekers will pay the UNWP and then either pay a levy or receive a subsidy depending upon whether the average per user cost of transmission to that POI is greater than or less than the average cost per end-user in the competitive footprint.
- For example, if the national average transmission cost per end-user is $3 per month, and in a central Melbourne POI, the cost of transmission per end-user is $1 per month, the UNWP paid by the access seeker interconnecting at the Melbourne POI includes a levy of $2 per user per month. On the other hand, the cost of transmission to Darwin might be $10 per user per month and in that case the access seeker would receive a payment by NBN Co of $7 per user per month.

The ACCC notes that there may be scope for amalgamating POIs into groupings (for example CBD, Metropolitan, Regional) to make the approach more administratively simple.

The scheme is revenue neutral to NBN Co but could be managed by an alternative agency if it was considered that this would be more likely to promote transparency. For example, the ACCC could be the agency which establishes the national average transmission cost per end-user, publishes a table of POIs with the actual transmission cost per end-user to each POI, and establishes the size of the required increase or decrease to the prices of NBN Co's product.

The ACCC notes that under the equalisation levy approach, if there aren't large differences in transmission prices within competitive routes (which the ACCC considers to be the case), the mechanism would be 'self-correcting' – i.e. if prices for transmission to NBN POIs are relatively uniform, the levies and subsidies needed on NBN Co's access prices would be low or zero.

NBN Co's solution to the problems

NBN Co's proposal to adopt a system of centralised POIs, with a UNWP for all of its wholesale products, was intended to lead to a broadly similar cost structure for access seekers from the end-user to a capital city POI, regardless of the location of the end-user. If there were differences in the cost faced by NBN Co in providing this product between end-user locations, and the uniform price were above the efficient long run cost of supply in metropolitan areas and below the long-run efficient cost of supply in regional areas, then this price would be an averaged price, delivered via internal cross-subsidisation.

Internal cross-subsidisation means that access seekers in low-cost, metropolitan areas, that are charged an averaged access charge that is 'above-cost,' provide the revenues to

NBN Co that subsidise access seekers in high-cost areas that are charged an averaged access charge that is 'below-cost' (noting that this could be the same access seeker).

The ACCC acknowledges that NBN Co's proposed solution would address both of the problems outlined above. However, the ACCC considers that this outcome is being delivered in such a way which leads to the deleterious consequences for competition and efficiency outlined in section 4. The key differences between NBN Co's approach and those outlined in this section of the report (in addition to the implications for competition and efficiency) are that:

- NBN Co's approach sources revenues in metropolitan areas from its supply of transmission as well as its FTTP access network. In removing competition from metropolitan transmission markets and becoming the sole supplier of transmission up to a centralised-POI, NBN Co has a greater pool of revenues from which to 'source' its cross-subsidy. For example, in its POI Modelling report (provided in confidence to the ACCC on 18 November 2010), **[c-i-c]**.[214]
- The approaches outlined in this section could be transparent (as they could be administered by an external agency) and could provide more flexibility to government to implement changes over time (e.g. to the cap on NBN Co's transmission prices) if its policy priorities change.

[214] NBN Co POI Modelling, p. 3.

7. Implications for Layer 1 unbundling

The request for advice from the government asks the ACCC and NBN Co to consider the effect of POI location on potential Layer 1 unbundling and home-run topology. The location of NBN POIs will have implications for potential future Layer 1 unbundling.

Layer 1 unbundling involves the network operator providing a form of physical access to the network so that an access seeker can install its own optical network equipment to provide services to end-users, as opposed to purchasing a higher Layer access service from the network operator such as a Layer 2 bitstream service.

An example of Layer 1 unbundling in the legacy network context is an access seeker installing its own DSLAM equipment in a Telstra exchange and purchasing a ULLS service to supply retail or wholesale voice and/or DSL services.

From a competition perspective, there are two main ways that an optical access network could be unbundled at Layer 1:

- physical fibre unbundling – providing a separate fibre from the fibre exchange to each premises; and
- wavelength unbundling – providing access to individual wavelengths on the one fibre.

In practical terms, physical fibre unbundling would only be viable where home-run topology has been deployed, so that an access seeker can gain access to a dedicated fibre from the fibre exchange to each premises.

It is currently not clear how wavelength unbundling may be implemented on a wide scale over an optical access network, as there are no agreed international standards. Wavelength unbundling may be able to be implemented under either a home-run or shared network topology.

The ACCC discussion paper asked for submissions to address the implications of the number and location of POIs for potential Layer 1 unbundling and home-run network topology for the NBN. A number of submissions responded to this issue. [215]

Almost all of the submissions that addressed the issue of unbundling acknowledged that access to unbundled Layer 1 services would require interconnection at or close to the FAN sites.[216] Many of the submissions that commented upon unbundling indicated that preserving the option for some form of Layer 1 access would be desirable,

---

[215] Submissions addressing the issue of unbundling were received from: AAPT, ATUG, BES, Comms Alliance, Internode, Michael S Cox, Nextgen Networks, Open Networks, Optus, Telstra, TPG and VHA.

[216] For example, Comms Alliance, pp. 9-10. On the other hand, whilst Internode recognised that Layer 1 unbundling would require connection at the FSA, it did not consider that this should have a direct bearing on the location or number of POIs; Internode submission, p.5.

although there were some differing views as to merit of preserving physical unbundling as an option vis a vis the future possibility of wavelength unbundling.[217]

The fully or semi-distributed POI options would likely allow for future Layer 1 unbundled access to a greater number of end-users than a more centralised approach.

Both the physical and wavelength unbundling approaches would likely require access and interconnection at the location where the fibre lines to each end-user terminate on the NBN Co optical line terminal network equipment (OLTs) so that an access seeker can deploy its own OLTs. This would mean interconnection at NBN Co FAN sites.

Under the fully or semi-distributed POI options many POIs will also be FAN sites. Therefore access seekers will be able to interconnect at a large proportion of the locations which house OLT equipment. For example, if there were fully distributed POIs (every FAN was a POI), theoretically an access seeker could gain unbundled access to every end-user, so long as the network topology allowed the desired type of unbundling to occur (i.e. physical unbundling would require home-run topology to be in place). Under a semi-distributed POI approach, unbundled access would be possible to any end-user that was directed served by an OLT located at that POI.

Therefore, if in the future it was decided that it would be desirable to allow for Layer 1 unbundling to occur, a fully or semi-distributed POI policy would allow access seekers to access unbundled services to a greater number of end-users than under a centralised POI option. This would make entry into the market as a Layer 1 access seeker more viable, as the addressable market would be greater than under a more centralised POI approach.

The extent to which any Layer 1 unbundled access could be implemented in practice, however, would still rely on a number of other factors, including:

- the number of end-users directly serviceable from the POI locations;
- the type of network topology used to reach access seekers – physical unbundling could not be practically implemented without home-run topology deployed between the FAN and the premises;
- in the case of wavelength unbundling, the development and commercial availability of such technology; and
- the economics of duplicating and operating the required optical access equipment.

The more centralised the POI approach that is adopted, the more restricted the potential for future Layer 1 unbundling.

As both unbundling approaches will likely require interconnection at the FAN site, the fewer FAN sites that access seekers have direct access to, the fewer the end-users that

---

[217] For example, AAPT, ATUG, TPG, Nextgen, Optus and VHA expressed some support for the consideration of Layer 1 unbundling. However, Optus submitted that a home-run/dark-fibre unbundling solution was not appropriate for unbundling, but rather wavelength unbundling would be the appropriate mechanism; Optus submission, p. 19.

are able to be accessed via unbundling and the less viable and/or attractive the option for potential Layer 1 entrants.

The ACCC notes that if a centralised POI policy was adopted, but it was decided at a future date that Layer 1 unbundling was desirable and should be pursued, it could be theoretically possible for NBN Co to allow for additional POIs to be created at FAN sites for Layer 1 access seekers. However, in practice, this would mean that a Layer 1 access seeker would need to establish (or purchase access to) transmission links to any FAN site where it wished to access unbundled services. This could present significant barriers to entry for potential Layer 1 access seekers, particularly if any currently existing transmission links to such sites had been stranded by the initial centralised POI approach and/or redeployed for other purposes or services.

Therefore, the ACCC considers that NBN Co's preferred centralised POI approach would not be conducive to allowing future Layer 1 unbundling of the NBN.

ATTACHMENT A – Long-term interests of end-users

In considering the promotion of the LTIE under Part XIC of the TPA, the ACCC will have regard only to the extent to which something achieves the following objectives:

- promoting competition in markets for listed services;
- achieving any-to-any connectivity in relation to carriage services that involve communication between end-users; and
- encouraging the economically efficient use of, and the economically efficient investment in: (i) the infrastructure by which listed services are supplied; and (ii) any other infrastructure by which listed services are, or are likely to become, capable of being supplied.[218]

Promoting competition

Competition is the process of rivalry between firms, where each market participant is constrained in its price and output decisions by the activity of other market participants. The benefits of competition to end-users are lower prices, better quality and range of services over time.

Below are some concepts relevant to the consideration of promoting competition in the markets for listed services.

Identifying the relevant markets

To assist in determining the impact of a particular thing on markets, the ACCC will first need to identify the relevant market(s) and then assess the likely effect on competition in each market.

Section 4E of the TPA provides that the term 'market' includes a market for the goods or services under consideration as well as any other goods or services that are substitutable for, or otherwise competitive with, those goods or services. The ACCC's approach to market definition is discussed in its 2008 Merger Guidelines, is canvassed in its information paper, *Anti-competitive conduct in telecommunications markets*, August 1999 and is also explored in the ACCC's second *Fixed Services Review position paper*, April 2007.

Assessing the impact of on relevant markets

Once markets have been identified, the next step is to assess the likely effect of the particular thing on competition in each relevant market. Subsection 152AB(4) of the TPA requires that regard must be had to the extent to which a particular thing will remove obstacles to end-users gaining access to listed services.

[218] Section 152AB(2) of the TPA.

Market Power

Competition may be inhibited where the structure of the market gives rise to market power. Market power is the ability of a firm or firms to constrain or manipulate the supply of products from the levels and quality that would be observed in a competitive market for a significant period of time.

Competition will be promoted when market structures are altered such that the exercise of market power becomes more difficult. For example, barriers to entry may have been lowered (permitting more efficient competitors to enter a market and thereby constraining the pricing behaviour of the incumbents) or because the ability of firms to raise rivals' costs is restricted.

Any-to-any connectivity

Subsection 152AB(8) of the TPA states that the objective of any-to-any connectivity is achieved if, and only if, each end-user who is supplied with a carriage service that involves communication between end-users is able to communicate, by means of that service, or a similar service, with other end-users whether or not it is connected to the same network.

The any-to-any connectivity requirement is particularly relevant when considering services that involve communications between end-users. When considering services which do not require user-to-user connections (such as carriage services that are inputs to an end-to-end service or distribution services, such as the carriage of pay television), the ACCC generally gives less weight to this objective.

Whether a particular POI option will achieve 'any-to-any connectivity' requires an assessment of the degree to which that POI option affects the ability of end-users of particular services to communicate with end-users who are supplied with the same or a similar service on the same or a different telecommunications network. The ACCC considers that none of the POI options proposed raise concerns regarding the fulfilment of the 'any-to-any connectivity' requirement.

Efficient use of, and investment in, infrastructure

In considering what is efficient use of, and investment in, infrastructure, regard must be had (but is not limited) to the technical feasibility of providing the service, the legitimate commercial interests of the supplier, and the incentives for investment in infrastructure.

Economic efficiency has three components:

- Productive efficiency refers to the efficient use of resources within each firm to produce goods and services using the least cost combination of inputs.
- Allocative efficiency is the efficient allocation of resources across the economy to produce goods and services that are most valued by consumers. It also refers to the distribution of production costs amongst firms within an industry to minimise industry-wide costs.

- Dynamic efficiency refers to efficiencies flowing from innovation leading to the development of new services, or improvements in production techniques. It also refers to the efficient deployment of resources between present and future uses, such that the welfare of society is maximised over time.

Paragraph 152AB(6)(a) of the TPA requires the ACCC to have regard to a number of specific matters in examining whether a particular thing is likely to result in the achievement of this objective. Some of these are outlined below.

Technical feasibility

In assessing the technical feasibility of supplying and charging for a service, the ACCC will consider the:

- technology that is in use, available or likely to become available;
- costs involved, and whether it is reasonable or likely to become reasonable; and
- effects or likely effects on the operation or performance of telecommunications networks.

The ACCC will look to an access provider to assess whether it is technically feasible to supply the relevant service, and will also consider experiences in other jurisdictions.

The legitimate commercial interests of the supplier

A supplier's legitimate commercial interests are its obligations to the owners of the firm, including the need to recover the cost of providing services and to earn a normal commercial return on the investment in infrastructure. The ACCC considers that allowing for a normal commercial return on investment will provide an appropriate incentive for the access provider to maintain, improve and invest in the efficient provision of the service.

Paragraph 152AB(6)(b) of the TPA also requires the ACCC to have regard to whether the access arrangement may affect the owner's ability to realise economies of scale or scope. Economies of scale arise from a production process in which the average (or per unit) cost of production decreases as the firm's output increases. Economies of scope arise from a production process where it is less costly for one firm to produce two (or more) products than it is for two (or more) firms to each separately produce the relevant products.

The ACCC will assess the effects on the supplier's ability to exploit both economies of scale and scope on a case-by-case basis.

Incentives for investment

Firms should have the incentive to invest efficiently in infrastructure. The ACCC must also consider the effects of any expected disincentives to invest arising from anticipated increases in competition.

ATTACHMENT B – POIs and NBN Co's planned network design

POIs, Fibre Serving Areas and Connectivity Serving Areas

A POI is the inter-network location where traffic is exchanged between one network and another. It functions as a point where:

- transmission traffic is offloaded onto an access seekers own network, or traffic is offloaded onto a transmission provider's network for transport to the access seekers POP;
- service providers who wish to provide applications (for example, content distribution networks for video or latency sensitive services) can co-locate so that it is closer to the end-user; and
- the carriage/switching of voice traffic through the existing Telstra Call Charging Area (CCA).

The initial NBN POIs are the POIs which will allow access seekers to connect and exchange traffic with the NBN, following the completion of the rollout.

In the NBN context, copper ESAs will be replaced by FSAs. There will be significantly fewer FSAs (700 – 1 000) than there are current ESAs (5 000). This is driven both by technology differences (the GPON network can reach up to 20 kilometres, which is much greater distance than is usual for copper in metropolitan ESAs), and the fact that NBN Co's fibre network will cover only 93 per cent of premises, which overlays approximately 1 900 of today's ESAs.

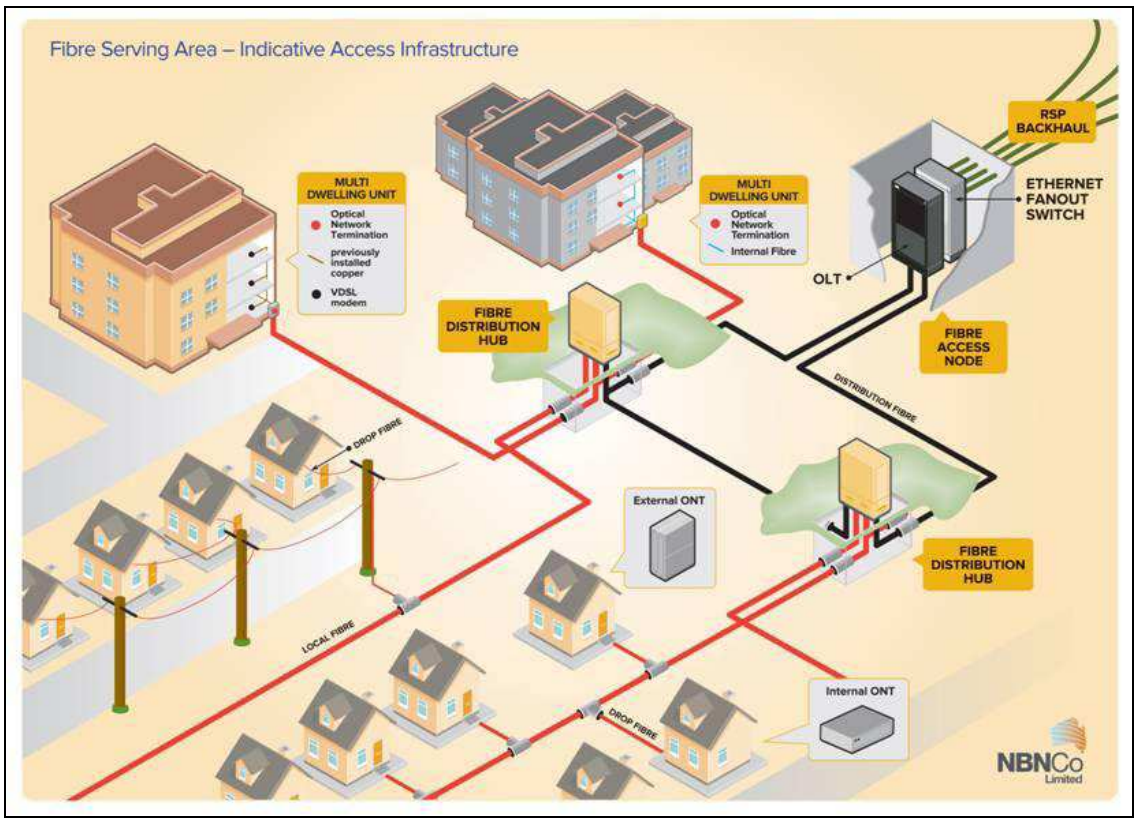
ESAs were designed to provide voice telephony service over copper wires and the area was limited by the distance to the furthest premises. In metropolitan areas, ESAs tend to be limited to about a 5 km radius. As a practical matter, inner city ESAs tend to be centred on the location of a post office in a suburb. As a result, many inner city ESAs have a relatively small radius. The GPON fibre architecture that is proposed by NBN Co is also limited by the distance to the furthest premises. However, in contrast to an ESA, an FSA can serve a further reach (about 15 km measured on a recti-linear basis). As a result, the number of FSAs is smaller than the number of ESAs.

In metropolitan areas, there are about a fifth as many FSAs required compared with the number of ESAs. As a result, there will be a significant number of ESAs which will not form part of the NBN. Backhaul provided to these premises will not be able to be used directly as part of the NBN.

Figure B1 provides NBN Co's example of an indicative FSA. In the figure, the Optical Line Terminals (OLT(s)) and Ethernet FANOUT switch could be located at an existing local exchange – in which case the local exchange becomes a FAN and a technically feasible POI. However, it is possible that not every existing local exchange will house an OLT(s) and Ethernet FANOUT switch (i.e. become a FAN and therefore a technically feasible POI) due, as noted above, to the greater reach of the GPON network relative to copper.

It should also be noted that different FANs may serve different numbers of end-users – that is, different FSAs are likely to contain a different number of end-users. In less densely populated areas, a single FAN is likely to house less OLTs than a FAN in a more densely populated region.

Figure B1 Indicative Fibre Serving Area



Source: NBN Position Paper.

A CSA is a construct developed by NBN Co which defines a geographic area on the basis of it including a minimum addressable end-user market. A CSA may consist of one or more FANs/FSAs. If a CSA includes multiple FANs/FSAs and a single POI were offered for that CSA, this would mean that interconnection would only be permitted at one of the potentially multiple technically feasible POIs. That is, whereas in the above figure interconnection would be technically feasible at the FAN, a CSA would consolidate multiple of these FANs/FSAs, NBN Co would transfer traffic between these FSAs (referred to in the above figure as 'RSP backhaul'), and interconnection would be permitted at only one of the FANs within any CSA.

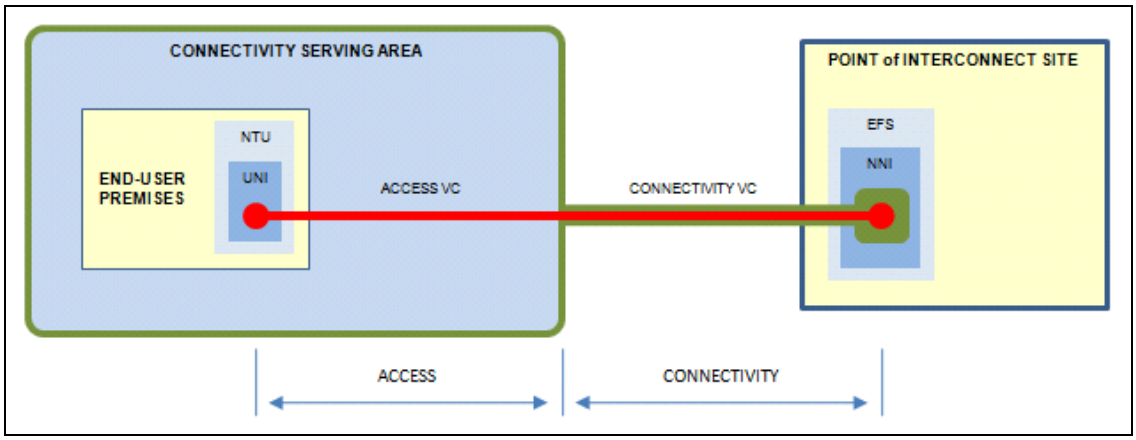
The ACCC's understanding is that the CSA construct is aimed at minimising the degree of management of CVC links (defined below) required by access seekers in serving a national market (as only one CVC would need to be purchased per CSA).

NBN Co's proposed product offerings

Under NBN Co's current product proposals, both the AVC and CVC components will need to be purchased (that is, the components form part of a bundled product offering).

In its most recent consultation on its Fibre Access Service[219] NBN Co notes that the AVC service component is depicted in the figure below as residing in the 'Access' portion of the service, and the CVC components are depicted as representing the 'Connectivity' portion of the service.

Figure B2 NBN Co's proposed fibre access service components



Source: NBN Co Product Technical Specification – Fibre Access Services, August 2010

To the extent that the CSA in the above figure consists of multiple FSAs with technically feasible POIs (FANs), this construction of the AVC and CVC service components would not allow access seekers to interconnect at those FANs.

Under NBN Co's current product proposal the AVC and CVC products do not bear a direct relationship to the underlying network infrastructure that provides the products. That is, depending on the location of the POI relative to the OLT, AVCs and CVCs may be provided using varying amounts of what would traditionally have been described as 'transmission network infrastructure' (aggregation switches, optical fibre). The infrastructure associated with the provision of the AVC and CVC logical components is shown in Figure B3 below.

[c-i-c] However, the ACCC understands that the logical product constructs of the AVC and CVC do not have a direct mapping to the underlying network elements.

The protected fibre links between the OLT and the EFS are likely to be short, and be within a single physical enclosure **[c-i-c]** where the OLT and NNI are local. On the other hand, the length and location of the remote protected fibre links depends on the location of the POI/NNI relative to the remote FAN site.

If the POI/NNI is distant from the remote FAN site (that is, if the POI is 'semi-distributed' or a centralised POI) NBN Co will transport traffic (prioritise, queue, schedule) over potentially long distances from the OLT to the POI/NNI in accordance with the performance metrics of the traffic classes being transported within each of the AVCs and CVC. On the other hand, if the POI and NNI are situated locally, the distances are shorter, but NBN Co will still switch traffic within the local Ethernet

[219] NBN Co Product Technical Specification.

switching domain according to the performance metrics of the traffic classes being transported within each of the AVCs and CVC.

Hence, the 'FAN' **[c-i-c]** may be a single physical location; on the other hand, if the POI is located in a different place to the first aggregation switch, the FAN would consist of a single local physical enclosure and another physical enclosure in another location (where the POI/NNI is located).