

Chapter Four

Product offering and network architecture

Overview

4.1 The importance of decisions on the final design of the NBN is that these decisions will, by default, go a long way to determining matters of market structure and product offering, as well as the cost to taxpayers of establishing the network.

4.2 Decisions as to product offering and network architecture therefore affect the extent to which the NBN can and will:

- realise the Government's stated policy objectives;
- enable trans-sectoral uses (such as eHealth applications) and deliver trans-sectoral benefits;
- enable innovation; and
- be commercially viable.

4.3 An over-arching concern expressed by a number of submitters was that NBN Co's product offering and network architecture decisions have been, and continue to be, made in the absence of three critical pieces of information:

- a cost-benefit analysis of the NBN proposal – analysis which has not been undertaken at any stage of the NBN project by the Government, the Department, or commissioned consultants;¹
- a publicly available, detailed business plan which comprehensively outlines and consolidates the policy framework for the operation of NBN Co, the role of NBN Co, and the extent to which it will operate as an alternative to Telstra's pre-existing ubiquitous copper network or as a replacement service that is mandatory for Australian premises; and
- a finalised and publicly available Implementation Study and a Government response to it. As discussed in detail in chapter 2, the Implementation Study was not released publicly until 6 May 2010, meaning that it was not available to industry and the public during all consultation and design phases of the NBN project before that date. The Implementation Study is now subject to a public consultation period with submissions due at the end of May 2010. Given that timeframe it is unlikely any Government response will be publicly

1 In its *Third Report*, the committee described in detail its concerns about, and the implications of, the absence of any cost benefit analysis having been undertaken: *Third Report*, November 2009, pp 64–66, [6.8]–[6.18]. See also the discussion in chapter 2, above.

released until at least late June 2010, over three months after the Government received the Implementation Study from the Lead Advisor.

4.4 The committee believes that the absence – publicly or at all – of this critical information has severely compromised the transparency, merit and adequacy of decisions that have been made on the design of the NBN.

4.5 Responsibility for determining the NBN's final network architecture and NBN Co's product offering has been left to NBN Co. NBN Co has now decided on its product offering but has made final decisions on only some aspects of the network's architecture. Submissions to the committee varied in the extent to which they supported the decisions made. The key issues raised are discussed below. Also discussed below are matters raised in submissions which relate to those aspects of network architecture – of which there are many – which remain undecided.

The absence of critical information

4.6 As described above, decisions on product offering and network architecture have been, and continue to be, made in the absence of three critical pieces of information:

- a cost-benefit analysis of the NBN proposal;
- a publicly available, detailed business plan which comprehensively outlines and consolidates the policy framework for the operation of NBN Co and the role of NBN Co; and
- the Implementation Study and the Government's response to it.

4.7 In its *Third Report*, the committee deplored the Government's failure to acquire a cost-benefit analysis for the NBN, a failure which is in contravention of the Government's own legislative requirements for infrastructure projects.² Almost six months later the position has not changed. At no point has the Government undertaken or commissioned a cost-benefit analysis.

4.8 Writing prior to the release of the Implementation Study, Mr Kevin Morgan, an independent telecommunications consultant, succinctly expressed the problems that now exist for network architects whom the Government has put in the impossible position of designing network architecture in the absence of a cost-benefit analysis:

Given the lack of any underpinnings derived from a full cost benefit analysis the [Implementation Study] will have to mount an unimpeachable case that the untried model of a national wholesale network can be viable and that the government's unprecedented experiment can work. If it is to do that the [Implementation Study] will have to present findings that defy the orthodoxy in the international telecommunications industry which remains that the vertically integrated model of network operation and retail service

2 *Third Report*, November 2009, p. 66, [6.18].

provision remains the most efficient structure for the industry, even in the age of fibre and Next Generation Networks (NGN's). The reality that the study has to overcome is that the government's structurally separated model ignores the weight of international evidence and ignores the reality that large scale fibre deployments, including FTTH upgrades, are being led by the vertically integrated operators in all leading markets including the USA, Japan, Korea and in Europe.³

4.9 The discussion in chapter 2, including the extended quotations of Mr Morgan's commentary on the Implementation Study, indicates that the Implementation Study has fallen far short of mounting such a case.

4.10 The Business Council of Australia explained in its submission the sterilising effect that uncertainty and a lack of publicly available information has on the investment decisions of commercial entities:

Companies need a level of stability in the policy framework, and fewer surprises, in order to make the long-term investments needed to bring new and better telecommunications products to market. Uncertainty around the role of NBN Company, particularly given its public ownership, will raise investor uncertainty. Clearly, if policy settings have the effect, intended or otherwise, of companies deferring or withholding investments, it will take longer for new technologies to get to market and Australia's productivity will fall behind.⁴

4.11 Finally, the imperative of having a comprehensive document that clearly articulates the Government's policy objectives and the role of NBN Co was highlighted in comments made by the leading communications consultant, Mr Paul Budde of Paul Budde Communication Pty Ltd. After stating that it is 'crucial' that 'focus is kept on why we are building this infrastructure in the first place, and why we are spending taxpayer dollars on it',⁵ Mr Budde explained that if the NBN's priorities remain unclear, the realisation of the full potential of the infrastructure may be compromised:

In order to deliver e-health, smart grids and public safety it is essential that the NBN be nationally integrated – an infrastructure that is capable of supporting end-to-end trans-sector [Quality of Service]. If support for the end-to-end [Quality of Service] levels required by these sectors is not part of the basic NBN infrastructure then it will be very difficult for these sectors to use that network.

What we have seen so far is a consumer-based NBN which will consist of 200 local loops and a variety of backhaul options. The question is: will such a network be of sufficient quality to be used for health records, MRIs, mission-critical energy and environmental information, etc?

3 Mr Kevin Morgan, *Submission 122*, pp 1–2.

4 Business Council of Australia, *Submission 107*, p. 4.

5 Paul Budde Communication Pty Ltd, *Submission 105*, p. 1.

...

We certainly need to ask the question: what gets priority here – competition policy subtleties or the national interest? I would like to stress that the issue is the creation of an infrastructure such that competition may be maximised at the services level.⁶

4.12 The committee asked Mr Michael Quigley, CEO of NBN Co about where the objectives of NBN Co are formalised. The following interchange took place:

Senator FISHER—On the structure and governance of NBN Co., what sets out the objects? Where can I find the *raison d’etre* for NBN Co.?

Mr Quigley—You can find it in the letter that was written to me as the original interim executive chair. There was in my appointment letters a set of objectives that the government has set.

Senator FISHER—When will those be formalised and how will they be formalised?

Mr Quigley—They are on government letterhead. I take them as quite formal.⁷

4.13 Subsequent further questions also raised other possible locations setting out the policy framework and objectives for NBN Co:

Senator FISHER—Do you have a memorandum of association as do publicly listed companies?

Mr Quigley—We have various formal documents—constitutional and the usual things. There is no reason why we cannot make those available.

Senator FISHER—Is that publicly available?

Mr Quigley—Yes.

Senator FISHER—Presumably that would contain something about your objects.

Mr Quigley—Yes, it may...Our annual report will probably have a lot of that. What we are trying to do is make it quite clear.⁸

4.14 At the same hearing, representatives of the Department continually emphasised that the details of the Government's objectives and business model will be found in the Implementation Study and the Government's response to it:

CHAIR—Is it expected that the NBN Co. will follow the implementation study?

Mr Quinlivan—The critical thing there will be the government's response to the implementation study, which will obviously follow its release. The

6 Paul Budde Communication Pty Ltd, *Submission 105*, p. 1.

7 Mr Michael Quigley, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 58.

8 Mr Michael Quigley, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 59.

government's response will form the policy framework which will guide the project and NBN Co. into the future. That is a critical issue.

CHAIR—Has there been any announcement as to when the government might respond, or do you have any expectation that you can share with us?

Mr Quinlivan—No, Senator, not at this stage.⁹

4.15 The Implementation Study, when released subsequently on 6 May 2010, contained one version of what the mandate for NBN Co might be, but even the wording of the recommendations (for example 'Government *should* set NBN Co an objective...') implicitly acknowledged that the Government is yet to decide and formalise what NBN Co's mandate will actually be.¹⁰ In a chapter entitled 'Establishing a mandate for NBN Co' the Implementation Study outlined the multiple facets that might form part of an NBN Co mandate and how NBN Co's fulfilment of each aspect might be measured.¹¹

Committee view

4.16 The committee remains exasperated that critical information and documents have not been disclosed to the public for such a significant period of time, and that in the interim, decisions on network architecture have been made in what appears to be a largely ad hoc process.

4.17 The committee believes that a comprehensive policy framework and detailed business model must be provided by the Government and NBN Co to the Australian public. The committee does not consider that broadly-worded objectives expressed at a high-level in ministerial press releases, letter of appointment or littered throughout various documents related to NBN Co are an adequate substitute for such a document. Nor does the committee consider adequate ministerial or departmental reassurances that claim the detail and justification for the NBN project will be found in documents yet to be made public.

4.18 Although the committee was heartened to see discussion, in the Implementation Study, of some matters that relate to the establishment of a comprehensive policy framework and detailed business model for NBN Co, the committee remains of the belief that the discussion is far from sufficient. The Implementation Study offers little certainty to stakeholders and the public as to what the Government and NBN Co will actually do in practice. In those circumstances, suggestions from the Government or the Department that the Government's response

9 Mr Daryl Quinlivan, Deputy Secretary, Infrastructure, Department of Broadband, Communications and the Digital Economy, *Committee Hansard*, Canberra, 15 April 2010, p. 65.

10 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, Chapter 2, p. 56.

11 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, Chapter 2, pp 56–131.

to the Study, which will only be provided on some as yet unspecified date, is a promise of too little, too late.

4.19 The committee believes that the Government, having had the Implementation Study for more than two months now, should release a comprehensive response to the document as soon as possible. The committee has already outlined in chapter 2 of this report its recommendations for some of the essential matters that the Government must urgently address, including that the Government provide a clear articulation of the mandate for NBN Co and where that mandate will be formally recorded.

NBN Co's decisions on network architecture

4.20 The Government has tasked NBN Co with: connecting 90 per cent of Australian premises to a NBN with fibre-based services of 100 Mbps; delivering broadband services of 12 Mbps to the remaining 10 per cent using next generation satellite and/or wireless technologies; and providing equal, wholesale access to retailers to enable them to deliver advanced digital services to the nation.

4.21 Within those parameters, NBN Co has been given broad discretion to decide on the architecture it will use to build the NBN and the wholesale product it will offer.

4.22 NBN Co has sought to design the network's architecture, and hence its wholesale product offering, in consultation with wholesale customers and the telecommunications industry. On 21 December 2009, NBN Co released a Product Consultation Paper that provided an outline of NBN Co's plans for the NBN.¹²

4.23 It is important to understand that NBN Co does not intend to – and will not – provide all the fibre and related infrastructure that will ultimately comprise the NBN. NBN Co's role is more limited. Its intention is to offer fibre services only between an end user's premises and what is called a Point of Interconnect (PoI). At a PoI, NBN Co's services will cease and it will be possible to connect with the existing backhaul services¹³ of Retail Service Providers and/or Wholesale Service Providers. As Ms Christy Boyce, Head of Industry Engagement for NBN Co, explained in one of NBN Co's Industry Consultation Sessions:

[NBN Co] is about facilitating the delivery of [retail service providers' services]...to end users. [NBN Co is] simply moving bits from one place to another, from a premise to a point of interconnect, and allowing [NBN Co's] customers, [that is,] the RSPs, to take care of the rest.¹⁴

12 NBN Co Ltd, *NBN Co consultation paper: proposed wholesale fibre bitstream products*, December 2009, www.nbnco.com.au/content/upload/files/NBN001_concept_paper_final.pdf.

13 Backhaul services are the data carriage services provided over high-speed, high-capacity fibre lines, which carry aggregated network traffic between a PoI and a centralised or 'core' part of the network, for example an Internet Service Provider's data centre.

14 Ms Christy Boyce, Head of Industry Engagement, NBN Co Ltd, *NBN Co Industry Consultation Session*, Melbourne, 1 February 2010,

4.24 The Product Consultation Paper used the following diagram (Illustration 1) to illustrate, at a high level, NBN Co's proposed infrastructure for what it terms a 'Fibre Serving Area' (FSA). The FSA is the limited part of the NBN that will in fact be serviced by NBN Co – the remainder of the network will be serviced by infrastructure and services owned and provided by other Wholesale and Retail Service Providers.

Illustration 1—Fibre Serving Area – Indicative Access Infrastructure

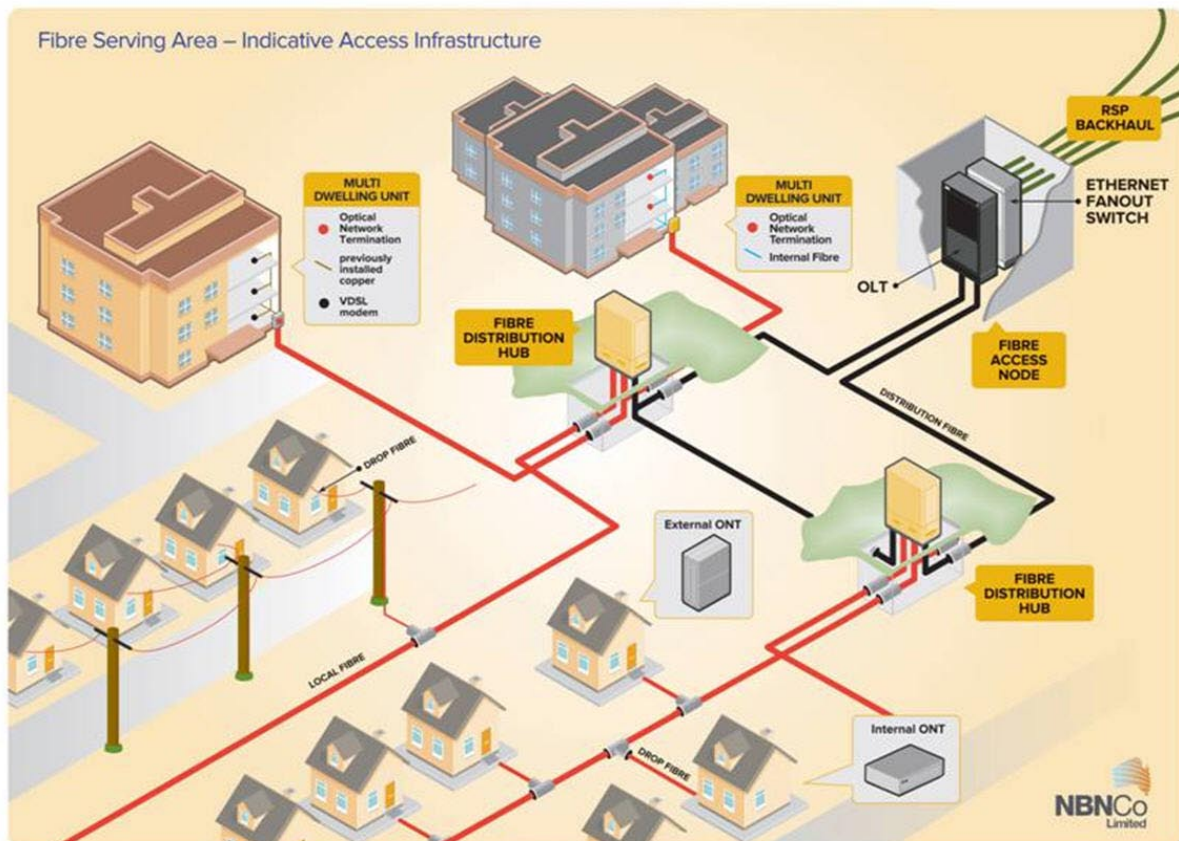


Illustration taken from NBN Co Ltd, *NBN Co consultation paper: proposed wholesale fibre bitstream products*, December 2009, p.6, www.nbnco.com.au/content/upload/files/NBN001_concept_paper_final.pdf and reproduced with the permission of NBN Co Ltd.

4.25 An FSA runs from an end user's premises to a Fibre Access Node (FAN) – the facility which houses the active equipment providing the network services to the FSA. As is evident in the diagram, NBN Co proposed that the access infrastructure have a degree of in-built flexibility enabling:

- aerial or underground deployment of fibre to an end user's premises;
- the installation of internal or external Optical Network Termination (ONT) devices at an end user's premises; and
- differing arrangements for the deployment of fibre to single dwellings as opposed to multi-dwelling units.

4.26 The Product Consultation Paper outlined NBN Co's intentions as to the:

- level ('layer') of its fibre wholesale offering;¹⁵
- wholesale products which it would offer;
- high-level technology standards for the network;
- policy to inform the choice of location for Points of Interconnect (PoIs);¹⁶ and
- service features which NBN Co will support with its wholesale fibre products.

4.27 Almost fifty submissions were received by NBN Co in response.

4.28 In March 2010, NBN Co published a detailed response to those submissions in a document which also included its final decisions on some key aspects of network architecture.¹⁷

4.29 NBN Co decided that its wholesale fibre offering will be a 'Layer 2 Ethernet Bitstream' service.¹⁸ The Ethernet Bitstream service will be offered as:

- a Local Ethernet Bitstream (LEB) product in urban and regional centres; and
- an Aggregated Ethernet Bitstream (AEB) product for less densely populated areas.

15 There are a number of 'layers' of service which combine to provide the communications and computer services delivered across a broadband network. The architectural decisions on the NBN have been made with reference to what is known as the Open System Interconnection (OSI) Reference Model. This Model divides network architecture into seven layers. At the bottom (Layer 1) is the passive infrastructure – the 'dark fibre' which is sometimes referred to as the 'dumb fibre'. Layer 2 (otherwise known as the link or active layer of the network) involves active electronic components that add intelligence to the dumb fibre of Layer 1. More specifically, these components encode and decode packets of information into 'bits' and transmit ('carry') the bits across the fibre using an ethernet connection. In the context of the NBN, this Layer 2 service is known as an 'ethernet bitstream service'. Layer 3 is the Network layer which creates paths for transmitting data from node to node. It includes services for switching, routing and forwarding packets of information between nodes. The higher layers (Layers 4–7) add further 'value', ultimately resulting in the provision (at Layer 7) of application services such as email and internet browsing applications with which an end user interfaces.

16 A Point of Interconnect (PoI) is a connection point that allows a Retail Service Provider (RSP) or a Wholesale Service Providers (WSP) to connect its network, transport (eg backhaul) and/or application and content services (eg email) to NBN Co's access capability. That is, the Point of Interconnect is the point at which an RSP or WSP can access the wholesale data transmission services that NBN Co provides from the PoI to an end users' premises.

17 NBN Co Ltd, *NBN Co response to industry submissions – proposed wholesale fibre bitstream products*, March 2010, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/NBN_Co_response_to_consultation_submissions.pdf.

18 See footnote 17 above for an explanation of what is an ethernet bitstream service.

4.30 The LEB and AEB products will be offered on a mutually exclusive basis so that where the AEB product is offered, an LEB product will not also be available and vice versa.

4.31 The difference in service between the LEB and AEB products is based on the location of the relevant PoI for the FSA. The LEB, as its name suggests, is a 'local' link. It will run within an FSA, linking an end user's premises to a Point of Interconnect (PoI) located at the FAN. Illustration 2 below depicts the arrangement.

Illustration 2—Local Ethernet Bitstream product

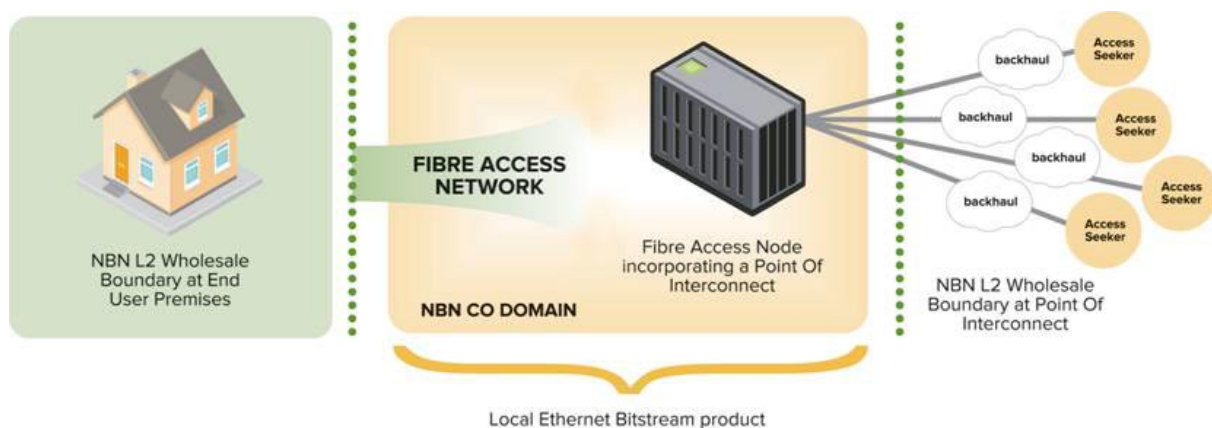


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4.32 In contrast, the AEB product will be offered where the PoI is not located at a Fibre Access Node, but rather further upstream at what NBN Co describes as an 'Aggregation Node'. The Aggregation Node aggregates traffic from a number of Fibre Access Nodes, and the AEB product provides an 'aggregated' link between the PoI located at this Aggregation Node and a number of FSAs. Illustration 3 depicts the arrangement.

Illustration 3—Aggregated Ethernet Bitstream product

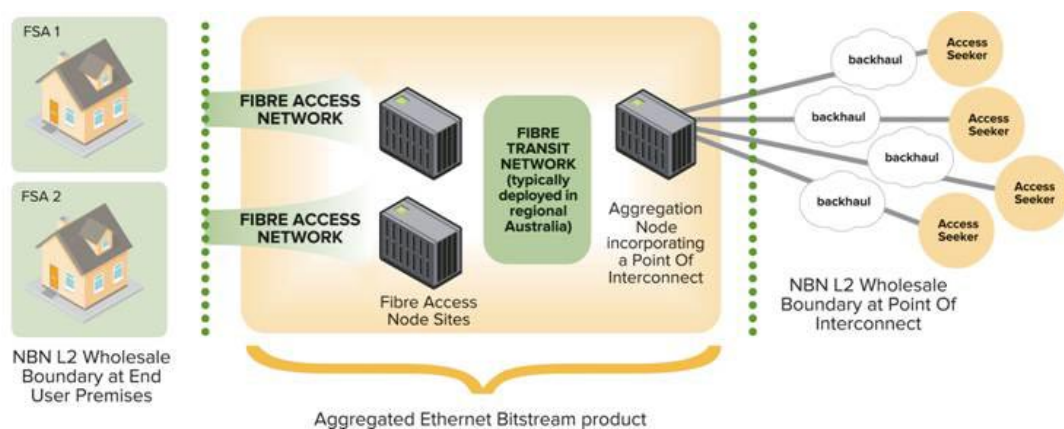


Illustration provided by NBN Co Ltd and reproduced with the permission of NBN Co Ltd.

4.33 The rationale for the different products (ie LEB and AEB products) lies chiefly in a policy decision informing where NBN Co will locate PoIs. NBN Co has said that it will locate PoIs so as to support competition among Retail Service Providers and with regard to the availability of contestable backhaul. In practical effect, this policy means that, ordinarily, a PoI will be located at the point where two or more backhaul services exist so that there will be competition amongst wholesalers and retailers to provide backhaul services from that PoI back to core parts of the network. Many regional areas today are serviced by none, or only one, backhaul service provider (usually Telstra). Where these areas are within NBN Co's 'fibre footprint', NBN Co's intention is to locate the PoI not where that backhaul first becomes available, but where *contestable* backhaul becomes available or is likely to become available (ie, where a competing backhaul link from a second or third backhaul service provider exists or is likely to exist). This issue is discussed in more detail later in this chapter.

4.34 The AEB product will provide an aggregated link from a number of FANs to that point (at which the Aggregation Node incorporating a PoI will be located). NBN Co's policy of aggregating traffic is designed 'to provide RSPs with access to a larger number of end users through a single POI [and therefore] create incentives for RSPs to offer [regional] services in that location, and in turn increases the likelihood of competitive back-haul build-out to that point'.¹⁹ Because NBN Co will not also provide a PoI where backhaul first becomes available, any backhaul links, or parts of backhaul links, existing below the PoI (ie closer to the individual FANs) may be left stranded from the network.

4.35 Finally, NBN Co's LEB and AEB products will both provide active services including security and Quality of Service capability²⁰ and IP multicast²¹, and will, in the ordinary case, be delivered using Gigabit Passive Optical Networks (GPON) technology (as opposed to Point-to-Point technology).²²

19 NBN Co Ltd, *NBN Co response to industry submissions – proposed wholesale fibre bitstream products*, March 2010, p. 17, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/NBN_Co_response_to_consultation_submissions.pdf.

20 'Quality of Service' refers to the extent to which a certain level of network performance (ie data flow across the network) can be guaranteed. It is about the predictability of service delivery and a wide range of networking technologies and techniques are involved. Specific criteria of measurement include availability, bandwidth, latency and error rates.

21 IP multicast is a way of transmitting, in a single transmission, Internet Protocol (IP) datagrams (ie packets of information) to a number of recipients. One present application is the streaming of media applications (eg Pay-TV) over the internet, the advantage being that multiple end users can be serviced in a single transmission from the retail service provider.

22 Point to Point technology would see every premises allocated a dedicated fibre. In the GPON alternative, a single optical fibre is 'split' into multiple strands so it can be utilised for multiple premises. The premises then share the bandwidth available on the fibre. The committee's *Third Report* contains more detail on the relative merits of GPON and Point-to-Point technology: *Third Report*, November 2009, pp 12–13.

Commentary on NBN Co's network architecture

4.36 Submissions to the committee indicated a significant amount of dissatisfaction amongst some industry players and members of the public with some of the decisions made by NBN Co. The major contentions relate to:

- the decision to supply a Layer 2 service;
- the policy informing the choice of location of PoIs;
- the decision to aurally deploy fibre on a significant scale, as opposed to deploying all NBN infrastructure underground; and
- a perceived lack of consultation with consumer groups when designing the network.

Layer 2 service

4.37 As described above, there are a number of 'layers' of services which combine to create the final products delivered and used over a broadband connection. The layered structure is often referred to as 'the technology stack'. The agreed industry standard model for describing the layers in the technology stack is the Open System Interconnection (OSI) reference model. Diagram 1 below illustrates the seven layers of this model.

Diagram 1—Open System Interconnection (OSI) reference model

Function	Example Product	OSI Model
Cross-network communication • Controls routing and ensures reliability	IP Stream/'white label' products	7. Applications Layer
		6. Presentation Layer
Area Networking • Creates connection and transfers data	Ethernet	5. Session Layer
		4. Transport Layer
		3. Network (IP) Layer
Transmission Medium • Defines mode of transmission and receipt	Dark fibre	2. Link (active) Layer
		1. Physical (passive) Layer

Illustration provided by NBN Co Ltd and reproduced with the permission of NBN Co Ltd.

4.38 When announcing the NBN, the Government stated that it would be a wholesale-only, open access network.²³ There was broad consensus that this meant NBN Co would be limited to offering product services at Layer 3 or below, and that it would offer these services on a wholesale basis only. (Discussion as to whether the exposure drafts of legislation subsequently released by the Government in February 2010 revoke the commitment to NBN Co being a wholesale only service provider are discussed in chapter 5). The important point for present purposes is that NBN Co's network architecture was limited to a choice between providing Layer 1, 2 or 3 services.

NBN Co's justification for a Layer 2 service

4.39 As described above, NBN Co has decided to supply a Layer 2 service, specifically a Layer 2 Ethernet Bitstream Service. Mr Michael Quigley, CEO of NBN Co, described to the committee the rationale for that decision as follows:

The layer 2 bitstream product construct that we decided upon was a compromise. You could go with layer 1, which is just dark fibre with no electronics on it. Layer 2 bitstream is kind of the network plumbing. We can move bits from one location, from a premise, to a point of interconnect. We do not move above that into layer 3, although there are certain constituencies who would like us to do so, for various reasons. Likewise, we also have people who say we should be operating just at layer 1. I have even had people tell me that we should be operating at layer zero, which means that we should just dig holes in the ground for other people to lay fibre in all over the country. There is a judgment to be made about where you can get ubiquitous coverage but make the smallest possible footprint, both in a geographic sense and in a value chain sense. We wanted to leave plenty of opportunity for retail service providers to innovate, to add functionality, on top of the layer 2 bitstream. So it was a considered judgment. We also had a look at what was going on in other parts of the world, particularly Ofcom in the UK and parts of Europe. There seemed to be general convergence that this was the right point in the value chain, in the stack, to form a wholesale only access product.²⁴

4.40 Mr Quigley went on to explain that NBN Co is embedding some Layer 3 functionality into their network 'because [NBN Co has] to do that to provide some sophisticated Layer 2 services' but that NBN Co will not be offering those Layer 3 services as a product at either a retail or wholesale level:

Senator LUNDY—I ask you specifically: do NBN Co. plan to offer services above layer 2 on your fibre network?

23 The Hon. Kevin Rudd, MP, Prime Minister, the Hon Wayne Swan MP, Treasurer, the Hon Lindsay Tanner MP, Finance Minister, and Senator the Hon. Stephen Conroy, Minister for Broadband, Communications and the Digital Economy, 'New National Broadband Network', Joint Press Release, 7 April 2009, www.minister.dbcde.gov.au/media/media_releases/2009/022, accessed 24 April 2010.

24 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 50.

Mr Quigley—No.

Senator LUNDY—Not at all?

Mr Quigley—We have no plans to provide any services above layer 2— with one exception. We are embedding some layer 3 functionality in the network because we have to do that to provide some sophisticated layer 2 services, but we are not offering those layer 3 services as a product.

Senator LUNDY—At a retail level.

Mr Quigley—That is right—or even at a wholesale level. We are simply not offering that. It is just a functionality that is inbuilt into the network.²⁵

4.41 Finally, Mr Quigley clarified for the committee how the NBN Co's open access model and provision of wholesale Layer 2 services will herald an end to the status quo experienced by some users located in multiple dwelling units or estates who, because of present infrastructure arrangements, find themselves forced into having only one option of a Retail Service Provider:

Mr Quigley—If it is an estate in which there are multiple dwellings, if we established a fibre network there, our intention would be wholesale only, once again, open access... [W]hat people sometimes refer to is whole estates being locked up with one carrier and no option for the consumer to move. That would absolutely not be our intent because we can support multiple retail service providers so that different people in the estate could have different retail service providers if those retail service providers chose to use underlying network. We are not the people who have the relationship with the end customer. They are free to choose whatever retail service provider decides to use our network. In fact, we have the capability in this layer 2 network to supply an end user who chooses to have two retail service providers or three. They could have one for video, one for voice and one for high-speed internet—

Senator LUNDY—In the same house?

Mr Quigley—In the same house and all on the same fibre because we are partitioning the product to allow that to happen. We can provide quality of service for each of those streams. We can hand each of those streams that are embedded within the stream that is in the fibre at the point of interconnect back off to different retail service providers.²⁶

Comments on NBN Co's decision

4.42 The committee received a range of opinions on NBN Co's decision to supply a Layer 2 service.

4.43 Only one submitter argued that NBN Co should be supplying services below Layer 2. Professor Walter Green of the Communications Expert Group expressed

25 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 50.

26 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 51.

concern that the higher up NBN Co provides services, the greater the potential for architecture decisions to limit innovation:

I believe the whole area of variations for access and such should be reworded, principally to allow modifications of interface standards—because that is where the real technical advantages and innovations are—and to eliminate either pricing conditions or protocol-type access.

CHAIR—When you say a service that is protocol-independent, is that the same as a layer 2 service?

Prof. Green—No, it goes beyond. It is in fact layer 1 and below.²⁷

4.44 Mr Stephen Dalby, Chief Regulatory Officer of Internet Service Provider iiNet Ltd, gave a statement of support for NBN Co's decision to provide Layer 2 services that was fairly typical of the attitude of other existing Internet Service Providers and Retail Service Providers:

We would be very comfortable with layer 2. Similarly, we would be comfortable with layer 1 services. Whilst layer 1 may have been desirable—and that would be similar products to, say, unconditional local loop on the copper network or dark fibre as backhaul services from point A to point B—we are not restricted from acquiring backhaul services from other sources anyway. So that is not really an issue. In terms of the other benefits that come with the NBN, we are quite comfortable with living with a layer 2 world.²⁸

4.45 Optus argued that if NBN Co were to supply services above Layer 2, it would compromise competition in the higher layers:

...our philosophical perspective is that NBN Co. should operate in areas where there is a market failure. We would perceive that to be at layer 2 and below. We argue that there is a prospectively highly contestable market at layer 3 and above and therefore that is why NBN Co. probably should be precluded from operating above layer 2, because you can get competition in that sector. If, however, NBN Co. is able to go up the value chain, then perhaps that competition will not eventuate.²⁹

4.46 The Australian Competition and Consumer Commission (the ACCC) expressed qualified support for arguments that NBN Co should provide Layer 2 or below services in the interests of competition, stating that it has 'some sympathy for a

27 Professor Walter Green, Director, Communications Experts Group Pty Ltd, *Committee Hansard*, Melbourne, 14 April 2010, p. 70.

28 Mr Stephen Dalby, Chief Regulatory Officer, iiNet Ltd, *Committee Hansard*, Melbourne, 14 April 2010, p. 16.

29 Mr Andrew Sheridan, General Manager, Interconnect and Economic Regulation, Optus, *Committee Hansard*, Melbourne, 14 April 2010, p. 47.

position that says, in the first instance at least...services should be offered as low in [the technology] stack as possible to allow potential competition to develop'.³⁰

4.47 The main calls for NBN Co to provide – or at least build into its network architecture the capacity to provide – wholesale Layer 3 services came from consumer and telecommunications user groups and independent consultants. In contrast to established telecommunications carriers and service providers like Optus and iiNet, these groups and individuals argued to the committee that it was in the interests of end-users and trans-sectoral services that a Layer 3 NBN Co service be either possible or available to wholesale purchasers.

4.48 The rationale advanced was that a competitive wholesale market for the supply of Layer 3 services may not develop. This would compromise the extent to which new players and trans-sectoral services like healthcare operators, could either have access to, or afford to deliver services over, the NBN given they would need to build for themselves that Layer 3 capability.

4.49 Ms Rosemary Sinclair, Chair of the Australian Telecommunications Users Group (ATUG) explained the concern:

My question is: will the people who buy layer 2 wholesale themselves offer layer 3 wholesale services [unbundled from higher layer services] when they have a foot in the retail camp?

...

[I]f we have a ubiquitous high-speed network, there may be other people [eg healthcare providers] that want to come into this market and deliver their services using the communications platform that is enabled by the NBN. I am not sure what value-adding there is in requiring those people to invest in bits of telecommunications infrastructure, so I want to make sure that those people can get a higher level wholesale service which does not require them to invest in being a telco at any level of the stack but allows them to deliver their services.³¹

4.50 The proposal put forward by ATUG was that there be a reserve power afforded to the Minister, exercisable on the recommendation of the ACCC, to compel NBN Co to provide wholesale Layer 3 services if a competitive market for the supply of these services does not develop by itself. Ms Sinclair expressed the hope that such a power:

...would be like the minister's reserve pricing power [under the *Trade Practices Act 1974* (Cth)]. It would never need to be used but having it there, as we have said about that power, is a very good safety net for all of us. The best position is if it is not used and the market says, 'Okay, there is a

30 Mr Michael Cosgrave, Communications Group General Manager, Australian Competition and Consumer Commission, *Committee Hansard*, Melbourne, 14 April 2010, p. 63.

31 Ms Rosemary Sinclair, Chair, Australian Telecommunications Users Group, *Committee Hansard*, Canberra, 15 April 2010, p. 11.

need for these services for these sorts of customers and we are going to offer them those services'.³²

4.51 Mr Paul Budde of Paul Budde Communication Pty Ltd similarly argued that it may be in the national interest for NBN Co to provide higher layer services, and that a Ministerial exemption to enable NBN Co to wholesale supply higher layer services may be appropriate:

The competitive advantages that are said to flow from an NBN that is constructed to as basic a formula as possible have been claimed but not proved. However these commercial advantages stand in stark contrast to the difficulties that will arise due to the fact that very few trans-sectoral services can afford to run over an NBN, which would potentially force these sectors to use services that can only be provided by one national wholesale player...

This concern seems to be addressed to a certain extent in the proposed NBN Co legislation, which will give the government the possibility of allowing sectors to buy infrastructure capacity directly from NBN Co.³³

4.52 The Internet Society of Australia (ISOC-AU) also argued that NBN Co should provide Layer 2 and also aggregated Layer 2 and Layer 3 services to reduce 'the financial barriers to entry into the broadband market...and [enable] service providers...[to] focus on the layers where true innovation is highest: services, applications and content'.³⁴ Mr Tony Hill, President of ISOC-AU expressed concern that a Layer 2 only service will fail to adequately service regional and remote users:

Our experience of competition policy is that low-density population centres have been served by only one provider under the [Universal Service Obligation] provisions of telephone services... [W]e are suggesting that, if only layer 2 is reaching those areas because of the NBN's activities, those people will not have the freedom of choice of layer 3. Let us posit a situation where NBN becomes a provider of layer 2 and layer 3... [T]he layer 3 services would then be freely available across the whole breadth of the NBN service and not depend on investment by particular service providers to install layer 3 equipment at the far reaches of the NBN network.³⁵

Committee view

4.53 The committee understands that NBN Co's decision to supply a Layer 2 service only was a 'compromise' that sought to balance a number of competing

32 Ms Rosemary Sinclair, Chair, Australian Telecommunications Users Group, *Committee Hansard*, Canberra, 15 April 2010, p. 17.

33 Paul Budde Communication Pty Ltd, *Submission 105*, p. 2. Provisions of the exposure draft legislation (the 'NBN Co legislation') are discussed in detail in chapter 5.

34 Internet Society of Australia, *Submission 118*, p. 4.

35 Mr Tony Hill, President, ISOC-AU, *Committee Hansard*, Canberra, 15 April 2010, p. 4.

arguments. The committee believes that it is appropriate for NBN Co to pitch its wholesale product offering at Layer 2. However, the committee is concerned by suggestions from a number of submitters that there may be significant consequences for the NBN to deliver trans-sectoral benefits and create opportunities for innovation if a competitive market for the supply of unbundled Layer 3 services does not develop.

4.54 The committee notes the commentary provided on this point by the Implementation Study:

It is reasonable to expect that given the low barriers to entry, wholesale Layer 3 providers will emerge—either as standalone businesses, or as wholesale arms of retail providers. Furthermore, national networks will not be required on day one. As NBN Co begins to commission POIs, Layer 3 operators can deploy equipment progressively, managing their investment and optimising their model as the NBN grows. In addition to wholesale providers, it is likely that there will be sufficient competition between Layer 3 retailers to ensure customers have access to a wide range of IP-enabled services. End users will receive better services, and more choice, in either case...

A diverse, mass market, national Layer 3 market could be slow to emerge. Most operators of Layer 3 networks initially will be retail ISPs and telecommunications carriers, who will focus on using their own IP services to deliver today's retail offers of broadband, voice, and TV. As a result, some services which require bespoke, new IP services—for example, home health monitoring that depends on real time class of service—may not be delivered immediately.

However, these services should in most cases be complementary to today's ISP and telecommunications services, and carriers could be expected to pursue these wholesale opportunities over time. A worst case scenario is possible if Layer 3 becomes commoditised, consolidated, and dominated by one or two national providers. In this case, a small number of concentrated providers could exercise control over the product offering at Layer 3, and potentially foreclose retail competition. If Layer 3 competition is limited in particular regions, those areas would suffer from a poorer set of available options. Limited competition would also limit the prospects for ASPs and other non-carrier operators.

Should the Government conclude in the future that a Layer 3 market is not functioning, to the detriment of innovation and end-user benefits, intervention may be justified. One option would be to address shortfalls through regulation—for example, obliging retail service providers to offer a Layer 3 service which can support applications deemed important to the public interest. Another option, given the relatively low cost of deploying a national Layer 3 network, would be for Government to tender for the deployment of a Layer 3 service with Government as an anchor customer. Such a network could support public services such as health and education, as well as serving ASPs who are unable to source the wholesale services they require in the market.

At this stage, such measures would be premature. Ongoing ACCC monitoring of this market will enable Government to identify any further interventions that are necessary to foster healthy competition.³⁶

4.55 The committee recommends that the Government detail its understanding of the likelihood that there might be failure in the Layer 3 wholesale market, and what it understands would be the consequences of any such failure for service delivery and innovation potential.

Recommendation 7

4.56 That the Government detail its understanding of the likelihood that there might be failure in the Layer 3 wholesale market, and what it understands would be the consequences of any such failure for service delivery and innovation potential.

Location of Points of Interconnect

4.57 NBN Co has publicly stated the general policy it intends to use to inform its selection of PoI locations, one of supporting competition among Retail Service Providers and encouraging innovation and efficient investment in backhaul infrastructure.³⁷ In its response paper to industry submissions on its proposed wholesale fibre bitstream product, NBN Co stated that there appeared to be general support for its intended approach.³⁸

4.58 One substantial dissenter from NBN Co's proposed approach, however, is Telstra. Telstra did not make a submission to the committee on this point. However, in a submission to NBN Co, Telstra indicated its dissatisfaction with NBN Co's decision not to offer a PoI at every FSA.³⁹ Telstra submitted that NBN Co is constrained by 'commitments Australia has made in respect of telecommunications services in the WTO General Agreement on Trade in Services,⁴⁰ as well as in several bilateral Free

36 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, pp 427–428.

37 NBN Co Ltd, *NBN Co response to industry submissions – proposed wholesale fibre bitstream products*, March 2010, p. 17, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/NBN_Co_response_to_consultation_submissions.pdf, accessed 24 April 2010.

38 NBN Co Ltd, *NBN Co response to industry submissions – proposed wholesale fibre bitstream products*, March 2010, p. 17, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/NBN_Co_response_to_consultation_submissions.pdf, accessed 24 April 2010.

39 Telstra Corporation Ltd, *Response to NBN Co Consultation Paper: Proposed Wholesale Fibre Bitstream Product*, 12 February 2010, p. 8, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/Companies/Telstra.pdf, accessed 24 March 2010.

40 WTO Negotiating Group on Basic Telecommunications, Reference Paper, 24 April 1996, available at www.wto.org/english/news_e/pres97_e/refpap-e.htm.

Trade Agreements⁴¹ and went on to state that 'these trade commitments include obligations in respect of the provision of interconnection by major suppliers in Australia.'⁴² It is not clear from Telstra's submission whether it is arguable that NBN Co's policy would in fact breach the commitments identified, and further, what status those commitments have under international and domestic law.

4.59 As a matter of policy as opposed to law, in Telstra's view, the AEB product would punish an RSP (which in the ordinary case would be Telstra) who has taken the first-mover risk and built its own backhaul infrastructure in a previously un-serviced area:

NBN Co's proposed determination of the location of PoIs would force an RSP that has already built or acquired backhaul to those FSAs where interconnect is not offered by NBN, to acquire network components (namely the AEB Transit Link) which the RSP would not require for the retail service to be provided, had a PoI been made available at the relevant FSA. This policy would advantage RSPs which have not built or acquired backhaul to those FSAs.⁴³

4.60 The matters at stake were succinctly summarised in a submission to the committee by telecommunications consultant, Mr Kevin Morgan:

The network topography outlined by NBN Co, with limited numbers of [PoIs] which will be sited where there is contestable backhaul, has enormous implications for Telstra and for the costs of the NBN. Clearly the decision to host PoIs where there was more than one provider of backhaul i.e. where there is another carrier's network beside Telstra (typically Optus backhaul) threatens to strand thousands of kilometres of Telstra backhaul network and will mean NBN Co is running thousands of kilometres of backhaul at considerable cost. The rule of thumb is rural backhaul will cost \$40000–50000 per kilometre to build.

The decision to limit the PoIs in this way is not an engineering one but a policy decision ostensibly to remove any monopoly on backhaul. Telstra owns 90% plus of the backhaul in regional areas and it is integrated into both fixed line and mobile service. Rendering Telstra's backhaul unusable for fixed line traffic in this way will have damaging impacts on the

41 For example, the bilateral Free Trade Agreements concluded with the United States, Singapore, Chile, and ASEAN and New Zealand, all include specific chapters in respect of telecommunications services. See, generally, www.dfat.gov.au/trade/ftas.html.

42 See Article 2 of the WTO Telecommunications Reference Paper, Article 12.11 of the Australia-United States FTA; Article 9.7 of the Singapore-Australia FTA; Article 11.10 of the Australia-Chile FTA; and Article 6 of the Annex on Telecommunications to Chapter 8 of the Agreement Establishing the ASEAN–Australia–New Zealand Free Trade Area.

43 Telstra Corporation Ltd, *Response to NBN Co Consultation Paper: Proposed Wholesale Fibre Bitstream Product*, 12 February 2010, p. 8, www.nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/Companies/Telstra.pdf, accessed 24 March 2010.

economics of wireless service in regional areas if fixed line revenues are removed from its regional network.

Also from a general pro competitive perspective the limited numbers of PoIs will place significant costs on smaller RSPs and increase the challenges they face. It is clear from the work done by Ofcom in the UK that flexibility in the location of PoIs and a proliferation of PoIs within next generation networks is seen as essential to encouraging competition.⁴⁴

4.61 It is important to note that it is not only Telstra that may be detrimentally affected by NBN Co's decision to locate PoI's at an aggregated node in those areas where only the AEB product is offered. Evidence to the committee indicated that smaller RSPs – particularly RSPs offering local or regional services – will also be significantly affected. Mr Morgan alluded to this in the extract above when he said that the restricted location of PoIs 'will place significant costs on smaller RSPs and increase the challenges they face'.

4.62 From evidence presented to it by Professor Walter Green of the Communications Experts Group, the committee understands that the explanation for why the location of PoIs will affect regional RSPs is as follows. Regional and local RSPs locate their data centres in regional and local areas, for example Geraldton in Western Australia. To service a customer also located in Geraldton, a Geraldton-based RSP needs to have a data link between its data centre (in Geraldton) and the premises of the end-user (also in Geraldton). Data travels between the RSP and the customer via that link. The NBN Co product will service only part of that link, namely that part which transmits data to and from the customer and the PoI. At the PoI, the RSP 'connects' its services with those of NBN Co. It is then for the RSP to make its own arrangements for transmitting the data the rest of the way, namely from the PoI back to the RSP's data centre. Where NBN Co offers the AEB product, it is locating the PoI at the point where backhaul becomes contestable. NBN Co will make arrangements to either build the intermediate backhaul or else contract with the existing monopoly backhaul provider for use of the pre-existing infrastructure. That is beneficial to an RSP which has a data centre located further upstream (eg at a metropolitan centre). That RSP has the option of choosing between a number of backhaul providers for backhaul services from the PoI 'back' to a metropolitan centre. But the issue for the regional RSP is that it needs to obtain transmission services not to a metropolitan centre (for which there would be multiple backhaul service providers from which to choose), but instead back to the regional area and for that transmission service it must negotiate access with the only existing (and therefore monopoly) backhaul provider. The choice of location of the PoI is therefore requiring an unnecessary 'boomerang' arrangement for data transmissions between regional RSPs and their regional customers. This is what Professor Green was meaning when he said:

[NBN Co] have said that if there is no contestable backhaul then there will be no access to the NBN at a regional or remote centre. Throughout WA there is no contestable backhaul, so that means by default that Perth is the

44 Mr Kevin Morgan, *Submission 122*, p. 7.

only area [for a PoI]... At the moment, the only people who can provide a fibre connection from Perth to the major regional centres is Telstra... NBN will, via various negotiations with Telstra, get access to fibre to bring all the connections back to Perth. The problem that you have got is that people in Kalgoorlie, Bunbury, Geraldton, Port Hedland, Karratha and all those places will then have to go back to Telstra to buy a link from Perth to their centres. So the NBN is negating what I believe were the benefits. They should make the connections available in Geraldton and then provide backhaul from them in competition with Telstra to allow people to build the networks they want.⁴⁵

4.63 In its response paper to all submissions received, NBN Co did not nominate its intended PoI locations. That paper deferred further discussion on the PoI topic to a more detailed discussion paper that it indicated would be released in late March 2010. As at the date of writing this report, the committee understands that the paper has not yet been released.

4.64 From the committee's preliminary assessment of the Implementation Study, it does not appear that that document progresses the debate to any great extent. The Implementation Study acknowledges the obvious importance of the location of POIs and states that '[t]o create a national level playing field, NBN Co will need to carefully choose POI locations and design an appropriate transit backhaul product'.⁴⁶ Following a rather cursory analysis of the options NBN Co has in terms of selecting POI locations, the Implementation Study concludes with the rather thin recommendation that 'the location of NBN Co's POIs be reviewed on a regular basis to permit new investment below the POIs and to ensure the objectives of affordability and a level playing field are met above the POIs'.⁴⁷

Committee view

4.65 The committee believes that the as yet unknown location of POIs throughout Australia is another instance of key stakeholders and the public being left in a vacuum of information about critical aspects of the NBN's architecture. The location of POIs will affect the commercial viability of a number of asset owners and retail service providers' operations, not to mention the costs associated with any trans-sectoral applications run over the NBN.

4.66 The committee would question why NBN Co has not yet released its promised discussion paper on POIs, and would urge NBN Co to release that document and commence the consultation process as soon as possible.

45 Professor Walter Green, Director, Communications Experts Group Pty Ltd, *Committee Hansard*, Melbourne, 14 April 2010, p. 72.

46 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, p. 333.

47 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, p. 334.

Aerial versus underground deployment

4.67 As discussed in chapter 3 above in relation to progress on the mainland and the selection of first release sites, NBN Co has stated an intention to deploy fibre aerially in some areas, and go underground where power infrastructure is already underground. As discussed extensively in its *Third Report*, the committee strongly believes that underground deployment should be preferred and is concerned that aerial deployment represents only a band-aid solution and is inappropriate for a long-term infrastructure project.⁴⁸ The committee's views are set out in chapter 3.

Consultation with consumers

4.68 NBN Co undertook an extensive industry consultation process as a part of its network design process. As explained to the committee by Mr Quigley:

[NBN Co has] been developing a wholesale product for some time now and we have been involved in a range of industry consultations, particularly over the past four months or so. Those consultations have involved public presentations in which we provide information on our proposed products and answer numerous questions. They have also involved detailed discussions with service providers to hear directly from them. We have released an industry consultation paper on our wholesale product proposal and we have received feedback from industry.⁴⁹

4.69 The committee applauds NBN Co for its evident hard work in seeking input from industry as it designs the network architecture and refines its wholesale product offering.

4.70 However, the committee was concerned by comments made by the Australian Competition and Consumer Action Network (ACCAN) that the consultation process has not adequately engaged consumer groups or consumers' requirements. ACCAN submitted:

...there are [currently] 9 major NBN-related government initiatives, processes and consultations underway on various aspects of the NBN, some of which fail to adequately embed consumer requirements. For example, the Communications Alliance⁵⁰ has seven streams of NBN activity at various stages of development, including critical consumer issues such as end user premises and end user migration. Yet consumer groups do not qualify to be members of Communications Alliance and therefore are ineligible to be

48 *Third Report*, p. 52.

49 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 43.

50 The Communications Alliance is a peak policy development organisation for the telecommunications industry. Its membership is comprised of service providers, vendors, consultants and suppliers.

members of the Communications Alliance committees developing the NBN rules of operation.⁵¹

4.71 At the committee's hearing, Ms Teresa Corbin, Deputy CEO of ACCAN, elaborated on the current consultation between NBN Co and consumer groups and ACCAN's proposal that there be a legislative consumer advisory group:

[Y]ou should have a consumer advisory group. We do have to have this for NBN Co. because, at the moment, there is a very loose engagement between ACCAN and NBN Co. We are having coffee, we are having lunch and that kind of thing—we are building that relationship—but we need to actually have a structured dialogue that has some objectives, some things you are trying to achieve. You do develop a different type of dialogue that way; it has a bit more depth... [With a consumer advisory group] you get some real exchange of views and an understanding of each other's perspectives. That is when you get change, that is when you get things moving forward and you find solutions to problems you would never have expected that you could find.⁵²

4.72 In response Mr Quigley commented:

We have had some very extensive consultation on...architecture with groups such as the Communications Alliance and others, and I have stood up at events numerous times—almost once a week—making sure we articulate our architecture as we move along. I would invite anybody who would like to know a little bit more about the architecture to come along to one of those meetings. If ACCAN would like me to spend a couple of hours talking to their people about the architecture, about our product construct, about information that is in fact available on the web and our 1800 number that people can ask questions on, I would be more than happy to do so. There is a lot of information out there already if people choose to go get it.⁵³

Committee view

4.73 The committee believes that genuine consultation and accommodation of consumer interests in the actual design of the network is imperative, and that it is not satisfied by merely providing information after the event to consumers as to what the network architecture will be.

4.74 The committee urges NBN Co to formally engage consumer groups in its consultation processes as well as general information sessions. The committee recommends such action by NBN Co as an interim measure. For the longer term, the committee believes it is appropriate to entrench consultation with consumer advocacy

51 Australian Competition and Consumer Alliance, *Submission 121*, p. 5.

52 Ms Teresa Corbin, Deputy CEO, ACCAN, *Committee Hansard*, Canberra, 15 April 2010, p. 35.

53 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 43.

groups in the governing legislation for NBN Co. For that reason, the committee recommends in chapter 5 below that the exposure draft bill for the governance arrangements of NBN Co (the National Broadband Network Companies Bill 2010) be amended so as to create a statutory consumer advisory group for the NBN, similar to the Consumer Consultation Forum which exists for the Australian Communications and Media Authority (ACMA).

Recommendation 8

4.75 That NBN Co formally engage consumer groups in its industry consultation processes. That such consultation be in addition to the involvement of consumer groups in NBN Co's information sessions.

Commentary on unresolved matters of network architecture

4.76 Submissions to the committee also raised concerns relating to aspects of network architecture and overall management which have not been finally determined, or at least for which there has been no public disclosure of the Government and/or NBN Co's intentions. The major concerns relate to:

- uncertainty surrounding what role Telstra's assets will play in the NBN, how customer migration will be handled; and the extent of any compensation that will be offered to Telstra (and subsequently other service providers) for the acquisition of their assets and migration of their customers to the NBN;⁵⁴
- the timeframe in which NBN will provide services to regional and remote areas in Australia, and the details of the proposed progression for that roll-out;⁵⁵
- NBN Co's network access pricing, including whether there will be a cross-subsidy arrangement for regional areas and whether NBN Co will be commercially viable;⁵⁶
- end-user pricing, including how expensive broadband services will be for end-users and whether there will be a cross-subsidy arrangement for regional users;⁵⁷

54 For example, Mr Kevin Morgan, *Submission 122*, pp 5–8.

55 AUSTAR United Communications Ltd, *Submission 116*, p. 1.

56 For example, Mr John de Ridder, Principal, De Ridder Consulting Pty Ltd, *Submission 113*, pp 4–5; Mr Paul Budde, Managing Director, Paul Budde Communication Pty Ltd, *Submission 105*, p. 2; Indigenous Remote Communications Association, *Submission 110*, p. 1; Communications Law Centre, UTS, *Submission 111*, pp 1–3; Australian Telecommunications Users Group, *Submission 112*, p. 23, Mr Kevin Morgan, *Submission 122*, p. 5.

57 For example, Mr John de Ridder, Principal, De Ridder Consulting Pty Ltd, *Submission 113*, pp 4–5; Mr Paul Budde, Managing Director, Paul Budde Communication Pty Ltd, *Submission 105*, p. 2; Indigenous Remote Communications Association, *Submission 110*, p. 1; Communications Law Centre, UTS, *Submission 111*, pp 1–3; Australian Telecommunications Users Group, *Submission 112*, p. 23, Mr Kevin Morgan, *Submission 122*, p. 5.

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- the complaints handling mechanism for NBN end-users and whether existing industry ombudsman and consumer representative groups are sufficient (both in terms of expertise and resourcing);⁵⁸
 - NBN Co's intentions as to wireless and satellite services;
 - the future of Telstra's Universal Service Obligation;⁵⁹ and
 - the existence of a lifeline telephony service.⁶⁰

4.77 A number of these areas involve 'macro' decisions on the NBN: decisions on these matters will fundamentally affect the commercial viability of NBN Co, the content of, and timetable for, services to be delivered over the NBN as a whole, and how the network will ultimately affect the lives and wallets of end-users.

4.78 The absence of certainty in the areas listed above is yet another example of how the NBN project lacks coherency and is being progressed in an ad hoc, non-transparent manner. It is demonstrative of Government policy that is inexcusably deficient in accountability and detailed planning.

4.79 A number of the areas listed above are addressed elsewhere in this report. For ease of reference, cross-references are provided below.

- No decision on what will be NBN Co's final access prices and pricing model: see chapter 7;
- No arrangements for an effective complaints-handling and consumer representation mechanisms: see chapter 5;
- No detail on NBN Co's intentions as to wireless and satellite services: see chapter 9; and
- No detail on the future of Telstra's Universal Service Obligation, including whether a universal service obligation will exist in the future for broadband services: see chapter 6.

4.80 The balance of these issues are discussed individually below.

Telstra's assets, customer migration, and the matter of compensation

4.81 Telstra and NBN Co have been negotiating for months to reach agreement on whether NBN Co will acquire Telstra-owned assets and infrastructure, and at what price.

58 For example, Australian Communications Consumer Action Network, *Submission 121*, p. 3.

59 For example, Australian Communications Consumer Action Network, *Submission 121*, p. 5; Northern Territory Government, *Submission 123*, p. 1.

60 For example, Mr Allan Horsley, *Submission 108*, p. 5; Internet Society of Australia (ISOC-AU), *Submission 118*, p. 5.

4.82 Telstra owns the ubiquitous copper network covering much of Australia and over which telephony and internet services are currently delivered to the vast majority of Australian premises. Of critical importance is the size of Telstra's customer base, in addition to the assets and infrastructure that it owns and which could be utilised as part of the NBN (eg ducts, pits, poles, pipes and backhaul). The committee found helpful the following analysis of the key issues from Mr Kevin Morgan:

Telstra's involvement in the NBN would not only secure the network's customer base and guarantee it immediate access to significant cash flows it would also significantly lower the network build cost by many billions of dollars. This is not necessarily because of access to Telstra's assets such as ducts and the pit and pipe distribution network in suburban streets. The value of those assets was limited for Telstra itself when it deployed the HFC network in the mid 1990's. Fifteen years ago Telstra found that much of the pit and pipe infrastructure needed extensive and costly rehabilitation before it could be used for HFC and consequently Telstra used aerial deployment in all but limited areas.

Far more importantly than access to infrastructure, Telstra's agreement to transfer its traffic to the NBN would give certainty to the network rollout. If Telstra, which controls not just its own customer base but effectively the customer base of other ISP's reliant on Unbundled Local Loops (ULL) and Telstra wholesale products, agreed to 'turn off' its copper then it would bring 100% of the market to NBN. This would mean NBN could connect premises as it rolled out fibre leading to significant efficiency gains for the NBN as it would not have to backtrack later to connect premises. The alternative scenario to connection of homes as they are passed by the cable rollout would be for individual Retail Service Providers (RSPs) to identify customers in areas where fibre was being deployed, with the customers then being connected on a piecemeal basis. This would be inordinately expensive for NBN Co, leading to repeated visits to the same neighbourhood and even the same street.

In reality Telstra's agreement to transfer traffic to the NBN is vital to its success but that does not necessarily imply commercial success unless customers are prepared to accept far higher access charges that will be passed on to them by their RSPs. Commercial success would also demand very high rates of take up of top line packages that will maximise the wholesale payment made by the RSPs.⁶¹

4.83 NBN Co and Telstra settled on terms of engagement for their negotiations in December 2009.⁶² Despite repeated industry rumours and media speculation that a deal has been near for months, no agreement had been reached at the time of writing this report. On 19 March 2010, Telstra released a statement to the Australian Stock

61 Mr Kevin Morgan, *Submission 122*, p. 5.

62 The Hon. Stephen Conroy, Minister for Broadband, Communications and the Digital Economy, 'Terms of engagement agreed between Telstra and NBN Co', Press release, 18 December 2009, www.minister.dbcde.gov.au/media/media_releases/2009/117, accessed 29 April 2010.

Exchange saying that it believed there remained a significant gap between the parties as to what would be acceptable financial outcomes.⁶³

4.84 The Minister has stated publicly that it is not necessary for NBN Co to reach agreement with Telstra for the NBN to be operational and commercially viable:

We will build the NBN with or without Telstra and while it would be cheaper and quicker with Telstra's help, we don't need them to build the network, we are building the network irrespective of the outcome of the talks with Telstra.⁶⁴

4.85 The committee is not in a position to test the accuracy of that statement. It did not have access to the Implementation Study during its consultation process, nor did it receive sufficient guidance from the Minister or the Department. Representatives of the Department and NBN Co stated at the committee's hearings that the matter was one of commercial sensitivities and confidentiality and would not be discussed.⁶⁵ Telstra declined the committee's invitation to submit, noting the commercial sensitivities at that time surrounding its position.

4.86 Since the committee's consultation process however, the Implementation Study has been released with the bold assertion that the NBN is viable without a deal being reached with Telstra. The Implementation Study models its analysis of the feasibility of NBN Co on the assumption no deal with Telstra is reached.⁶⁶ Responding to this aspect of the report, one analyst, Mr Ian Martin of RBS Equities, is reported to have said:

The figures in the study shine some light on press reports, suggesting NBN Co values Telstra's cooperation at around A\$8bn: A\$5bn+ build saving from use of Telstra's ducts and backhaul dark fibre, plus incentive payments of [about] A\$2.5bn to migrate customers (ie A\$300 per customer for Telstra's 7.5m basic access and 1.3bn ISDN lines). If the government is willing to pay some extra to significantly de-risk the whole project, then we believe a deal can still be reached at around the A\$11bn level that we would see as offering fair value to Telstra...

63 Mr Mitchell Bingemann, 'Telstra fight for compensation over NBN rollout far from over', *The Australian*, 19 March 2010, www.theaustralian.com.au/business/industry-sectors/telstra-fight-for-compensation-over-nbn-rollout-far-from-over/story-e6frg9hx-1225842759445, accessed 28 April 2010.

64 Quoted in John Durie, 'Senator Stephen Conroy won't delay NBN legislation for Telstra', *The Australian*, 14 October 2009, www.theaustralian.com.au/business/news/senator-stephen-conroy-wont-delay-nbn-legislation-for-telstra/story-e6frg90f-1225786575788, accessed 28 April 2010.

65 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 44; Mr Daryl Quinlivan, Deputy Secretary, Infrastructure, Department of Broadband, Communications and the Digital Economy, *Committee Hansard*, Canberra, 15 April 2010, p. 69.

66 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, Chapter 7.

The government's implementation study assumes NBN Co will sign up 54–63% of premises on fibre, equivalent to 100% of current broadband penetration. It expects 75–90% of premises on fibre by 2035, but with mobile-only households already at 10%, which we think will rise to 20% over 5 years, this is an optimistic assumption. It makes no allowance for a substantial targeted market response by Telstra. Telstra's HFC covers [about] 20% of premises and Telstra may also roll out FTTN or FTTP in target areas. Also 35% of premises are MDUs [Multi Dwelling Units], which are relatively easy to target with competitive fibre (many already have fibre access).⁶⁷

4.87 The committee would also point out that a failure of NBN Co to negotiate terms of access with Telstra, or indeed any other infrastructure owner, would be inconsistent with the Implementation Study's own recommendation that 'NBN Co should not construct an end-to-end network across the country'. As the Study goes on to provide:

Where the market already provides the necessary infrastructure to enable superfast broadband services, and retailers can access that infrastructure at reasonable prices, NBN Co should not enter. Entry by NBN Co into these markets would be an inefficient use of funds, provided that a market emerges to support adequate national connectivity for those service providers who desire it.⁶⁸

4.88 The committee also does not believe it is the national interest for NBN Co to construct an end-to-end network across the country, believing that this would see an inefficient, wasteful result where identical infrastructure was replicated for no increased service gain.

4.89 In addition, the committee would voice its concern that prices are being negotiated with Telstra when critical information about Telstra's assets and customer base are not known. When the committee asked the Department 'how much of Telstra's assets are usable in the NBN?', it was told:

The Department does not have access to sufficient details of Telstra's assets to answer this question. The Government has a Bill in the Parliament the Network Information Bill 2009 which would enable collection of this information, but it has not been passed as yet.⁶⁹

4.90 Similarly, when the committee asked 'What work has been done to assess the quality of individual assets (eg has anyone looked at the quality of the copper network pipes being discussed)?', the Department responded:

67 Quoted in 'RBS focuses on NBN's high take-up projections', *Communications Day*, 10 May 2010, p. 5. See also chapter 2 above.

68 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, p. 61.

69 Department of Broadband, Communications and the Digital Economy, answer to question on notice, 20 April 2010, (received 23 April 2010).

Information concerning Telstra's assets is held by Telstra. In the absence of an appropriate authority of the kind described above, the Department has no ability to access this information. The extent of disclosure of this information in the negotiations between NBN Co and Telstra is a matter for commercial agreement.⁷⁰

Compensation to Telstra and others

4.91 The committee is concerned that there is a significant risk that the NBN Co or the Australian Government will be required to compensate Telstra or other infrastructure owners in respect of infrastructure that they own and which is stranded from the NBN or rendered redundant as a result of network architecture decisions made by NBN Co. The committee's concern is that this could see a significant cost-blow out in the already enormous price-tag of the NBN.

4.92 When the committee raised the general question of compensation with the Department, it received the following response:

The telecommunications industry is an open market and new entrants can build, buy or lease assets which may impact other current industry participants. Further, technology developments mean equipment and software upgrades often occur in a 3–5 year lifecycle. Industry participants need to adapt to changing circumstances and new competitors. It is not apparent that compensation liability arises in this situation.⁷¹

4.93 The committee also asked the following, more specific question about compensation to the Department:

The NBN Co is progressively announcing network architecture details. Recently NBN Co indicated more details about Points of Interconnect (POIs). The media reported that there “are still a significant number of premises for which NBN Co will aggregate fibre access net sites back to a POI in reach of contestable backhaul – stranding existing uncontested infrastructure along the aggregation route”.⁷²

(a) What is the likely quantum of such compensation? How is it calculated? What work has been done to quantify it?

(b) Who will be liable to pay compensation – Government or NBN Co? Will this affect the potential for NBN Co to subsequently be sold?

(c) If the government will be liable for compensation owed because of NBN Co's network architecture decisions, what oversight / assessment of

70 Department of Broadband, Communications and the Digital Economy, answer to question on notice, 20 April 2010, (received 23 April 2010).

71 Department of Broadband, Communications and the Digital Economy, answer to question on notice, 20 April 2010, (received 23 April 2010).

72 *Communications Day*, 25 March 2010, p. 2.

NBN Co decisions is the Department undertaking to calculate and mitigate future liabilities?⁷³

4.94 In response, the Department did not indicate whether any work had been done on this issue, only that it is 'premature to conclude' that the question of compensation will arise:

NBN Co issued a discussion paper in December 2009 which amongst other things, sets out the company's initial approach to providing POIs. There have been no decisions made as yet by the Government in relation to the proposed approaches. However, continued utilisation of existing backhaul infrastructure will be a matter for the owner of that infrastructure.

In view of the not yet settled arrangements in regard to proposed POIs, it is premature to conclude that the question of compensation will arise.⁷⁴

4.95 The committee is particularly mindful of the importance of the issue of compensation given the findings of the Auditor-General in the Australian National Audit Office's report into the NBN Request for Proposal Process.⁷⁵

4.96 The Auditor-General concluded that the Department failed to adequately assess and provide timely advice to the Government on compensation risks relating to the Government's initial Request for Proposal process. That process, which was ultimately terminated by the Government, asked for proposals from private enterprises to build, operate and maintain the NBN.⁷⁶ The Auditor-General criticised the Department's failure to adequately assess the compensation risks, concluding that 'information on the scale of potential compensation would have better informed, and may have influenced, the Government's approach':

The department considered the compensation risk was 'significant' for a FTTN solution but did not estimate the quantum of this risk until relatively late in the process. Consequently, the department was not in a position to provide early advice to the Government on its likely impact on the viability of non-Telstra proposals, having regard to the Government's proposed contribution. While an estimate of any compensation range, understandably, would be broad and caveated, there was a need, earlier in the process, to put some dimensions to the 'significant risk' that a non-Telstra solution may require the payment of compensation to Telstra. The estimate of the potential cost of compensation developed by the department

73 Senator Fisher, Written additional question on notice to NBN Co, 20 April 2010.

74 Department of Broadband, Communications and the Digital Economy, answer to question on notice, 20 April 2010, (received 23 April 2010).

75 Australian National Audit Office, *The National Broadband Network Request for Proposal Process: Department of Broadband, Communications and the Digital Economy*, 3 February 2010, www.anao.gov.au/uploads/documents/2009-10_Audit_Report_20.PDF, accessed 5 May 2010.

76 A full chronology of the Request for Proposal process and its ultimate termination is provided in chapter 2 of the committee's *Third Report*.

10 months into the RFP process was some billions of dollars. The compensation risk had a considerable bearing on the outcome of the process following the exclusion of Telstra. No other national proponent was able to meet the Commonwealth's objectives and accept the potential compensation costs.

Estimating the potential compensation could have begun early in the process by using publicly available information and engaging specialist expertise, and been updated when better information became available (as noted in paragraph 2.57). While recognising the approach to delivering the NBN would be a decision for the Government, information on the scale of potential compensation would have better informed, and may have influenced, the Government's approach.⁷⁷

4.97 The committee believes that the Department should conduct analysis as to whether there is a risk that an obligation to pay compensation may arise in the future in relation to the activities of NBN Co and the design of the NBN. The committee believes that waiting to assess the question of compensation until *after* all network architecture decisions have been made, and all commercial negotiations have been concluded, is too late. Such an approach risks repeating the very same mistakes that the Department made, and which the Auditor-General criticised, in relation to the handling of issues of compensation regarding the Request For Proposals process.

Recommendation 9

4.98 That the Department immediately consider whether potential decisions on network architecture will create a risk that NBN Co and/or the Government will be liable to pay compensation to third parties, and the likely quantum of any compensation.

Services to regional and remote Australia

4.99 NBN Co has not disclosed a detailed roll-out plan for its network build. Nor has it decided on the areas that will actually be included in the 90 per cent fibre coverage footprint.

4.100 There is no publicly available timetable of where and when services will be delivered to regional and remote Australian premises.

4.101 Elsewhere in this report the committee has commented on the historical neglect and under-servicing of regional and remote areas in terms of the provision of telecommunications infrastructure and services.⁷⁸ The committee also noted the overwhelming focus of recommendations of the Regional Telecommunications

77 Australian National Audit Office, *The National Broadband Network Request for Proposal Process: Department of Broadband, Communications and the Digital Economy*, 3 February 2010, www.anao.gov.au/uploads/documents/2009-10_Audit_Report_20.PDF, accessed 5 May 2010, p. 25.

78 See chapter 3, above.

Independent Review Committee's report that there needs to be better co-ordination between all levels of government and telecommunications providers.

4.102 The committee is concerned that the absence of a detailed roll-out plan is having a chilling effect on the building of infrastructure in regional and remote areas. It is also being kept secret whether NBN Co will, as the committee and others such as the Regional Telecommunications Independent Review Committee have called for, be 'rolled-into' urban centres from the bush as opposed to being 'rolled-out'. The latter option would leave under-serviced regional and remote communities neglected for years to come.

Recommendation 10

4.103 That NBN Co release a detailed implementation plan describing how and when services will be provided to specified regional and remote locations, and what the cost of connection will be for regional householders.

4.104 That the implementation plan prioritise the servicing of regional and remote locations so that the network is 'rolled-into' urban areas from regional and rural areas.

End-user pricing

4.105 More than 12 months after the Government announced its intention to build the NBN, it is still not known how much it will cost the average Australian user to access services over the NBN. The average Australian users' taxes are contributing to the enormous cost of building the NBN. But an average Australian household has no way of knowing whether it will even be able to afford to purchase superfast broadband services over the network. There is simply no answer to the simple question: 'what will this cost me?'

4.106 As NBN Co is a wholesale-only provider, end-user pricing is ultimately a matter for Retail Service Providers. But until NBN Co finalises and makes publicly available its wholesale access pricing, Retail Service Providers cannot finalise their pricing of products for consumers and businesses. In evidence to the committee, Mr Quigley made it apparent that it is not even possible to take NBN Co's wholesale prices in Tasmania as indicative of what NBN Co might charge for access on the mainland. As Mr Quigley stressed, the Tasmanian access charges are 'interim prices' only.⁷⁹

4.107 The only indication of how much broadband services over the NBN might cost the average Australian residential premises in the future was provided by the Internet Service Provider, iiNet. iiNet will be offering broadband services to Tasmanians from July 2010. As an indication of its expected pricing for Tasmanians,

79 Mr Michael Quigley, CEO, NBN Co Ltd, *Committee Hansard*, Canberra, 15 April 2010, p. 47.

iiNet referred to its current pricing of FTTH services in Point Cook in Victoria.⁸⁰ Based on those prices, to purchase a package with 100 Mbps download speed (and somewhere between 1–5 Mbps upload speed), will cost an Australian residential premises between \$129.95–159.95 per month.⁸¹ Cheaper prices exist for slower speeds, but assuming NBN Co does not charge higher access fees on the mainland from its 'interim' pricing in Tasmania, to get the 100 Mbps service that the Government touts as the true benefit of the NBN, will still cost the average Australian just under \$2000 per year.

Lifeline telephony service

4.108 'Lifeline telephony services' refers to the ability to maintain the use a telephone service in the event of a power failure, for example to dial emergency services. The current copper network can transmit electricity, meaning that an end-user could still make telephone calls on a non-cordless landline telephone even if the mains electricity to the premises is cut. Unlike copper, the fibre lines cannot transmit electricity.

4.109 The issue was succinctly expressed by the Internet Society of Australia:

Electricity cannot be transmitted over optical fibre. That means that the existing situation in which electricity can be sent over copper wire into people's homes in cases of emergency cannot be replicated in a fibre NBN. Back up power must be provided where it will clearly be needed in emergency situations (fire and police stations, hospitals, nursing homes, etc). There will also need to be an extensive education campaign [to] ensure members of the public are aware that their fixed phone service may no longer operate in emergency situations. Special provision will also need to be made for residences in which people with special health or other special needs.⁸²

4.110 Mr Alan Horsley also submitted that:

Commonwealth and State Governments have recently established arrangements which provide for emergency information telephone calls to be made to the homes of people threatened by natural disasters.

Individual members of the community as users and Government will reasonably expect that any basic telephone service that may be made available directly from the National Broadband Network Termination Unit

80 Point Cook is a test site for Fibre to the Premises technology that was launched by Telstra in December 2009.

81 Mr Stephen Dalby, Chief Regulatory Officer, iiNet Ltd, *Committee Hansard*, Melbourne, 14 April 2010, p. 21. See also, iiNet Ltd, answer to question on notice, 14 April 2010 (received 27 April 2010).

82 Internet Society of Australia (ISOC-AU), *Submission 118*, p. 5.

and located at customers' premises will function at a time of mains power failure.⁸³

4.111 After identifying the problem, the Implementation Study proposed that:

NBN Co should design its [optical network termination device] to provide end users with the option of a self-supplied, self-maintained battery backup to maintain telephone access in the event of a power failure. There are customers who will need assistance with maintaining the battery backup—principally designated priority assistance customers who qualify for lifeline services and currently receive special assistance from telecommunications providers. Government should pay to provide and maintain battery backup for these priority assistance customers, and NBN Co should enable such features as required via contractual arrangements.⁸⁴

Committee view

4.112 The committee believes that it is essential that priority assistance customers, like the elderly, hospitals, and emergency services, have access to a working landline telephone service in the event of a mains power failure to the premises. However, the committee is concerned that such a solution does not go far enough. Australian users expect that their non-cordless landlines will work during a power failure, even if that failure lasts for days. The committee is concerned that there will be circumstances where end-users have not paid for or maintained a battery backup and there could be tragic consequences as a result. At the very least, the committee agrees with the Internet Society of Australia that there will need to be a mass-education campaign to alert end-users to the consequences of a non-copper telephony service in the event of a mains failure to the premises.

Recommendation 11

4.113 That priority assistance customers, like the elderly, hospitals, and emergency services, have access to a working landline telephone service in the event of a mains power failure to the premises.

4.114 That there be a mass-education campaign to alert end-users to the consequences of a non-copper telephony service in the event of a mains failure to their premises.

83 Mr Alan Horsley, *Submission 108*, p. 5.

84 McKinsey-KPMG, *Implementation Study for the National Broadband Network*, 5 March 2010, pp 36–37.