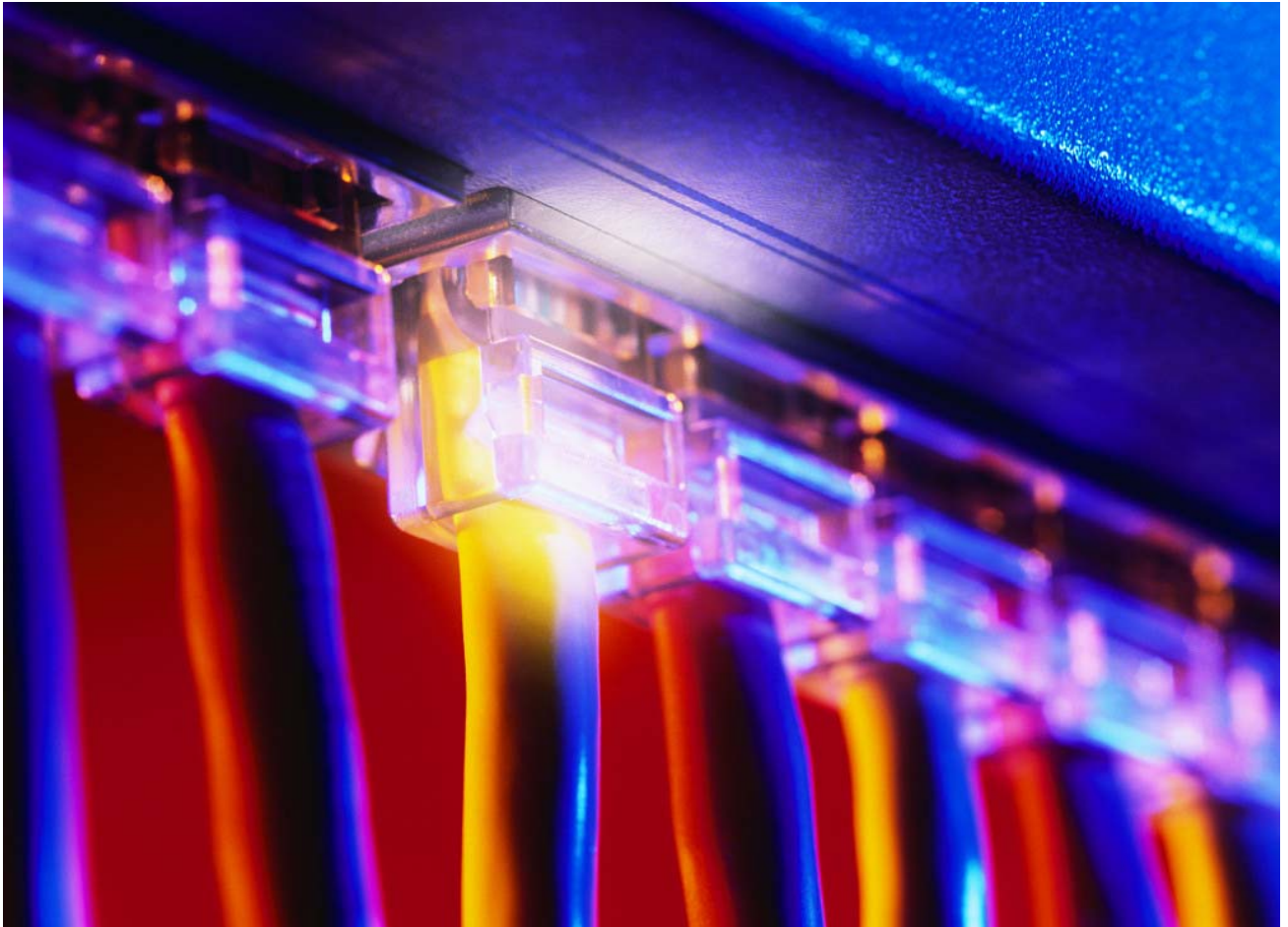# An Industry Vision for the National Broadband Network Plan

Supplementary Report

Prepared for the

Panel of Experts to assess National Broadband Network proposals

and the

Minister for Broadband, Communications and the Digital Economy
Senator the Hon. Stephen Conroy

30th March 2008

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Background

At the BuddeComm FTTP Roundtable in Sydney in October 2007, the Minister for Broadband, Communications and the Digital Economy, Senator Stephen Conroy, invited the industry to prepare a telecoms infrastructure vision paper as a term of reference for the Government's National Broadband Network (NBN).

Building upon the previous work of the Wholesale Industry Group, and referencing the Australian Labor Party's 2007 document, 'New Directions for Communications - A Broadband Future for Australia – Building a National Broadband Network'[1], a 'FTTP Special Interest Group' (FTTP SIG) was established to formulate ideas and provide a common voice for the FTTP industry.

A key output of this group was the development of a collaborative industry paper that put forward 17 key industry recommendations for the Government's NBN. This paper was called 'An Industry Vision for the National Broadband Network Plan' and was presented to the Minister for Broadband, Communications and the Digital Economy, Senator the Hon Stephen Conroy on March 6th 2008.

At the March 6th meeting, in discussion with the Minister, the FTTP SIG agreed to establish 3 key working groups to provide additional input for consideration by the Minster's Department and upcoming Panel of Experts that will assess proposals to build the National Broadband Network.

On March 11th 2008, the Minister announced the Panel of Experts[2].

This paper provides a set of supplementary information on 3 key topics (Greenfield FTTP deployments, Brownfield FTTP deployments and Access Seeker requirements to the NBN) that will be presented to the Minister's Expert Panel.

Acknowledgements

Facilitated by Paul Budde, this paper has been prepared collaboratively by various volunteers who were present at the Industry Roundtable on March 6th, 2008.

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[1] Available at www.alp.org.au

[2] See http://www.minister.dbcde.gov.au/media/media_releases/2008/016

1.   Summary

The Fibre to the Premise (FTTP) Special Interest Group (SIG) is very supportive of the Minister's plan for a National Broadband Network (NBN). This paper provides supplementary recommendations to the report of March 6 entitled 'An Industry Vision for the National Broadband Network Plan' and provides recommendations for the consideration of the Government's Panel of Experts that will assess proposals to build the National Broadband Network.

The timing of the NBN initiative is critical to Australia's future.
- Australia's current copper based telecommunications infrastructure is aging and is unable to keep up with the demands of broadband users.
- Australia is beginning to fall behind in Brownfield high-speed broadband because of a lack of open access regulations.
- At the time of writing this report there have already been 114 planned or implemented FTTP communities on Greenfield sites involving some 157,000 lots.
- Over the next 6 years there is projected to be one million additional new homes built in Australia.
- The need for a robust, high speed, scalable telecommunications infrastructure is seen as the foundation for many other government and industry led initiatives such as:
    o e-education;
    o e-health;
    o e-government;
    o affordable housing;
    o environmental monitoring;
    o access to social services;
    o public security and safety;
    o climate change;
    o communication;
    o smart utility grids; and
    o entertainment services.

Whilst the demand and necessity for new telecommunications utility is growing rapidly, the current processes for implementing solutions towards this aim have been far from straight forward and are certainly not to the same level of maturity as other utilities such as power, water and gas.

In the transition to new telecommunications infrastructure technologies, the industry has already encountered a significant number of obstacles that have been encountered by all stakeholders including developers, councils, providers, ISP's and vendors. Examples of some of the issues include:

1. A lack of financial incentives for deployment of open access FTTP high speed networks;

2. Ignorance of and options for back haul network solutions used to connect FTTP Communities.

3. Anti-competitive conduct by some retail carriers that wish to monopolise access to connected communities through the use of FTTP;

4. A lack of education, motivation and funding for community aggregation to drive FTTP Open Access Network Solutions.

5. Legislative and Regulatory obstacles to FTTP Network deployments.

6. Inconsistent approaches by various State Government, State Authorities and Local Councils towards the planning and regulating of community infrastructure and land use management required for FTTP deployments.

7. A need for important changes to the regulatory regime for access seekers.

In order to address issues such as these, the Panel of Experts and the Government will need to consider many of the experiences and knowledge that the Australian industry has gained so far in the implementation of FTTP solutions for both Greenfield and Brownfield sites as well . This report has captured a wide range of these key issues and proposes a number of recommendations based upon their collective first hand industry experience.

In summary, the FTTP Special Interest Group believes that the successful rollout of an advanced 'open access' National Broadband Network in Australia will require the provision of incentives, a range of assistance for stakeholders, the removal of a range of impediments by all levels of Government and critical changes to the regulatory regime. Accordingly, this group has identified the following list of 24 key recommendations for the special attention of the Expert Panel and Minister.

Common Recommendations between Greenfield and Brownfield
1. Establish a **national network basic topology standard** (See section 3.1)
2. Establish a **Central Co-ordination Office** (See section 3.2)

Key Greenfield FTTP Recommendations
3. Establish a **sustainable funding model for backhaul networks**. (See sections 4.4.1)
4. Establish a **sustainable funding model for community networks**. (See section 4.4.2)
5. Reduce anti-competitive conduct by **offering funding and rebates *only* for true open access networks**. (See section 4.4.3)
6. Promote **education and support for the industry** at all levels regarding NBN topics such as benefits, capabilities, standards, services, funding etc, (See section 4.4.4)
7. Reduce **Legislative and Regulatory Obstacles**. (See sections 4.4.5)
8. Improve **Coordination of Government Agencies at all levels** (See section 4.4.6)

Key Brownfield FTTP Recommendations
9. Only provide **funding for 'open access' FTTP infrastructures** within Brownfield environments. (See section 5.2)
10. Source **minor funding for connecting homes from the consumer** (both residential and commercial) (See section 5.2)
11. Source **major funding for connecting homes from the network operator and/or the retail service providers** (See section 5.2)
12. Only consider proposals in Brownfield environments that are based on **overbuild** scenarios. (See section 5.3.3)
13. **Funding should only be provided where new distribution network infrastructure is provided** and not using existing infrastructure from incumbent telecommunications operators. (See section 5.3.3)
14. Select a **basic network architecture that utilises an end-to-end multi-layer planning approach**. (See section 5.3.2)
15. Allow **use of existing electrical infrastructure** such as overhead power, existing dark fibre and ducts. (See section 5.4.1)
16. Address the use of existing **Telstra ducts**. (See section 5.4.2)
17. Address the use of **co-location facilities** such as Telstra exchanges. (See section 5.4.3)

18. Develop **standards for the connection and hand off from the neighbourhood network to the customer service lead**. (See section 5.5.2)
19. Define the location of the **service demarcation point** near the Customer Premise Equipment. (See section 5.5.3)
20. Any current **ducting or leads used for service leads should be unambiguously declared the property of the End User** (land lord, home owner). (See section 5.5.4)

Key Access Seeker Recommendations

21. Establish **reasonable access terms**.
22. Improve the **efficiency of the arbitration process**.
23. Reduce the ability of parties to **'game' regulatory processes**.
24. Eliminate **conflicts of interest** between commercial interests and regulatory compliance.

2.   Introduction

Most of the recommendations that were made in the original report[3] applied specifically to issues within the "Brownfield" environment. This supplementary paper provides an extended set of issues categorised into three key areas: Greenfield FTTP Deployments, Brownfield FTTP Deployments and Access Seeker requirements.

Within the FTTP SIG, smaller working groups were established on each of these topics in order to develop a set of recommendations that should be considered for a successful rollout of the National Broadband Network.

The approach has been to:
- Identify issues for each layer of the NBN and describe them in a clear fashion;
- Develop specific recommendations that address these issues that respondents should adhere to; and
- Where feasible, provide direct questions or statements relating to these issues that should be considered for inclusion in any RFP.

This report has been prepared in a very short period of time and as a result may be limited in detail in some areas and may require clarification in others. However, the FTTP SIG hopes that the information provided will be of assistance to the Expert Panel and the Department. The SIG is also available to present this material and discuss any of the topics identified in more detail, if required.

The FTTP SIG is also willing to participate further in developing strategies for the National Broadband Network. The members all have a strong vision for the benefits that an Open Access high speed National Broadband Network will bring to Australia and to enable it to continue its growth and sustain a competitive position in the international market.

Time is of the essence. OECD nations in Asia, America and Europe already have strategic plans for the deployment of National Broadband Networks. Some countries and regions such as Korea, Hong Kong, Japan, United States and Europe[4] have significant rollouts of FTTP already underway. Australia has also started, but based upon experience to date, realises that a number of fundamental changes need to occur if Australia is to succeed and remain globally competitive in the emerging Knowledge Economy[5]. Time is quickly running out. Carpe Diem!

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[3] 'An Industry Vision for the National Broadband Network Plan' – 6th March 2008.
[4] Japan – 10M FTTH connections, United States – 2M FTTH Connections, Europe – 1M FTTH connections
[5] According to DFAT, 48% of the Australian economy in 2005 was based on the Knowledge Industry

3.   Common Issues Relating to Brownfield and Greenfield Deployments

This section describes issues that are relevant to both Greenfield and Brownfield deployments.

3.1   National Network Basic Topology Standard

Over the years the incumbent telecommunications operator has been responsible for building the Customer Access Network (CAN). Unfortunately, the original copper network was not designed to cater for the actual growth and services that have evolved since the start of the Internet and the resulting increasing bandwidth requirements.

With the current opportunity to build a NBN, the industry is faced with many potential topologies and standards to choose from. In building a fibre network, the solution must be scaleable, flexible, future proofed and be capable of delivering current and new services on a common fibre infrastructure either aerial or underground. Unless a uniform standard topology is adopted for this purpose, then the NBN may have a limited lifespan and suffer the same consequences as the current copper network.

Typical Architecture

Both groups are concerned about disparate architectures impacting the long term viability of the NBN. We would prefer to see a similar national architecture enforced yet do not want to prescribe a specific architecture. Appendix B provides a high level architecture developed from the TasColt project. Tasmanian representatives have confirmed they will assist in further developing this architecture for the NBN if called to. The TasColt architecture could at least be considered as a reference architecture for bidders.

Common Basic Network Topology for FTTP

To provide the flexibility and scalability of a fibre network to meet the demands of a current and future Access Network deployment, the following recommendation and guidelines are made:

> **Recommendations**
>
> - A common fibre infrastructure should meet a common national network basic topology standard.
>   The standard should ensure the following minimum criteria over the same fibre network:
>   - That any cable network deployed must be capable of delivering speeds of at least 1 Gbps or better.
>   - To be able to provide Point to Multipoint fibre.
>   - To be able to provide Point to Point fibre to any subscriber (from the Head end / Hub site to the premises)
>   - To be capable of providing Point to Point links or wavelengths (eg DWDM) to subscribers.
>   - To be able to provide on-net and off-net access.
>   - To be able to provide for complete separate and private networks e.g Government, security.
>   - To have provision for growth in the fibre serving area.
>   - To have spare availability to any premises
>   - To be easily accessible for maintenance and trouble shooting

As an example, the Verizon fibre network in the US has designed a network to meet all of these criteria for both aerial and underground distribution in both Greenfield's and Brownfield's sites. Where available, Telstra Fibre-based Customer Access Networks have also been designed to meet these minimum requirements.

3.2 Central Co-ordination Office

A key issue identified by both the Greenfield and Brownfield groups is the need for a centralised co-ordination office. This office will be involved in setting standards and providing procedural, legal and technical advice (including setting a uniform architecture) for the NBN builders.

The Central Co-ordination Office (CCO) would also be able to assist in coordinating and providing an interface for organisations that could contribute to the NBN but do not necessarily have the available resources to participate in the entire NBN programme. The aggregated value of these organisations is seen as significant and the presence of a CCO would help to facilitate industry collaboration.

3.2.1 Representation for all Potential Contributors

Potential contributors to the NBN could include organisations such as:
- Councils and Local Government
- State Governments and State Government Departments
- Electricity Utilities (both State Government affiliated and independent)
- Small local Commercial entities
- Local Water and Sewerage Authorities

For example, many of these organisations have access to fibre (and other useful assets) that could be of use to the NBN but may not posses the resources to either exploit their assets or effectively participate.

3.2.2 The role of ACMA

The Australian Communications and Media Authority (ACMA), currently plays a valuable role in promoting self-regulation and competition in the communications industry, while protecting consumers and other users. One of the key roles that ACMA also plays is in the education of the industry on communications issues. These functions are compatible with the requirements for a CCO for the NBN.

Currently, ACMA is most likely to be under resourced to provide the necessary technical and regulatory support to Developers, Providers and the Industry on the topic of the NBN. Accordingly, ACMA or a similar authority will require Federal funding and support to facilitate a consistent approach to the deployment of the National Broadband Network in Brownfield and Greenfield environments.

3.2.3 Suggested Characteristics of the CCO

Setup

- In the timeframe required, the industry is unlikely to have the ability to establish a CCO independently and establish the autonomy that would be required for this Office. The CCO should therefore ideally be established with Government assistance as an office under the administration of the ACMA. Since the scope of responsibilities for the CCO are considerably broader than ACMA's current responsibilities, then the CCO will require specific government funding.

Regionally based

- ACMA already has central offices in Canberra, Melbourne and Sydney and regional offices in NSW, SA, Northern Australia and WA. The location of these offices would be ideal for the regional specific functions that will be required in each state. Each State will have it's specific set of issues, so this local presence will be critical.

Structure

- The COO should b established as a division of ACMA reporting to the Federal Department of Broadband, Communications and Digital Economy.
- The constitution of the COO should be setup to ensure board representation by the key stakeholders, namely, all levels of Government, wholesale and retail service providers, developers and utilities.
- Its duties will be two way in order to represent issues to the Federal Government as well as to represent issues to its members (and non-members).
- In order for the COO to be effective, it will require specific legislative tools to help facilitate access to critical infrastructure for the NBN.
- ACMA will continue to be tasked with the role of educating and informing the industry whilst the COO will be tasked with specific implementation and co-ordination responsibilities such as those listed below.

Specific Responsibilities

Some suggested responsibilities for the CCO could include:
- Maintain national standards for FTTP network deployments;
- Maintain an updated network architecture map and provide network planning tools to assist members with network and development planning;
- Maintain maps for the location, composition and capacity of existing conduit networks, fibre back haul, community infrastructure and aggregation demographics, future residential developments, infrastructure (roads, rail and other services) and other relevant information;
- Assist providers by streamlining access to town planning/ building approval departments;
- Develop and maintain standards for physical construction, taking cognisance of and trying to minimise the number of different local requirements;
- Certification of FTTP contractors and providers;
- Provide equipment and contractor purchasing support;
- Develop and administer FTTP training programs for local government, planning authorities, developers and providers.
- Maintain a centralised network management system and coordinating network management activities; and

- Track information about the availability of funding from government bodies and semi government businesses.

Access

The CCO should also facilitate or advices access methods to infrastructure such as:

- Kerbsides

- Roads

- In-ground pipes and ducts

- Electrical poles

- Substations and pump buildings

Recommendations

- Establish a Central Co-ordination Office (CCO) for the NBN.

- Establish the COO as a division of ACMA reporting to the Federal Department of Broadband, Communications and Digital Economy.

- Setup the COO constitution to ensure board representation by the key stakeholders, namely, all levels of Government, wholesale and retail service providers, developers and utilities.

- Setup State offices of the COO as a "single desk" for property developers, local government and carriers can plan, approve and certify new FTTP communities.

- Establish a COO information web site, publish white papers and setup training programs to help promote FTTP education and concepts.

- Empower the CCO with legislative tools to help facilitate access to critical infrastructure for the NBN.

- Provide the CCO with a practical range of responsibilities that will help to streamline the process of co-ordination, planning, approving and implementing NBN infrastructure for all stakeholders.

As the industry's self-regulatory body, the Communications Alliance could also play a key role in this process.

4.   Greenfield Deployments

4.1   Introduction

In the planning of residential communities on Greenfield sites, the telecommunications infrastructure needs to be considered as equally important as other utilities, such as power, water, gas, roads, street lighting and storm and waster water.

Today, International consensus is practically unanimous in the view that an FTTP solution for Greenfield developments is the preferred scalable and long term solution that has the capability to deliver phone, broadband, PayTV and FTA TV services as well as other potential value added services.

Anecdotal evidence to date, however, would also suggest that there are a broad range of issues being faced by developers that highlight the need for resolution on key areas such as:

- Implementation costs;
- The incumbent regulatory framework;
- The range of technology options;
- Incentives to deploy FTTP instead of copper or FTTN solutions;
- Their obligations and rights as a developer in relation to telecommunications;
- Selecting an appropriate FTTP solution provider;
- Education on the benefits and capabilities of FTTP; and
- Education on the need for "Open Access" FTTP network solutions rather than the closed solutions offered by a number of existing major carriers.

4.2   Residential Developer Requirements

Residential developers require the implementation of a telecommunications infrastructure that is:
- Affordable for the Developer (which is particularly important for low cost housing);
- Affordable for the Residential and Business Customers;
- An Open Access Network to allow residential and business customers a choice of providers on the network;
- Scalable for deployment across the entire Community for the duration of the development (up to 25 years in some cases) and beyond the completion of the development phase;
- Capable in terms of speed or bandwidth (say up to 1Gbps or better)
- Capable of delivering at a minimum: Telephone, Broadband, PayTV and Free to AirTV
- Capable of delivering High Definition Video conferencing to support initiatives such as e-health, e-education, e-government, various social services and reduced travel by working from home etc.
- Flexible to allow for future technologies, services and applications to be delivered; and
- Delivered by experienced FTTP Network Operators with financial credibility, a long term commitment to FTTP deployments and operations, an established track record in Telecommunications and a sustainable business model.

Until very recently, reliable operators committed to Open Access FTTP community networks have not been prevalent in the Australian marketplace. There has been a lack of choice in the marketplace of providers who are able to offer a holistic range of services from the customer end to the wholesale carrier end.

Whilst a range of FTTP operators are now present in the marketplace, the impediments to Open Access network deployment are very real. The following sections provide some background to the

costs and issues being experienced in Greenfield deployments and offers some recommendations on how to address these issues.

4.3   Background to Greenfield Costs

Primarily, the stimulation for the rollout of advanced FTTP "open access" broadband networks in Australia requires the provision of both financial and non-financial incentives as well as the removal of a range of impediments by all levels of Government.

Today, the majority of Greenfield residential developments implement all services underground. A typical underground deployment of FTTP solution in a Greenfield Development is shown in Figure 1 of Appendix B and the sample costing model for this type of deployment (assuming 1000 lots) would be as follows:

1. Conduit to the Home	$300 to $600 per lot
2. FTTP passive fibre support multiple services	$600 to $800 per lot
3. Fully provisioned active equipment (inclusive of RF overlay for TV services)	$1500 to $2200 per lot
4. Backhaul Interconnect (Net of civil works)	$100 to $150 per lot
Total	**$2500 to $3750 per lot**

The costs per lot include, by way of amortisation into the lot calculations, the Head End/Gateway Exchange equipment that is usually located in the Community Communications Centre. This head end facility may cost between $200,000 and $400,000 depending on a number of factors including how that equipment offers the delivery of services by retail carriers and service providers. Although, in some developments these costs are in addition to the above.

Back haul civil works and fibre cable is in the order of $45 to $80 per metre and the distances vary with each development ranging from close proximity to many kilometres. The costs also do not relate to the number of lots in the development. It is therefore not possible to give an average or typical development cost per lot for the backhaul Civil Works.

The costs for Greenfield deployments vary from Brownfield deployments for the following reasons:
- The number of lots per estates is typically lower than Brownfield suburbs and hence there are fewer economies of scale in the roll out.
- All infrastructure is 100% underground whereas the Brownfield model is based on mixed aerial and underground (60%:40% typical) deployment.
- A head end facility is required for each estate.
- The build-out is relatively slow (relating to the timing of housing construction); typically 20-30 connections per month while a Brownfield deployment assumes many hundreds or even thousands of connections per month in one area.

4.4 Key Issues & Recommendations

Some of the key issues and recommendations to incentivise the rollout of FTTP in Greenfields include:

4.4.1 Provide Sustainable Funding for Backhaul

The cost of building the backhaul is one of the biggest issues encountered when provisioning Greenfield sites. It is suggested that this an investment that requires a level of funding (eg. in the form of grants and tax rebates and benefits) by the Government, particularly in regards to the provision of the conduit (pit and pipe) networks.

Recommendations

- Provide Government funding in the form of grants and tax rebates and benefits. This funding should be focussed upon the provision of the conduit (pit and pipe) networks and should be provided only for Open Access Networks where the wholesale carrier and/or Developer does not offer retail services in competition to the retail carriers, carriage and other service providers accessing the open network.

- Encourage backhaul conduit infrastructure via a National fund to be available to developers and Local and State government bodies who include conduit infrastructure when they are doing other works. The fund should only be made available if the conduits are to be used for open access networks. These conduits could then be donated to a State or Federal authority to administer and manage (eg. maintain and operate). That authority should be empowered to charge a cost recovery fee for the service and some regulation by the ACCC on price may need to be incorporated. The grants should be made available to local authorities via the grants Commission.

- Developers should be entitled to reserve space in these managed Open Access conduits in consideration for their undertaking to develop land and the provision of plans evidencing their intention to do so, and only if the Services are open access services.

4.4.2 Provide Sustainable Funding For Community Networks

Currently, there is a lack of funding grants and tax benefits for deployments of Open Access FTTP high speed networks in Greenfield Developments. This should be a consideration, since there are significant benefits to be realised through the availability of this infrastructure for a wide range of initiatives eg. e-education, e-health, public security and safety, sustainability etc. The aim is develop a self sustaining model for funding of open access FTTP networks in new Greenfield environments that goes beyond the initial seed funding of the NBN.

Recommendations

- Funding in the form of grants and tax rebates and benefits and discounts against rates charged by government should be provided for the deployments of Open Access FTTP high speed networks in Greenfield Developments, where the wholesale carrier and/or Developer does not offer retail services in competition to the retail carriers, carriage and other service providers accessing the open network.

- Government and semi government bodies (including schools, universities, hospitals nursing homes or public utilities) should be obliged to participate in local community demand aggregation projects to support Open Access FTTP network deployment.

- The Government should provide support and assistance to developers who provide new open access FTTP Networks to communities. That assistance may be in the form of commitments by semi government power, water, gas and other service providers.

- Provide incentives such as "take or pay" contracts for Developers to compensate them for construction of FTTP Open Access networks to regions where there may be insufficient traffic and the development is particularly small.

- Government instrumentalities infrastructure should be made available free of charge for back haul and should encourage Open Access FTTP networks where the wholesale carrier and/or Developer does not offer retail services in competition to the retail carriers, carriage and other service providers accessing the Open Access network.

- Communication Centres used in connection with the provision of Open Access FTTP networks should be immune to rates or taxes charged by any level of Government.

- To recover over a 20 year period the cost of the financial incentives, grants and tax benefits provided by Federal Government for the deployment and connection to residential and commercial premises, new Federal Laws could potentially be used to require the imposition of a small annual 'Broadband Communications Levy'. This concepts need to be explored further.

4.4.3   Reduce Anti-Competitive Conduct

Anti-competitive conduct by retail carriers, service and content providers that wish to monopolise access within connected communities, also removes the competition on price and services within those communities.

In some cases there is also reluctance by some retail carriers, service providers and content providers to share ducts and other ICT infrastructure, notwithstanding the access regime and government regulation to encourage co-location.

Currently, it is common for incumbent carriers not operating Open Access FTTP networks to overbuild in areas to compete for customers against new carrier entrants offering Open Access networks. This behaviour does not adhere to the requirements of the *Telecommunications Act* to utilise conduits or cables with spare capacity. In some cases there is insistence for end to end control to resist participation in Open Access network platforms.

> **Recommendations**
>
> - Carriers that do not offer Open Access connection over the FTTP networks should be:
>   - Ineligible for any government assistance, incentives, rebates or tax benefits;
>   - Ineligible for any incentives including take or pay contracts from government or semi government bodies (including schools, universities, hospitals nursing homes or public utilities); and
>   - Prohibited from taking any action or making any offer or inducement to entice any government or semi government body to not participate in a local community demand aggregation project to support and Open Access FTTP network deployment.
> - The ACCC must be given powers and encouraged to prosecute any carriers not operating Open Access FTTP networks that overbuild in areas to compete for customers against new carrier entrants offering Open Access FTTP networks.

4.4.4 Improve Industry Education and Support

There is a large need to improve education across the industry regarding FTTP Open Access network solutions in Greenfield developments.

> **Recommendations**
>
> - The Government should fund, sponsor and assist the provision of information to encourage community demand aggregation projects to drive FTTP Open Access network solutions within Greenfield Developments.
> - The ACMA or an alternate coordinating authority (CCO) should be charged with the duty to collect and provide to FTTP providers, Residential Developers and other stakeholders, information that meaningfully assists and stimulates FTTP deployments in Australia.

4.4.5 Reduce Legislative and Regulatory Obstacles

There are currently a large number of legislative and regulatory obstacles to FTTP Network deployments including:

- The existing Ministerial Telecommunications (Low Impact) Determination 1999. For FTTP Open Access Networks there are severe limitations on the size of equipment shelters for bellow ground installations of facilities;
- There are limited, if any, statutory rights of way over public utility corridors and lands for conduit networks dedicated for Open Access and no effective means of negotiations for access rights.

Council Planning for Greenfield land releases and development applications generally require consultation with service agencies for the orderly planning of land uses and approvals of development applications. Traditionally, for telecommunications requirements, the incumbent provider of the universal services obligation is consulted. This requirement for many local councils and state agencies prejudices new FTTP providers.

Local Authorities and Councils lack uniform laws and regulations for the determination of the strategic planning of Greenfields. At the various approval stages there is no uniform Australian Standards for FTTP deployments in Greenfields nor a process of certification by accredited Pit and Pipe Designers and Contractors.

There are rates, levies, charges and taxes that discourage the deployment of FTTP Open Access Networks; such as:
- Taxes on Head End or Gateway Exchanges / Community Communication Centres;
- Charges for access to Utility Corridors for roads, rail, power, water, gas and other services; and
- Charges for the retransmission of FTA TV within Communities serviced by FTTP Open Access Networks for copyright by any authorities (eg Screen Rights).

Recommendations

- Introduce a new Ministerial Telecommunications (Low Impact) Determination for FTTP Open Access Networks. This will permit a Community Communications Building that needs to service a FTTP open Access network to be at least $150m^2$ floor space and max 4m height.

- A Federal design guideline may also be required to assist in the assessment of the gateway exchange buildings so that all gateway exchanges are required to satisfy a strict design regime. If certified by accredited engineers, then these gateway exchanges may proceed under the Low Impact Determinations. This in turn will be required to be approved by a Federal or State authority and will provide a consistent approach to all Greenfield developments gateway exchanges.

- Statutory Rights of Way over Public Utility Corridors and Lands for Conduit or FTTP Networks dedicated for Open Access, should exist subject to the provisions of the *Telecommunications Act* and the consultation provisions with respect to Utilities under that Act.

- Mediation processes should be created to allow the ACCC to mediate agreements for access to enable FTTP deployments that cannot be settled between the parties within a reasonable timeframe.

- Local Authorities and Councils should adopt:
  o uniform laws and regulations for the determination of the strategic planning of Greenfields;
  o sensible Australian Standards for FTTP deployments in Greenfields

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including provisions relevant to the various approval stages

- o a uniform process of certification by accredited Pit and Pipe Designers and Contractors of the relevant FTTP design which if certified can proceed without further complication or requisition.

- Developers should be entitled to proceed with FTTP deployments if those minimum standards as certified by the accredited designers and contractors are achieved at each stage of the development process.

- Councils and Local Government must plan for Greenfield land releases and permit development applications that progress without there being a need to notify or procure the incumbent provider of the universal services obligation to be consulted.

- It should be sufficient for all Local Councils and State agencies to permit planning applications to proceed on the basis that any accredited FTTP provider, carrier, accredited engineer, or FTTP designer may certify that a standard phone line will be connected to each lot once approved.

- Rates or taxes on Head End or Gateway Exchanges / Community Communication Centres should be removed.

- Access charge for Public Utility Corridors for roads, rail, power, water, gas and other services should be removed.

- Retransmission Fees for FTA TV within Communities serviced by FTTP Open Access Networks (including for copyright or by any authorities (such as Screen Rights), should be addressed via alternate levy systems.

4.4.6 Improve Coordination of Government Agencies at all levels

There is currently a general lack of commitment by Government agencies and Government businesses to support community aggregation models that are required for sustainable Open Access FTTP Networks within residential and business communities. Contributing factors to this lack of commitment are:

- A general lack of knowledge about FTTP networks;
- The absence of a centralised co-ordinating office (refer section 3.2);
- A lack of co-ordination between utilities such as power, water and gas;
- Disparate Local and State Government approaches to FTTP eg.
  - o telecommunications standards for property developments
  - o provisioning and encouragement of FTTP networks in new communities
  - o conduit dedication and management where conduits are owned by them; and
  - o making available to FTTP providers useful information on the existing resources (eg spare conduits, community interest in aggregations, land for communications centres and points of inter-connect to back haul providers).
- A lack of skilled resources within agencies and departments

Based upon the historical evidence of the duration of time taken to address changes at a legislative level, it is suggested that a minimalist approach to legislative or regulatory measures is the best approach, and that the Government should be focused on alternative forms of encouragement and incentives to achieve the desired outcome.

An additional challenge for the Federal Government will be that many of the required legislative changes (such as land use, activities of other utilities and attitudes of government owned business) are within the powers of State and Local, but not Federal Government. This is despite the powers and immunities that are granted to Carriers under the *Telecommunications Act 1997*.

> **Recommendations**
> - Establish a Central Co-ordination Office (CCO) for the NBN that will assist in the co-ordination of Government Agencies in relation to FTTP (see section 3.2).
>
> - Federal Government to prepare guidelines and consult with state planning agencies, utility providers, local councils and development industry groups with respect to Federal Government's changes to telecommunications provisioning for Greenfield developments. (This would also be applicable to Brownfield developments).
>
> - Education of Local Authority and State businesses as to the NBN infrastructure and strategies for implementation and encouragement of Open Access FTTP network solutions.

5. Brownfield Deployments

5.1 Introduction

In the rollout of a National Broadband Network there will be an overlap of this network with existing serviced areas. This will raise complex issues such as which network takes priority, which network gets to use limited public infrastructure, and even how customers can be smoothly migrated to the new NBN. Given the potential for operators to either support or oppose the NBN, depending on the implications for them, this is a key topic that needs to be addressed fairly and equitably.

Due to the complexity of this topic, this report has limited the scope of the discussion to a few key areas:

- Areas with a capability of already receiving 'always on' Internet access;

- Only areas with fixed cable infrastructure will be considered. Wireless or satellite serviced areas will not be regarded as Brownfield.

The build for a FTTP solution in Brownfield environments will be regarded as a solution to provide a fibre to a *Connectorised Lead-in Joint*, allowing a later installation of an optical medium all the way to the customer. The key challenge for this design, will be the smooth migration of customers from the existing copper based telecommunication infrastructure to the new fibre optic based NBN.

One of the key concerns of the SIG has been the ongoing references to technical solutions that are only capable of 12Mbps downstream. The original submission to the minister called for a 100Mbps capable network. Appendix C[6] offers an engineering perspective as to why a FTTN network is inadequate and how DSL (or copper) based technology cannot meet the nation's future expectations of performance and functionality.

5.2 Background

Throughout the world there are a number of major FTTH deployments occurring; most notably Verizon in the United States, NTT in Japan and several CLECs in Europe. One of the misnomers created about FTTH in Australia has been the cost of deployment, with figures varying between $1,500 and $5,000 per home. At one point, previous advice to Government was that a national broadband network based on FTTH would cost somewhere between $30 and $50 billion dollars to achieve.

In Australia, there have already been two Brownfield pilot projects to determine if FTTH can be deployed in existing suburbs both from a financial and technical view point. These projects, Bright Telecommunications in Western Australia and TasColt in Tasmania, have shown the technical issues of deployment are relatively easily overcome, and it is only the financial modelling which must be carefully managed.

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[6] See "The Myth of FTTN"

The findings of both these projects were very similar with costs of approximately A$500 - $950 per home passed and A$1200 - $1300 per home connected[7]. However, the limited scale of these projects prevented them reaching financial KPI's that are being achieved overseas. The deployment costs for Verizon in the year 2007 were US$325 per home passed and US$850 per home connected including active optics and electronics and based on a 60% aerial 40% under ground split. Verizon now has some 10 million homes passed and over 1 million homes connected.

It would be reasonable to expect that a deployment of similar size could achieve figures close to that of Verizon. However, as these numbers are very rudimentary, the Verizon figures have been elevated to accommodate issues such as exchange rate variations, skilled workforce supply and demand and the rising cost of labour. Taking these issues into account, values for the cost of deployment can be reasonably estimated as follows:

No of Homes in Australia[8]	7,926,200
Housing Growth to 2010[9]	938,700
Total number of homes	8,864,900
Cost per Home Passed	$500
Total Investment	**$4,432,450,000**

Table 1 - Cost of passing homes (Government Contribution)

It is not to be expected that Government should bare the full cost of this network and that both telecommunications industry and community contribute significantly to the cost of deployment of this network.

The cost of backhaul and other facilities is estimated at approximate $1B and each connected home approximately A$950. In total this equates to:

Backhaul acquisition[10]	$600,000,000
Facilities and other items[11]	$400,000,000
Connection of Homes[12]	$4,463,477,150
Total investment	**$5,463,477,150**

Table 2 – Cost of connecting homes (Industry and community investment)

These values indicate that it is well within the Government's budget to demand any proposal received from industry to be based on FTTP.

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[7] The reason for a range of costs had to do with different accounting methods, extent of network coverage, supporting infrastructure and technology used. Full details of the breakdown and justification of these numbers can be provided upon request.

[8] 2006 Australian Bureau of Statistics.

[9] 2007 Housing Growth figures straight lined for 6 years. 2012 being the projected date for completion of the NGN rollout.

[10] Backhaul acquisition may include building new backhaul networks, utilizing existing capacity from providers such as Pipe Networks, Optus, Amcom, Silk, UEcomm et al, and leasing new capacity into regional areas on networks such as Nextgen, Silk, Reef, and OPEL.

[11] This includes items such as land acquisition, construction for community co-location facilities, capitalization of project management and other overheads.

[12] Assumes 53% take up of services based on Telstra retaining existing percentage of customer base.

It should be noted that deployment of FTTP in these Brownfield projects was based on a 60/40% split of aerial to underground fibre and did not offer any "special incentive packages". Greenfield projects typically cost more to deploy because they use underground installation methods (with conduits), install the lead-in to the home and offers of "special incentive packages" for the home owner – typically increasing the cost by approximately $1500 dollars per dwelling.

Recommendations

- The Government provides funding only for the cost of deploying open access FTTP infrastructure which passes homes within the Brownfield environment.

- The funding for connecting homes is sourced partially from the consumer (both residential and commercial) and more significantly from the network operator and/or the retail service providers.

5.3   Planning and Generic Issues & Recommendations

Costs will ultimately drive the whole deployment of the NBN and the SIG (using a model similar to that described in the two Australian case studies in Appendix B) has based and structured its recommendations based upon the following cost driver components:

1. **Planning costs and issues:** Generic issues relating throughout the deployment.

2. **Neighbourhood Distribution costs and issues:** The network around the neighbourhood that collects and transports the network traffic between the premises and backhaul points. This includes the use of existing facilities for aggregation or patching of the backhaul to the street distribution network. Some specific backhaul concerns are also addressed in this section as well as prior to this section relating to pooling of existing backhaul resources.

3. **Premises Connection costs and issues**: This includes both the connection from the home to a "connection point" to the local street distribution, and any distribution around the home.
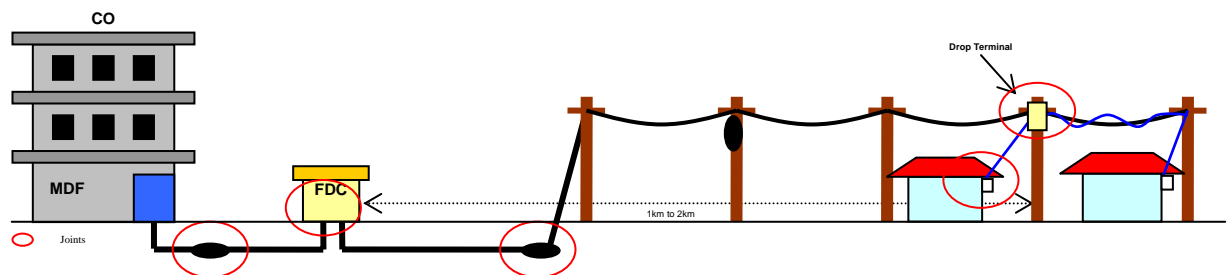
Figure 1 - Key elements of a FTTP system

5.3.1   Typical Architecture

The SIG is concerned about disparate architectures impacting the long term viability of the NBN and would therefore prefer to see that a similar national architecture is enforced. This topic is covered in more detail in section 3.1.

(Appendix B provides a high level physical architecture developed in the two Brownfield FTTP trials in Australia – Bright Telecommunications in Perth (now shutdown) and the TasColt project in Tasmania. Representatives of both projects[13] have confirmed they will assist in further developing this architecture for the NBN if called upon. The architecture could at least be utilised as a reference architecture for bidders).

Recommendations

- Common similar architectures are preferred (See also section 3.1).

- That the TasColt and Bright deployments are studied by the Expert Group preparing the RFP documents.

5.3.2   Multilayer Approach

A general global model is proposed for the basic network architecture of the NBN ie:
- IP protocol over broadband access;
- an IP/MPLS-based core network; and
- a metropolitan architecture (typically Ethernet) that supports shared bandwidth and differentiated service classes.

Ideally this multilayer approach should be planned end-to-end.

Recommendations

- Bidders will show an end-to-end multi-layer planning approach

- Bidders to provide pre-build analysis on the impact the FTTP design will have on all layers of the network including required augmentation of existing infrastructure

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[13] While the Bright project has now been shutdown, a member of the SIG has worked on the project for 5 years.

5.3.3 Overbuild

In building the NBN through existing Brownfield environments, the most significant issue is whether to overbuild or use the existing telecommunications infrastructure particularly within the distribution network.

There are a number of issues with the use of the existing infrastructure:

- The infrastructure is owned and maintained by the incumbent carrier;

- The current copper infrastructure is inadequately maintained in parts and is likely to suffer a large numbers of faults thus increasing operating costs;

- The existing copper infrastructure cannot adequately support the requirements of the National Broadband Network as defined by the Government (12Mbps symmetrical);

- There is limited access to the existing duct infrastructure[14]; and

- Current pricing for access to the existing duct infrastructure is prohibitive[15].

- It is the opinion of the SIG that any proposed network should be based on an overbuild scenario, thus bypassing the existing access network. The advantages that this strategy provides are many:

- It creates two competing networks for the delivery of services to the home. The market will therefore determine the price points which it can afford to deliver the services rather than regulated pricing from the ACCC;

- The incumbent carrier is likely to upgrade their existing network (or turn on functionality already existing within their network) at no cost to the government to ensure they remain competitive with the new network;

- Customers can be easily migrated on an individual basis to and from each network with minimal disruption of service (rather than the pillar migration specified by some consortiums);

- If both networks exist, service providers can have a choice as to which *network operator* they wish to deal with, thereby providing choice for both customer and retailer;

Recommendations

- The Government should only consider proposals based on overbuild scenarios;

- Funding should only be provided where new *distribution network* infrastructure is provided and not using existing infrastructure from the incumbent telecommunications operator.

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[14] Fibre and copper cannot be easily mixed within the same duct. In most *distribution networks* the existing conduit infrastructure is a single 50 or 100mm duct.
[15] This issue relates specifically to the cost of duct access. At $7 per metre per annum plus study, design and installation costs, it is prohibitive to use this infrastructure.

5.3.4   Identification of Existing Infrastructure

With the existence of over 25,000 shelter points and 80,000 copper junction points, existing sites need to be made available for the NBN.

A common difficulty is to determine the type and location of existing infrastructure that is already in the field. It is a concern that potential investors and planners will waste substantial effort re-inventing the wheel. This effort needs to be coordinated and distributed to bidders.

Although there are thousands of sites spread throughout metropolitan and rural Australia, they are limited in location and currently too few to address the whole country. There is a concern that an overbuild might cause an issue, and clutter existing sites. Therefore, expansion of existing sites should be granted by local councils. Power utilities should also allow for provision to expand their sites when requested. Considerations should take into account:

- **Adjunct shelters** – expansion to existing sites with minimal environmental impact.

- **Underground access** – Where needed, pit sites can substitute for above ground solutions.

- **Powering OSP sites** – Where FTTN is utilised, these sites will grow in capacity as the exchanges decentralise into the streets

- **12 core fibre minimum** – Since fibre forms the backbone to the FTTN sites, and expands with demand with FTTP, there should be no short term view taken for traffic/services capacity.

Outdoor shelter sites (nodes), should fall under the open network philosophy if they are to be part of the funding grant. Open access to these nodes can either provide full integration to 3rd party Network Operators of their equipment, or the nodes must stipulate the possibility for interfacing.

For integration into the nodes, the node provider must indicate the power and cooling characteristics, as well as the mounting dimensions with points of interconnection and termination on the distribution points. These nodes need to be dynamic to cope with changes in equipment that might be deployed within them, as they are expected to have an operational life of 10~20 years.

Open access policy also defines that the locality of these sites should be made publicly available as many Network Operators are doing now ie. Overlaying their equipment location on Google Maps.

Recommendations
- Detailed information on existing telecommunications and other infrastructure, including pipes, ducts, electrical needs to be gathered and provided to bidders.

- Similar information needs to be made available relating to possible backhaul options from communications points-of-presence in the areas.

- Council must grant ongoing access to the existing distribution sites.

5.4 Neighbourhood Distribution issues & Recommendations

5.4.1 Use of Electrical Infrastructure

The issue of overhead vs. underground is a key utility infrastructure issue. Current best estimates put the ratio of overhead to underground infrastructure to 70:30. This estimate is based upon the same overhead-to-underground ratio as the electricity grid. This is a reasonable indicator, especially given that a large proportion of this network will be utilised for the NBN.

A seventy percent overhead reticulation implies a very cost effective engineering solution right down to the customer premises if commercial and regulatory hurdles can be overcome. This is the key to a cost effective and timely rollout of the NBN.

Where overhead cable infrastructure is available, it is felt this will be the most economical method for a FTTP install. However, because the electrical utilities own most of this infrastructure, arrangements will need to be made to gain access to this infrastructure.

When a utility has to underground an overhead infrastructure, it is recommended that telecommunications conduit is installed and that the incremental cost should be met by a NBN fund.

It is not currently clear, even for the utilities themselves, if the electrical infrastructure can be utilised for anything but utility related purposes. Should this infrastructure be utilised, there needs to be a trade-off with the utility owners, and in some cases the councils who are still smarting from the previous HFC rollouts. Possible solutions include:

- Cable installed above normally reserved broadband cable space, even in some cases using the cross arm. The cable needs to be self supporting and non-conductive;

- Cable installed but then sold to utilities and leased back via IRU to the operator company;

- Utilities must also be given a bundle of dark fibres for their own use.

- The network operator to provide a separate end-to-end private circuit for smart applications (such as metering, e-Health, security). This channel needs to be isolated from all other services (particularly Internet) to ensure security of information.

Recommendations

- Access to overhead power reticulation needs to be guaranteed.

- Independent "Dark Fibre" needs to be reserved for use by the Electrical Utilities;

- Use of power reticulation infrastructure must be legislatively broadened to also include use for the NBN.

- Undergrounding work needs to include a funded telecommunications duct.

5.4.2   Telstra Cable Ducts

In general, the SIG felt that where it was not possible to install new fibre in to Telstra cable ducts to the last street distribution point. Therefore, the existing copper should *not* be mandated to be removed – hence the recommendation for a network overbuild. Conversely, the SIG felt that the existing copper network should provide intra-medium competition provided it was priced to represent a realistic cost of install and maintenance and *not priced* to undercut the NBN.

Recommendations

- Existing cable in cable ducts to the last street distribution box should be left to the owner's discretion and treated as a competing infrastructure.

- Pricing on use of the existing copper should represent fair costs to ensure no short term undermining of competition.

5.4.3   Community Co-Location Facilities

Telstra exchanges are not favoured as points of aggregation for what the SIG termed 'Community Co-Location Facilities'. One of the reasons behind this thinking is that there is a potential that the NBN could make them superfluous allowing them to be demolished. However, most backhaul routes terminate within exchanges and if competitive backhaul is required, they are natural points of aggregation.

Current agreements for use of the exchanges are limited to being a Point of Interconnect (POI), that is, any third party equipment located in the exchange must interconnect some way into the Telstra network. A service provider cannot use an exchange as a Point of Presence (POP) where they use their own network for reticulation

It is acknowledged that "relationship management and good will" will not be sufficient and real legislation/regulation will be required to allow access to infrastructure.

Recommendations

- Mandate that existing exchange buildings shall be permitted to be used as a Point of Presence without interconnection to the incumbent's network

- Access at reasonable rates to points of presence must be guaranteed;

- There must be a process in place to continue accommodation economically if the owner wishes to close an exchange. Suggestions are to offer first right of refusal to purchase or to guarantee at least any new use of the site would still guarantee use of the pits, ducts and a communications room for accommodation;

5.4.4   Other Infrastructure

There are many other techniques that can be used to provide both the backhaul and distribution networks. For example:

- In Austria, sewers are used as a cost effective mechanism for the reticulation of optical cable infrastructure.

- In The Netherlands and Scandinavia, micro trenching and blown fibre technology has provided a cost effective deployment mechanism where underground power has already been installed.

- In Australia, Optical Ground Wire (OPGW) has been used extensively for backhaul purposes on the high voltage power lines.

Depending upon the type of infrastructure in place, there are typically multiple cable technologies that can be used to take full advantage of the rights of way given to these utilities.

5.5   Premises Connection Issues & Recommendations

Given that a premises connection could potentially be the single most important cost driver, and could also be undertaken by a completely separate organisation to the one providing the neighbourhood infrastructure, premises connection issues need to be considered separately.

5.5.1   Last 10 Metres

One of the key areas to be resolved is the final connection to the premise and the ownership of the ducts to that premise. This is an extremely important and currently confusing issue in the industry. A successful solution should therefore, at least address the following installation environments:

- Single Dwelling Unit (SDU) with aerial service cables

- SDU with underground service cables

- Multi Dwelling Unit (MDU) with centralized splitting

- MDU with distributed splitting

5.5.2   Standards

As has been previously mentioned, the need for standards is imperative. A single, or at most, two or three national standards should be defined, depending on whether pre-terminated or field terminated solutions are used. These standards should cover the handoff from the curb aggregation point to the service lead to the home.

In the absence of current clear standards for the NBN, it is suggested that bidders are requested to outline their proposed physical connection methodology and that these are then judged against the following criteria:

1. **Flexibility**
   - No one solution should be predetermined and consideration should be given to the use of various access methods including aerial, underground, microtrenching, sewers, etc.
   - Any proposed solution should provide the ability to adapt to unforeseen infield challenges.

2. **Speed of deployment**
    o   The solution should be fast to deploy and not be held up by the supply of tools or finished goods. For example, NTT in Japan experienced considerable rollout problems due to tooling issues. The result was that NTT went from a limited number of costly tools shared by many, to low cost tools held by many.
    o   The solution should be as labour efficient as possible. Solutions which can be implemented with smaller crews are generally more efficient.

3. **Contractor Issues**
    o   Unskilled workers – solutions should be as robust as possible against poor installation skill levels.
    o   Tool issues – rollout must not be dependant on costly tooling or supply of parts.
    o   Network reliability – there must be a minimum of skill set for contractors. A minimum level training should be conducted. It is better to ensure build quality than to have to deal with poor quality later. Do it right first time!
    o   Ensure that a suitable competency & working environment for contractors is encouraged in order to minimizing any chance to make miss operation in the field.
    o   Reduce capital investment by contractors (eg. Use of a relatively expensive fusion splicer vs. low investment mechanical splice tool)

4. **Environmental and Aesthetic Issues**
    o   Avoid storage of excessive cable.
    o   Grounding – use of a non conductive cable (tension member) will eliminate the need for grounding.

5. **Cost Reduction**
    o   Use of low cost tooling.
    o   Use of specialised terminal closures to suit the local instalment environment.
    o   Cost of splitters > Cost of fibres
    o   Within a small geographical area with dense population, it is better to have centralised splitting and vice versa
    o   Connector types/splices with compatible cables (fusion vs. mechanical vs. connectorised)

Recommendation

•   Standards for the connection and hand off from the neighbourhood network to the customer service lead need to be developed. This could be a single standard encompassing either pre-terminated cable or field terminated cable.

5.5.3   Service Demarcation Point

With all Gas, Water and Electricity services today, the service demarcation point is at the customer side of the meter. This meter may be located at the fence, or to an extreme location within the building itself. With FTTP, the Network Operator Service Demarcation point should be the connection point for the End User device, in this case this being the ONU or ONT customer

interfaces. The ONU/ONT could be mounted on the outside of the home, or even in an internal desktop device.

Recommendations

- Any current ducting or leads used for service leads is to be unambiguously declared the property of the landowner, with the landowner having the right to (only) utilise that ducting for Telecommunications purposes as they sees fit – this could involve the removal of the existing cable if insufficient space was available for a new service cable.

- Compensation for use of this duct where clearly installed by Telstra must be considered.

5.5.4   Access from the street to the Service Demarcation Point ONU/ONT

The street to the ONU connection is the responsibility of the network operator which is then selected by the service provider as selected by the End User (landlord or home owner). This connection is at the cost of building and maintenance by the selected network operator, even if the End User provides ducted access. If the network operator uses the provided duct, they must maintain it.

In maintaining the philosophy of open access, if the end user chooses to change service provider, the existing network operator must make full access to the duct, at a reasonable cost, where it has been installed and paid for by the incumbent network operator to a replacement network operator.

Recommendations

- Any current ducting or leads used for service leads is to be unambiguously declared the property of the landowner, with the landowner having the right to (only) utilise that ducting for Telecommunications purposes as they sees fit – this could involve the removal of the existing cable if insufficient space was available for a new service cable.

- Compensation for use of this duct where clearly installed by Telstra Ltd must be considered.

- The street to customer premises service lead should be the responsibility of selected network operator who may recoup costs from End User via other means.

- Once a duct has been used, and unless there is an alternative agreement in place with the duct owner, the network operator utilising the duct is responsible to maintain it;

- Multiple overbuild of service leads to be discouraged

6.   Access Seeker Requirements

The following section provides a representative view of a range of telecommunication's providers, ISP's and content and service providers who will make use of the infrastructure that is built for the NBN.

6.1   Introduction and Background

The Government's pre-election policy stated that building a national broadband network is a major and historic step and one that is critical for Australia's future economic prosperity.

Critically, the network's construction is not only an historic step, but a major and historic opportunity to set in place an access and regulatory regime that will secure the future growth, innovation and competition in the information, communication and telecommunications sector.

The Government's pre-election policy, New Directions for Communications – Building a National Broadband Network, correctly identifies the relative parlous position of Australia's access to broadband.

It also correctly identifies the benefits of a more extensive and comprehensive broadband availability. In doing so, it highlights that the lack infrastructure investment has left many Australians with no access to fixed line broadband.

While this in part is true, the level of access to high-speed broadband and expansion of the Australian ICT industry has also been driven by the lack of genuine open access to the current infrastructure.

Notably, where genuine open access is available, either due to competition or enforced by determinations of the Australian Competition and Consumer Commission (ACCC), many Australians have access to broadband at higher speeds than proposed by the Government's National Broadband Network policy.

Some larger ISPs can provide ADSL2+ to more than 90 percent of metropolitan Australians as a result of its own infrastructure investment in exchanges and competitive access to other existing infrastructure.

In considering the implementation of the National Broadband Network, the Government and its advisers must recognise and consider this important fact: "many Australians have been left with no access to fixed line broadband" not just because of a lack of infrastructure investment, but also because of a lack of genuine open access to existing infrastructure and a regulatory regime that promotes, encourages and protects competition.

In this context, the Government's commitment to "construct a genuinely open access national fibre to the node network and put in place regulatory reforms necessary to facilitate such an investment" is welcomed. It must be noted that the Government's preference should be for a fibre-to-the_premise (FTTP) network rather than a fibre-to-the-node.

Additionally, the Government's commitment that a pre-requisite for all proposals made under the policy must provide genuine open access to bottleneck fibre infrastructure is also welcomed.

As noted in the pre-election policy, genuine open access must require equivalence of access charges and full scope for access seekers to differentiate their product offerings by allowing the customisation of access speeds, quality of services and contention ratios.

Further, the recent High Court judgement in Telstra Corporation v The Commonwealth (6 March 2008) reinforces the critical importance of setting in place a statutory access regime in advance of

awarding any consortium the rights to build the National Broadband Network. That statutory access regime must be directed at expressly "promoting … competition in the telecommunications industry generally and among other carriers" and seeks to achieve this goal by "giving each carrier the right … to obtain access to the services supplied by other carriers".

The future access and regulatory regime will be a key determinant of the ability of the Federal Government to successfully implement its election policy and deliver on its commitment to put "Australian back into the fast lane of the information super-highway."

The following submission is designed to provide the Government's Expert Panel with specific and critical factors for its consideration as it develops the Request for Proposals documentation related to the National Broadband Network.

It based on the extensive experience of investing in, and delivering, high-speed broadband to hundreds of thousands of Australians with existing and new infrastructure and under the current access and regulatory regime.

6.2 Executive Summary

The opportunity to provide input to the Government's plan to move to a next generation telecommunications network is an opportunity to address some of the shortcomings inherent in the existing regulatory regime.

The general principles that need to be applied to the regulatory improvements are those that have been in place for some time and expressed by government policy:

- Promoting competition;

- The long term interests of the end user.

Additionally, these improvements should address obvious deficiencies in the powers provided to the regulatory authorities pursuing these principles. These include:

- The establishment of reasonable access terms;

- Broadening the scope and improving the efficiency of arbitration processes;

- Reducing the ability of parties to 'game' regulatory processes;

- Eliminating conflicts of interest between commercial interests and regulatory compliance.

Getting the regulatory settings right will ensure consumer interests are promoted and the benefits of competition are realised in months rather than decades

Getting the regulatory settings wrong at this significant opportunity will lead to a reduction in competition and a return to higher prices, less choice and reduced prduct innovation.
Deployment of a new telecommunications infrastructure provides a unique opportunity to achieve a true open access regime, unsuccessfully pursued by Australian Governments since 1991.
Getting the access framework right, so that markets can operate efficiently is the key. Failing to address the known deficiencies while changing the architecture of the network platforms will destroy the competitive gains achieved to date.

This is an opportunity to not only fine tune existing regulatory settings, but also consider innovative approaches to service delivery. With multiple providers and any-to-any connectivity comes an ability to create competitive tensions on a geographic basis.
Discrete State, Regional or Metropolitan licences could be considered in addition to a full National solution. This geographic approach is already a matter of fact on a global scale and is not technically constrained. Considering new models to create additional competitive tension also has

the potential to develop niche markets. The current national approach was conceived at a time when telephony network constraints were an over-riding consideraation. The changed nature of telecommunications featuring IP based networks combined with Peering providers should encourage alternative approaches.

6.3   Access Seeker Requirements

By definition, these requirements relate to the wholesale layer of service provision. That is, they describe the broad requirements for improvements in the relationships between the rights and obligations of the network owner/operator (Access provider) and those organisations purchasing access (Access Seekers). This access being purchased to services and or facilities for the creation and eventual sale of retail products and services to end users.

They do not relate to the sale of retail products and services to end users.

They focus on the requirements for an orderly and managed migration from the current generation network (CGN) to a next generation network (NGN).

6.4   Next Generation Network Frameworks

6.4.1   Regulatory Framework

The existing regulatory regime has a number of shortcomings which are easily identified by parties wishing to 'game' the regime. This has resulted in, for example nine years of dispute over the cost of the ULL declared service, with no conclusion in sight for even the most basic commercial term – the price.

This has limited progress in the deployment of ULL services and presents a hurdle to investment for competitive entrants. Investors see the uncertainty of the regime, the inability of the regulator to conclude the process and the blocking power of the network owner as significant barriers to enter into the market.

These shortcomings militate against Government competition policy.

Recommendation

- All parties must have incentives to conclude negotiations quickly and reasonably priced, efficient access provision must be pursued as an attractive commercial proposition by the access provider (rather than a regulatory obligation). This is best achieved by removing the conflict of interest between access provider obligations and retail commercial imperatives. Structural separation of the access provider from a retail business unit is essential.

6.5   Conflicts of Interest Resolution

The existing network owner is seriously conflicted. It is required to by law to provide network access to its retail competitors. It is also required by law to maximise the return to its shareholders.
It is expected to do this in the long term interests of all end users (not just its own customers).

It views these obligations as mutually exclusive and is forced to choose between the two. It is unreasonable to expect a listed corporate entity to put the interests of its competitors, the broader industry or government policy ahead of its fiduciary obligations to its shareholders.

The letter of the current law is loose and provides many opportunities to avoid efficient access provision or policy compliance. Conflicts of interest cannot be resolved by notions of good behaviour or the expectation of good will between commercial opponents. Accounting separation and operational separation requirements do nothing to address the conflict of interest issue; in fact they may be seen to highlight the conflict by reporting the differences.

Recommendation

- Structural separation between the access provider and any and all access seekers will resolve this conflict of interest. A network owner or operator who is prohibited from retailing services to end users and licensed to sell only wholesale access will be incited by the commercial success of that wholesale provision, not by retail market share.

6.6　Price Setting

There are no current price setting arrangements in place. Instead, parties are expected to negotiate commercially. If negotiations break down, the ACCC has the power to arbitrate, those determinations being binding, but only on the parties to the dispute. Any other parties wishing to obtain the same result must negotiate/arbitrate separately and serially. Binding arbitrations between parties A and B have no flow-on to an identical dispute between parties A and C or B and C.

The current 'Negotiate – arbitrate' process is dysfunctional. It is based on the premise that two parties (Access Provider and Access Seeker) will negotiate in good faith to come to a commercial settlement for the provision of services.

Negotiation requires two parties. If one of the parties disagrees with the concept of providing access to its competitors, there is no incentive to participate in discussions on the terms of that access.

The 'arbitrate' step is designed to be a fall-back position in the event that parties cannot agree on an aspect being negotiated. In the current environment, no negotiation takes place, so the arbitration step is employed as an unsatisfactory substitute for a bilateral talks. The Arbitration process, as it stands, is subject to ACT and ADJR oversight. Given the starting point is that one party does not want to be in negotiations to start with, the arbitrations are taken to their maximum time-frames and then appealed.

The ACCC website listing current Access Disputes shows 32 disputes notified to the ACCC for arbitration and unresolved at 26 March. Telstra is a party to all those listed. There are only 17 Disputes *published* on their website by the ACCC as having reached a determination.

As an example of the time required to reach a conclusion using the negotiate / arbitrate method, we can use the Chime Vs Telstra LSS dispute[16] to illustrate the time frames.

Negotiations commenced with Telstra in the middle of 2003, at which point Telstra's 'rack rate' for LSS was $13.00/month. After failed negotiations and a lengthy arbitration process, a Final Determination was handed down by the ACCC in 2007 which expired on December 31 of that year.

This means that even when a dispute is 'finalised', it's not.
A 2nd LSS Dispute was notified by Chime in November 07 and is ongoing.

Timeline (Aug-02 to Mar-08 and beyond):

- Aug-02: ACCC issues pricing principles for LSS
- Jul-03: Negotiations with Telstra commence on LSS price of $13/mth
- Jul-04 – Jul-06: Various offers made to Telstra to settle at $9.00 / $7.50 / $5.00 / $4.50 / $3.50
- Nov-05: 1st LSS Dispute Notified
- Jan-06: Dispute amended
- Feb-06: Aust Competition Tribunal reinforces ACCC approach
- Jul-06: 1st Interim determination
- Dec-06: 2nd Interim Determination — $3.20
- Feb-07: Procedural matters raised
- Mar-07: Submissions on procedure
- Apr-07: Draft Final provided
- May-07: Procedural matters resolved
- May-07: Submissions on Draft Final
- Jun-07: Submissions on Draft Final
- Jun-07: Submissions on Draft Final
- Jul-07: 1st Dispute Final Determination issued — $2.50
- Aug-07: LSS Declaration extended to July 09
- Nov-07: 2nd LSS Dispute notified
- Dec-07: 1st Dispute Final Determination expires
- Dec-07: Negotiations with Telstra fail
- Jan-08: 2nd Dispute 1st Interim determination — $2.50
- Mar-08: 2nd Dispute Final

The ULLS was initially declared in 1999. In 2008, approaching the 10th anniversary of ULLS declaration, there is still no resolution to the price that should be charged for this regulated product.

The current process is therefore clearly not a suitable method for establishing prices in a dynamic market with hundreds of participants.

Recommendation

- In the event that the negotiate / arbitrate model is to continue, the minimum change required would be for a single arbitration to automatically be applied to all similar arbitrations brought during the life of the determination. An arbitration determination would, therefore, have the power of price setting for the industry at large.

- This concept should be broadened to cover any determination relating to a dispute on access provision as price is not the only basis for dispute or in need of arbitration.

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[16] Chime/Telstra LSS final determination - ACCC published reasons August 07.

6.7   Access Terms

The current wholesale DSL environment in Australia provides end-user services at a variety of speeds, usually without any form of Service Level Agreement and an aggregation or backhaul service which is billed separately and with various terms and conditions attached. Artificial constraints are applied to line speeds, average throughput, and backhaul configuration.

ISPs operating their own networks do not have these constraints applied externally. These are decision that may choose to make as it fits their business model.

Recommendation

- Access seekers must have the ability to operate the services delivered over the NGN as if they were their provided over their own networks. Limits on throughput, line speeds (both up and down), contention ratios, and any other network characteristics must be at the discretion of the access seeker.

6.8   Aggregation

The cost of aggregation should be embedded in the end user access price paid by access seekers.

The NGN should be capable of allowing access seekers to use the full line speed of each and every end user. This means that the aggregation network must be non-blocking and un-contended.

The minister has set a minimum bandwidth for each end user of 12 megabits. This should also apply to the aggregation network and there must be at sufficient capacity from each Node per end user back to the point of interconnection with the access seekers.

Unbundled aggregation has been one of the major commercial drivers encouraging Internet providers to deploy competitive DSLAM networks in Australia.

The cost of providing the backhaul service from a DSLAM to a service provider's network is largely fixed at the cost of obtaining dark fibre from the DSLAM site. The actual capacity of a single core of dark fibre already exceeds the total downstream capacity of a rack of VDSL2, let alone ADSL2+ DSLAMs, so the cost of operating the backhaul is essentially fixed.

To put this in commercial terms, the operating expense per megabit for backhaul of metro area DSLAMs is around $5 per megabit or about one twentieth the cost of Telstra's current wholesale charge. This cost will only go DOWN on a per megabit basis as demand increases because the operating cost is fixed, regardless of capacity used.

Recommendations

- Embedding the cost of aggregation into the end user access price for access seekers is the simplest way of ensuring that:

- Access seekers can offer the same retail prices for regional and rural users

- True broadband applications are affordable on the network

6.9   End User Access

Access costs are not that variable. The price an access seeker pays should ideally be fixed. (Usage costs in Australia may vary according to where data is sourced, but access is by and large fixed).

We have the situation today where competitive service providers running their own DSLAM infrastructure are able to offer a wide variety of data services from their DSLAM to their end users.

They can offer a variety of data speeds (depending on copper loop length):

- ADSL 1: 1Mbps/8Mbps

- ADSL 2: 1Mbps/12Mbps

- ADSL 2+: 1Mbps/24Mbps

- ADSL 2+ Annex M: 2.5Mbps/24Mbps

They can offer a variety of services

- PSTN over analogue, direct connected telephony

- PSTN over ATM via the DSLAM

- Voice over IP via the DSLAM

- Voice over IP via the Internet service

- Access to private IP data networks

- Access to private ATM data networks

- Access to multicast IP for delivering audio, video and data

- And even plain old Internet service

They can do this with no real incremental cost of backhaul or access ports because this is already in place. If one service is provided, any or all services can be provided as long as bandwidth is available on the copper pair from the DSLAM to the end-user.

Recommendation

- Any NGN must provide access seekers with a platform capable of the above AND MORE at a cost the same or less than current costs to provide these services.

6.10   Access versus Resale

In the current Australian regime (and in other jurisdictions), the concept of a 'ladder of investment' encourages new entrants to previously monopoly markets. It suggests that a new entrant can enter a market with limited investment, gain some market share and then expand that market share by targeted investment in infrastructure (which offers efficiencies and improved profitability), proceeding, over time, to a point where the new entrant has comparable infrastructure to the incumbent.

In the telecommunications market, this has been illustrated by new entrants investing initially in sales and marketing (call centres, billing systems, CRM, etc) and re-selling fully developed retail products and services purchased form others.

A next step has included the installation of voice switches, transmission systems and interconnection facilities. Later, data switches, DSLAMs, and access networks have been deployed (see below).

The introduction of a monopoly NGN platform brings to an end most of this investment ladder and leaves only those on the top rung with a path for investment.

The 'Ladder of Investment'
From simple 'Services Based' to Full 'Facilities Based' competition

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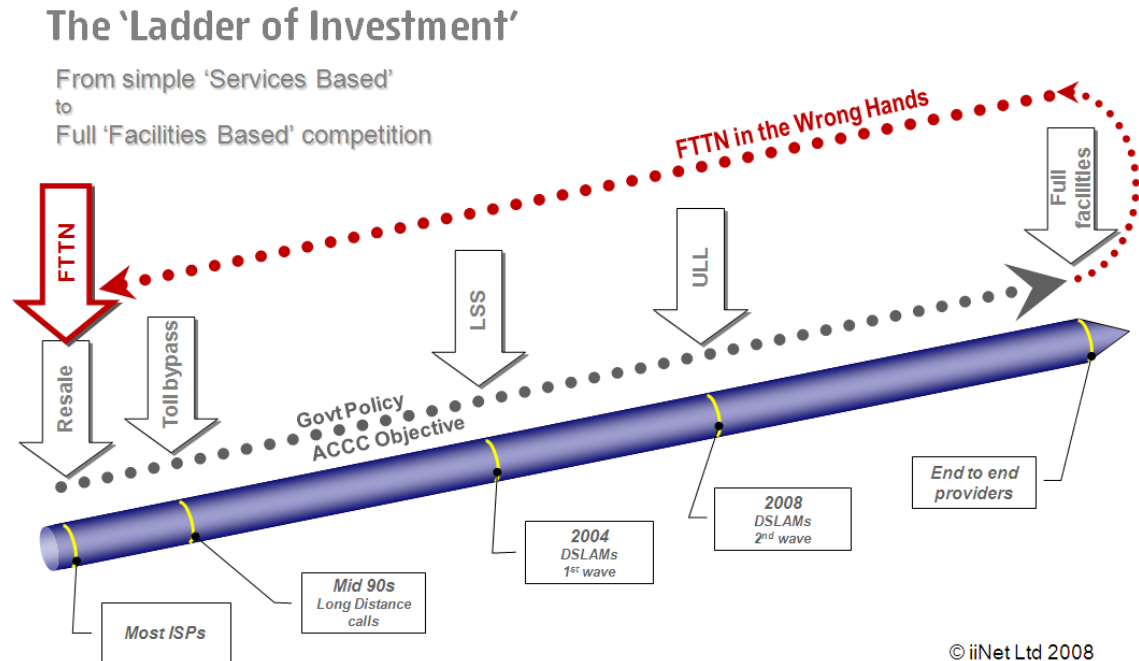
Recommendations

- Opportunities for competitive investment in the NGN must not be excluded.

- Legitimate infrastructure owners must be either compensated for stranded assets; or Allowed to retire the assets in line with reasonable investment returns or product life-cycles;

6.11   Unbundled Services

Customers of some Service providers (who do not currently force a bundle of telephony and Internet) will be forced to change providers as they find themselves having to choose a new provider. Under the new regime, they could be obliged to take both components from the same provider. Retailers will recognise this and will be able to force customers to pay more for the bundle than the customers currently pay for the sum of the parts, because there will be less competition.

Further, forced bundling of non-regulated services may exclude end users from accessing Pay TV entirely, if they choose a competitive service provider. This is the case in France in 2008.

Recommendations

The NGN framework must allow:

- Delivery of multiple streams (PVCs or VLANs) of service to each end user

- Delivery of services by multiple service providers to each end user

- Delivery of multicast IP and/or ATM to each end user

- Delivery of a basic standard telephone service (STS) access to each end user

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Each of these services must be able to be connected to different service providers. End users must be able to choose between providers for each service.

The ultimate driver for these connections must be the end user who must have the right to freely choose a service provider as is the case today.

6.12   Transition period CGN to NGN

6.12.1 Network Operators

Under the current regulatory regime, in line with the 'Ladder of Investment' concept and synchronised with government policy, many investors have developed infrastructure at great cost of both time and resources.

Recommendation

- Transitions from CGN to NGN must be possible without significant outages or compulsion;

- A no-disadvantage test must be satisfied prior to services being migrated to NGN (E.g. telephone numbering remains the same; service performance and price must be equal to or better than the service being replaced);

- Interconnection between CGN and NGN must be developed to allow a continuation of any-to-any connectivity.

6.12.2 End-users

In addition the principles above, end users are particularly vulnerable to sweeping technology changes which have the potential to render their own current hardware investment worthless. Hundreds of millions of dollars have been invested by end users on ADSL Customer Premises

Equipment (CPE) in the last two years alone. Business users must be allowed to continue to depreciate this equipment for years to come.

Recommendation

- A guiding principle for an NGN must be:

- End users must be able to use existing ADSL CPE for at least five years from the commencement of an NGN; or

- The NGN builder must replace and configure the ADSL CPE of an end user acquired within five years before the commencement of an NGN such that the end user can achieve a transition from CGN to NGN without outages.

6.12.3 Exemptions

Consideration must be given to end users who are currently serviced by technology other than ADSL over copper pairs. Numerous end users are currently serviced by dial modems on PSTN or ISDN. Other users are in estates serviced by Fibre to the Home from a variety of carriers, often with no access to Telstra copper or competitive services. Many rural users receive Internet service via wireless using proprietary protocols, WiMax or 3G.

These customers must not find themselves casualties of a hasty deployment of an NGN

(Note: This is not meant to be a complete list).

Recommendation

- Technical and commercial provisions for exemptions from forced migrations to the NGN must be incorporated in specifications.

6.13   Commercial Framework

6.13.1   Unbundling Provisions

Functionally equivalent services (to that available pre-NGN) must be available to access seekers, in particular the maintenance of choice for unbundling of services. Economies of scale and innovation are not mutually supportive. Simple re-sale of services permits no product innovation, other than by the access provider who is remote from the end-user.

Current arrangements allow unbundling at a number of points of access. New arrangements must not reduce these opportunities to add value for consumers or the development of new products and services overlooked or decided against by an access provider.

Forced bundles of telephony, Internet and Pay TV do not fit the existing ladder of investment and do not reflect the current competitive landscape. There is no natural requirement to force the bundling of different classes of service in an NGN and neither is there any natural requirement to block access to certain classes of service. In particular, excluding competitive access providers

from providing telephony or Pay TV would be a significant reduction in competitive opportunity since these are services which current infrastructure operators are able to deliver via their own equipment over ULL copper pairs today.

Recommendation

An NGN must support:

- Delivery of multiple streams (PVCs or VLANs) of service to each end user

- Delivery of services by multiple service providers to each end user

- Delivery of multicast IP and/or ATM to each end user

- Delivery of a basic STS access to each end user

Each of these services must be able to be connected to different service providers. End users must be able to choose between providers for each service.

The ultimate driver for these connections must be the end user who must have the right to freely choose a service provider as is the case today.

6.13.2 Transparent Ts & Cs

Transparency in the provision of (what will effectively be) monopoly access services is essential to reduce disputes and provide for accountability. It assists in driving down costs and encourages access seekers to develop innovative products on the platform.

There are two types of barrier in the current environment and they would naturally be transferred into an NGN world if the Ts &Cs remain unchecked. Financial barriers include Access Seekers being forced to wear disproportionate commercial risk in the form of unnecessary security deposits, onerous payment and trading terms and a loss of commercial security over their own customers.

Additionally, the instability of service brought about by the Access Provider retaining the right and capability to withdraw wholesale service from access seekers with minimal notice, leaving access seekers without recourse or the ability to provide alternative services for their end users.

Recommendation

- Access terms and conditions must be submitted to the regulator in the form of access undertakings, they must be transparent, comprehensive, complete and available for publication.

6.13.3 Dispute Resolution

Dispute resolution is a point of failure in the current regime.

Recommendation

- Any access dispute brought by any access seeker should be accepted by the regulator as an industry dispute. Any outcome of arbitration by the regulator should be applied to all participants seeking or providing access under the NGN.

- This should not be limited to price. Where an access undertaking omits terms or conditions required for effective negotiation, the regulator should identify the omissions and facilitate either a negotiated outcome with a fixed timeframe of six months or provide a binding determination itself.

6.13.4 Product Definitions

The debate about FTTx has been conducted within very limited parameters. The FTTx by definition has the potential to de-commission the existing copper customer access network that delivers a range of products and services other than broadband.

The NGN must allow the continuation of, or the migration to, functionally equivalent services currently used by customers in residential, business, corporate and government markets for a range of services such as secure ATMs, corporate data networks, Eftpos terminals, credit card authorisation, PABX networks, trading networks and so on.

Customers have systems and equipment installed with specific interface standards that may not be compatible with an NGN. An NGN then, has the potential to strand the investments of millions of customers, not just access seekers.

Recommendation

- Any new network infrastructure must allow the continuation of existing communications products and services as well provide for managed migrations, when and if required.

6.13.5 No Disadvantage Test

Services currently provided on the CGN are provided under a range of terms and conditions, developed over time.

Recommendation

- The NGN must be required to offer terms and conditions at no disadvantage to consumers over those applying to any services being replaced.

6.13.6 Residential

Above all, residential users are price sensitive. They buy the service they can afford and simple observation of cars on the road demonstrates that there is a wide spectrum of affordability.

There remains a large group of Internet users in Australia who for reasons of affordability, access or frequent relocation access the Internet via dialup modems. Testing with various FTTx technologies has shown that dialup modems are not necessarily compatible with the network.

Regardless of the Minister's goal of 12 megabits access speed in each direction, ISPs will doubtless seek the ability to implement some limits in order to protect their networks from large quantities of peer to peer (P2P) traffic.

Recommendations

- Consideration must be given to how people will access the Internet in an NGN world.
  (Commercial models in other countries (such as Germany) where end users pay a fee to the access network provider and then acquire Internet services from one of the many service providers available on the access network. Such models allow end users to obtain access to their service provider, even when they move house, without any interruption. This style of commercial access is unlikely to be proposed by a network builder who also intends providing retail service over the network but could easily be mandated by Government as a condition of building the network.)

- This must be under the control of individual access seekers.

6.13.7 Business

Small business users do not limit themselves to the telephone or broadband access. Eftpos and other transaction systems must be maintained under the NGN with no additional cost to business users. Any other services such as alarm and other remote monitoring systems which are dependant on CGN infrastructure must be guaranteed continuity.

Health providers must be able to maintain the provision of emergency call services and other independent living aids for the aged, infirm and disabled.

Recommendation

- Service continuity must be maintained.

6.13.8 Corporate & Government

Larger commercial networks bring together end users from around the entire planet into complex, blended networks. Access to the network is frequently provided in homes and the premises of contractors, vendors, customers and service providers. These networks are usually private and secure.

Recommendation

- This ability must be maintained and under the control of individual access seekers.

6.13.9 Law Enforcement

Service providers are currently obliged to provide interfaces for lawful interception.

Recommendation

- All provisions for lawful interception must be maintained.

6.14   Operational Framework

6.14.1 Customer Transfers

Customers must be able to choose providers or service types and be able to switch without penalty.

Under the current network arrangements, there is no consistency of transfer arrangements between infrastructure or service types. Number portability arrangements vary as does platform portability.

Some existing transfer arrangements are non-existent and customer transfers between providers or even different access arrangement with the same provider may be accompanied by enforced outages which create barriers to switching. Some customer transfer processes are voluntary and some are not.

Recommendation

- A fully automated and compulsory customer transfer regime must be put in place in order to provide customer choice and drive competition. This transfer regime must incorporate CGN to NGN transfers as well as provider to provider transfers.

6.14.2 Infrastructure Builds and Deployment

The current access regime allows the network owner to dictate the pace that competitive services are deployed. Restrictive work practises are the norm and infrastructure deployment and interconnection is progressed, delayed or blocked without negotiation and at the whim of the dominant access provider.

There is no third party auditing, no justification for unilateral decisions and no appeal.

There is no incentive for any other approach by the incumbent.

Recommendation

- Structural separation between the network owner or operator and any retail business entity must be a pre-requisite condition.

6.14.3 Facilities Access

The current access arrangements to exchanges and other facilities are not transparent and are unbalanced in favour of the incumbent.

The access points and points of interconnect under the proposed NGN are not clear.

Any facilities access arrangements under NGN need to be transparent, fair and equitable for all parties.

Recommendation

- Structural separation between the network owner or operator and any retail business entity must be a pre-requisite condition.

6.15   Conclusions to Access Seekers Recommendations

Structural Separation between access provider and access seekers must be the starting point for the provision of an NGN that will outlast any government putting it in place

Dispute resolution should be streamlined and strengthened

Price setting powers should be incorporated into dispute resolution.

Customer transfer processes are essential and should include service provider to service provider as well as CGN to NGN

No Disadvantage test should preserve existing services and terms including -

- Security for aged and infirm

- Maintenance of service types

- Price performance

- Bundling choices

Transitional arrangements are essential -

- Interconnection with CGN must be available

- Compensation for stranded assets must be incorporated for all existing asset owners

- Should not be enforced prior to five years from the commencement of NGN services in a given location.

Innovative licensing arrangements should be considered in addition to a single national network. This could include geographic network deployments servicing State, regional or metropolitan areas.

7.   Conclusion

As evidenced in this paper, the practicalities surrounding the implementation of a National Broadband Network in both Greenfield and Brownfield environments are complex and challenging. Whilst the vision is clear for a fibre based next generation telecommunications infrastructure, there are a number of realties that will need to be addressed to ensure a successful outcome for Australia.

The following 12 key principles underlie many of the recommendations included in this report:

1.   To promote end to end **open access principles**.
2.   To **focus funding only towards open access networks**.
3.   To **support the use of FTTP technology** as the preferred solution for both Greenfield and Brownfield environments.
4.   To **promote industry wide incentives** in preference to complex legislative changes wherever possible.
5.   To **reduce anti competitive behaviour** in the establishment of the NBN.
6.   To establish a **common national architecture** to ensure a nationwide compatible solution.
7.   To **support co-operation between utilities**.
8.   To establish **Statutory Rights of Way over Public Utility Corridors** for open access networks.
9.   To **promote consistency between Government agencies** that can benefit from the NBN.
10.   To **establish a central co-ordination office** to facilitate collaboration, communication and education in the FTTP industry.
11.   To promote **industry competition** for services.
12.   To support the **long term interests of the end users** of the NBN.

The FTTP SIG urges the Panel of Experts to carefully consider these key principles when reviewing proposals for Australia's National Broadband Network. These principles are based upon a considerable amount of industry knowledge and first hand experience gained in Australia and Internationally.

By developing a new National Broadband Network that adheres to these principles, it is believed that the resulting telecommunications infrastructure will provide an unprecedented opportunity for Australia to establish itself as a world leader in communications, as well as to provide an ability to support a wide range of other government initiatives including e-health, e-education, e-government and sustainability.

FTTP Special Interest Group
March 2008

Appendix A – Terms and Definitions

Access Seeker - an organisation that requires services on a network controlled by a third party (e.g. Network Operator).

BPON - defined as Broadband Passive Optical Network in ITU-T G.983.

Branch Network - is defined as the feeder portion of the Optical Distribution Network between the OLT and the Local Convergence Point.

Brownfield is defined as land which has existing residential or business tenancies serviced by telecommunications infrastructure.

Business - refers to large (corporate), medium, and small (Small Business, Small Office Home Office) business users. Businesses may occupy **"MTU"** (multi-tenanted units such as office blocks/towers) or **"STU"** (single-tenanted units such as a stand-alone office building or warehouse).

Circuit switched - refers to the method by which a communication frame is carried over a network that has pre established (and typically fixed bandwidth) circuits between nodes and terminals resulting in a fixed delay.

Connectorised Lead-in Joint - (CLJ) is IP67 (or higher) rated closure which houses the fibre, connectors and various splice management elements. Sometimes also called a Network Access Point (NAP), although technically not correct as a NAP typically does not have any joint or splicing capability.

Distribution Network - is defined as the first mile (or last mile) access portion of the Optical Distribution Network between the Local Convergence Point and the ONT located at the home. Sometimes referred to as the Access Network.

Drop Cable - is defined as the portion of the Optical Distribution Network that exists between the CLJ and the ONT. A drop cable is typically a hardened pre-connectorised variable length of Optical Fibre Cable.

EP2P - defined as Ethernet over P2P 100baseFX, 100baseLX, 100baseBX, 1000baseLX and 1000baseBX in IEEE 802.3ah

EPON - defined as Ethernet Passive Optical Network 1000basePX in IEEE802.3ah (Note that the expression Gigabit EPON or GEPON is synonymous with EPON.)

Exclusive Access - refers to the situation where a single retail service provider has exclusive use of the FTTH network.

Fibre-to-the-Building (FTTB) **-** is defined as a telecommunications architecture in which a communications path is provided over optical fibre cables extending from the telecommunications operator's switching equipment to (at least) the boundary of the private property enclosing the home or business of the subscriber or set of subscribers, but where the optical fibre terminates before reaching the home living space or business office space and where the access path continues to the subscriber over a physical medium other than optical fibre (for example copper loops within the building).

Fibre-to-the-Home (FTTH) **-** is defined as a telecommunications architecture in which a communications path is provided over optical fibre cables extending from the telecommunications operator's switching equipment to (at least) the boundary of the home living space.

Fibre-to-the-Node (FTTN) – A fibre to a communications node, typically a street cabinet incorporating electronics, with the final access being provided via intermediary electronics by other stepping stone technology such as wireless, VDSL2, Powerline etc.

Fibre-to-the-Premises (FTTP) **-** is more frequently defined as a telecommunications architecture in which a communications path is provided over optical fibre cables extending from the telecommunications operator's switching equipment to (at least) the boundary of the home living space or business office space. In the context of this document FTTP can mean Fibre to the Home or Fibre to the Building irrespective of the type of residence (residential or business).

GPON - defined as Gigabit Passive Optical Network in ITU-T G.984

Greenfield - is defined as a new land development which has no existing residential or business tenancies and is not serviced by any telecommunications infrastructure. Typically this is a broad acre style of development.

Homes/Premises Connected - is the number of residential and business premises to which an operator is supplying FTTH access under a commercial contract.

Homes/Premises Passed - is the number of residential and business premises to which an operator can currently deliver FTTH access within the operator's standard service activation period (for example 30 days) should the owners/occupiers sign a contract for an access service. Typically new service activation will require the installation and/or connection of a drop cable from the street or basement to the home or office, and the installation of subscriber premises equipment.

Internet - refers to use of the Public Internet for exchanging email, web-browsing, etc.

Local Convergence Point (LCP) - is defined as the point in the Optical Distribution Network where the convergence or aggregation of the various Distribution Networks into the Branch or Feeder cable.

Network Boundary Point - as defined in AS S009:2006 it is the point which is deemed to be the boundary of a carrier's telecommunications network for determining whether cabling or equipment is 'customer cabling' or 'customer equipment' for the purpose of technical regulation under Part 21 of the *Telecommunications Act 1997* (the *Act)*.

Network Operator - the organisation that will provide the maintenance, control and administration of the **Open Access Network.** The Network Operator will sell access to the network to a Retail Operator on a wholesale basis. The Network Operator does not and should be prevented from ever providing retail service. It may also be the owner of the network infrastructure.

Network Termination Device - as defined in AS S009:2006 it is a device meeting the carrier's requirements that is provided by the carrier to establish a demarcation point between the carrier's telecommunications network and customer cabling or customer equipment.

Open Access (Duct) - refers to the situation where multiple retail or wholesale service providers may share the use of a duct network covering a substantial region by drawing or blowing their fibre cables through the shared ducts, and compete to offer their services.

Open Access (Fibre) - refers to the situation where multiple retail or wholesale service providers may use the FTTH Network by connecting at a physical layer ("dark" fibre) interface and compete to offer their services.

Open Access (Packet) - refers to the situation where multiple retail service providers may use the FTTH Network by connecting at a packet layer interface and compete to offer their services to end users. Generally in this document reference to Open Access is by this means.

Open Access (Wavelength) - refers to the situation where multiple retail or wholesale service providers may use the FTTH Network by connecting at a wavelength layer interface and compete to offer their services

Optical Distribution Network (ODN) - is the fibre optical cable plant that runs from the central office equipment (e.g. OLT) through to the customer premises.

Optical Line Terminal (OLT) - IEEE/ITU definition for the optical equipment which converts electrical pulses into light pulses located at the central office.

Optical Network Terminal (ONT) **-** ITU definition for the optical equipment terminating the ODN located at the customer premise. It converts light pulses from the fiber optic line to electrical pulses.

Optical Network Unit (ONU) - IEEE definition for the optical equipment terminating the ODN located at the customer premise. It converts light pulses from the fiber optic line to electrical pulses.

Outside Plant (OSP) - is defined as the "Pit and Pipe" infrastructure in which cables will be installed

Packet Switched - refers to the method in which *packets* (discrete blocks of data) are *routed* between *nodes* over data links shared with other traffic. In each network node, packets are queued or buffered, resulting in variable delay.

Passive Optical Network (PON) - is a more common name for a Point-to-Multipoint cable plant, but specifically one which does not use any active equipment within the branching paths.

Point-to-Multipoint (P2MP) - cable plant provides branching optical paths from the telecommunications operators switching equipment to more than one contiguous location such that portions of the optical paths are shared by traffic to and from multiple locations. In generic terms this is a tree topology.

Point-to-Point (P2P) - cable plant provides optical paths from the telecommunications operator's switching equipment to a single contiguous location such that the optical paths are dedicated to traffic to and from this single location. In generic terms this is a star topology.

Residential - refers to private users in their homes. Residential users may live in **MDU** multi-dwelling units such as apartments/condominiums or **SFU** single family dwelling units such as stand-alone houses/villas/landed property.

Retail Operator - an organisation that acquires access on a wholesale from the Network Operator and packages a set of products and services and makes them available to third parties (customers).

Take-up Rate or **Take Rate -** for a network is calculated by the simple division of "Home/Premises Connected" by "Home/Premises Passed", and is expressed as a percentage.

Trunk Network or Backhaul - is the portion of a network that operates between the Community Co-location facilities (e.g. Exchange) and the main backbone network or data centre.

Video - refers to the exchange of visual material by use of **IP, RF** (carried via a separate optical wavelength) or **Other** encoding and transport protocols. (This category does not include Video carried over the Public Internet.)

Voice - refers to the exchange of human conversations by use of either **packet switched** or **circuit switched** mechanisms. It does not include Voice carried over the Public Internet such as Skype.

Appendix B – Deployment References

Concept Diagram
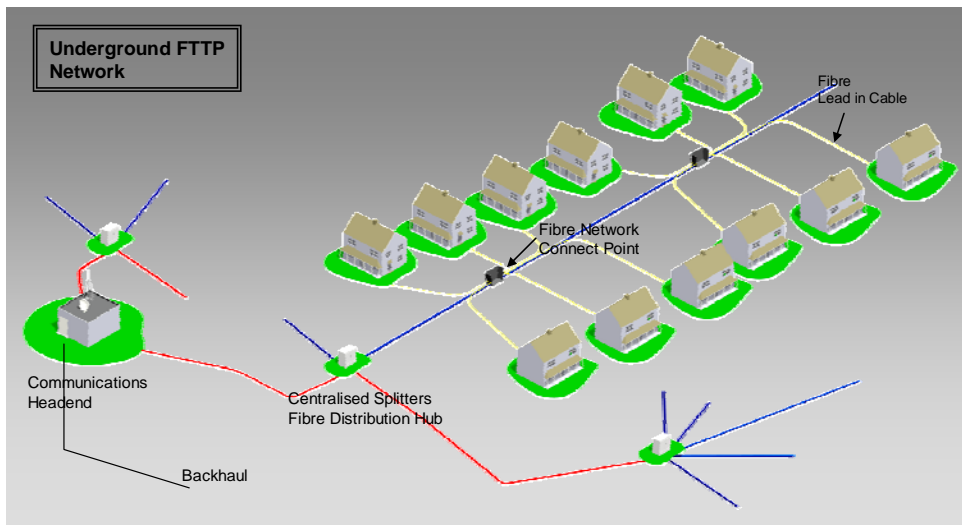
Figure 1 – A typical centralised splitter underground network suitable for Greenfield and Brownfield deployments. (Source: ADC)

Brownfield & Greenfield Deployment Images

Figure 2 – Brownfield Centralised Splitter and Distribution Cabinets – FDH (Source: ADC)

Figure 3 – Greenfields FDH Cabinets (Source: ADC)

Figure 4 – Fibre Distribution Hub Pole Mount (Source: ADC)

Figure 5 – A typical FTTP ONT installation. At BES in WA (Source: Opticomm)

Figure 6 –Head End Equipment installed at BES in WA (Source: Opticomm)

Figure 7 – Photo of an ONT. Over 4,000 of these units are already deployed in Australia (Source: Opticomm)

Case Study - TasCOLT (Tasmania)

Description
The Tasmanian Collaborative Optical Leading Test-bed (TasCOLT) is a world-class commercial brown field Fibre-To-The-Premises (FTTP) project designed to inform the Tasmanian Government and its partners on the business case for the deployment and operation of ultra broadband services to households, businesses and institutions in Tasmania.

Technology & Deployment
The project utilises Ethernet Passive Optical Network (ePON) technology deployed using a pre-terminated, pre-spliced optical fibre cable product. TasCOLT has been deployed aerially using infrastructure owned and operated by Tasmania's power utility Aurora Energy. The network is comprised of three demographically different footprints each linking back via trunk cables to a multi media capable Head end located in Hobart.

Each footprint is serviced by a single Point of Presence (PoP). Feeder cables extend out from the PoP to optical splitters which then link up to 32 customer's premises using distribution cable. The distribution cables are pre-fitted with optical connectors. A drop cable then extends from the connector to each property attached along the electrical drop cable to conceal it from view, ensuring low visual impact. The drop cable is terminated internally on to an Optical Network Unit where a customer requests service (see figure 8). This pre-terminated approach was chosen to avoid the costly impact of faulty infield cable joints and splices and to support the chosen phased connection model which included:

Figure 8 - Typical Aerial Deployment used in TasCOLT and Bright

This pre-terminated approach was chosen to avoid the costly impact of faulty infield cable joints and splices and to support the chosen phased connection model which included:
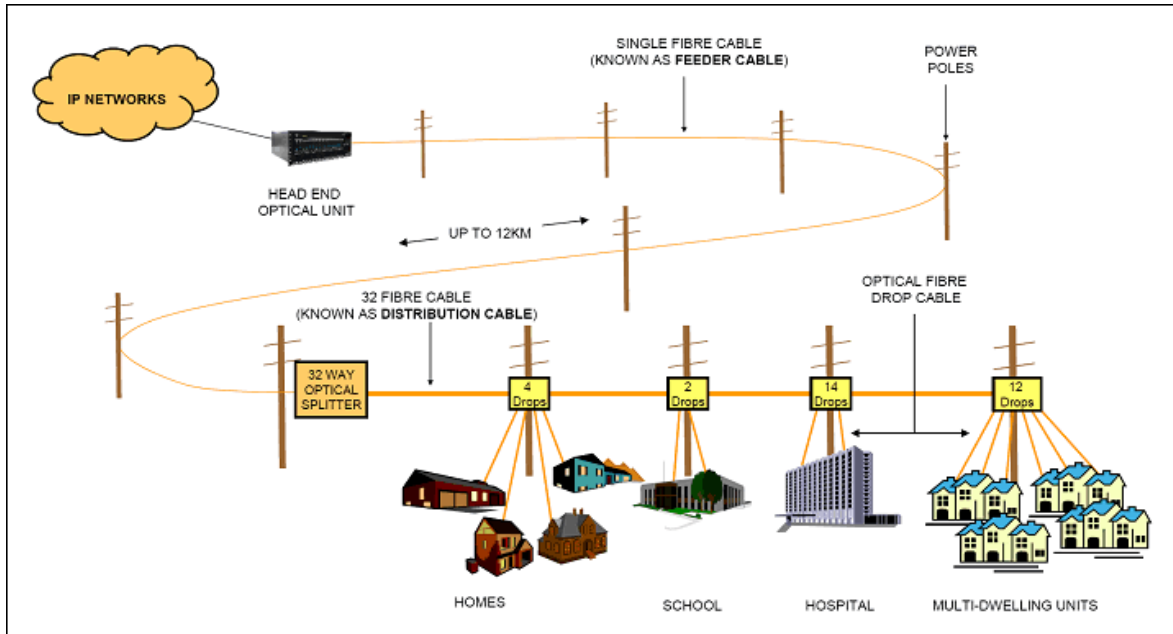
- **Stage one** - distribution cable deployed down each street.
- **Stage two** - a drop cable extended to each property facia subject to landlord approval and request for service; and
- **Stage three** – internally installed network termination point once service contract entered into.

Major Lessons Learnt

The TasCOLT project involved a complex technology deployment rarely undertaken in Australia previously. It was initially believed that the design and deployment of the test bed could be completed within six months. Due to a number of unforseen factors this blew out to almost two years. Early delays were caused due to the need to obtain local government approvals for the aerial cable deployment. This also included a need for an environmental impact study and approvals from the Tasmanian Heritage Council.

Further delays emerged during the time taken to work out the integration of the optical fibre cable system with Aurora Energy's existing electrical distribution infrastructure. This included:

- Compliance with Occupational Health and Safety standards;
- Australian engineering standards;
- possible reconfiguration of existing poles and cabling; and
- possible replacement of some poles and existing cabling.

Availability and affordability of skilled installation contractors also contributed significantly to delay the final completion date of the network. An important factor in mitigating the impact of these delays and keeping the project on course was the role of the project oversight committee. This group remained *independent* of the day to day project management.

Towards completion of the network build, further delays were experienced during the process of seeking approval from landlords to connect a drop cable to each property. Installation crews were only deployed to areas of each footprint once a sufficient number of approvals had been received. This proved a major hurdle to a timely and efficient implementation process. For a national rollout it would be recommended that service leads are only installed on demand.

Business Case

Initial estimates suggested that the construction cost of the network would amount to approximately AU$1,800 per property passed based on a full scale deployment model. Due to significant cost reductions in a number of network components and efficiencies achieved through lessons learnt during deployment it is estimated that this figure is now likely to be around AU$1,000. These figures are based on the three stage installation approach outlined above. Cost to undertake a stage one deployment (property passed) is lower again. During this time PON technology has also improved to be capable of supporting higher speeds and increased distribution concentrations.

Case Study: Bright Telecommunications (Western Australia)

Description

Bright Telecommunications was a wholly owned subsidiary of Western Power Corporation, that was formed for the purpose of constructing a high-performance, optical fibre customer access network in Perth, Western Australia. Bright progressed through a series of pilot projects to the point at which it had constructed or acquired a significant asset base, and had been successful in offering high-speed Internet, telephony and entertainment video services on a commercial basis to approximately 300 residential and business customers.

Much of the asset base included a conduit network which passed some 26,000 homes that was laid in conjunction with the undergrounding of the power system in particular suburbs. This conduit system is still in existence today the majority of which is not used because it is reticulated through residential areas.

The full scale commercial rollout of FTTP by Bright Telecommunications was stopped in 2004 due to political pressure brought about by the disaggregation of Western Power and a series of state wide power supply problems which highlighted the lack of investment and maintenance of the electricity infrastructure. The "back to basis" edict resulted in Bright ceasing its commercial operations and entering a maintenance mode until it was sold to Silk Telecom in 2006 (including the conduit assets). Silk subsequently terminated the residential pilot customers in December 2007 because it was unable to effectively support the dwindling residential customer base.

Technology & Deployment

The project originally started be utilising FTTN and FTTC technology the same as that deployed by TransACT. However in early 2002 it was decided that a fully FTTP network would have a lower cost of deployment and later that year the first Australian FTTH network was deployed.

It utilised Gigabit Ethernet Passive Optical Network (GEPON) technology deployed using a variety of underground and aerial infrastructure. It utilised both blown fibre and traditional loose tube cable construction as at that point in time pre-connectorised technology did not exist.

The network was comprised of three demographically different footprints (Burswood, South Perth and Como) each of approximately 600 homes, linking back via trunk cables to a multi media capable Point of Presence in the Perth CBD. Feeder cables extend out from the PoP to a two staged cascaded optical splitters (1x8 followed by 1x4) which then link up to 32 customer's premises using distribution cable.

Business Case

Initial cost of construction including the installation of the underground conduit and lead-in amounted to approximately AU$850 per property passed, and $2200 per home connected. Bright was a very early adopter of FTTH (world wide) and the cost of customer premises equipment (the ONT) in 2003 was in excess of $1500. Due to significant cost reductions in a number of network elements brought about by the large scale rollouts in Japan and the United States the next stage of rollout (had it proceeded in 2004) was costed at A$450 per home passed and $1800 per home connected (this still included some $400 for the lead-in and $1200 for the ONT).

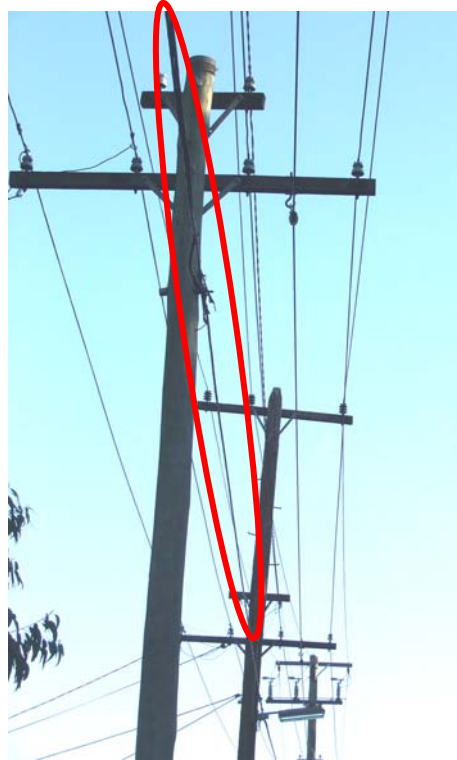**Figure 9** - Low Impact Aerial Deployment (ADSS Zone)

Figure 10 - Low Impact Aerial Deployment (lashed to neutral conductor)

Figure 11 – Example of vertical inlaid Fibre using micro-trenching technique (Source: Teraspan Networks)

Appendix C – The Myth of FttN

By Stephen Davies – Titan ICT

Significant debate has occurred in Australia over the past 2 years regarding the deployment of a Next Generation Network based on Fibre to the Node technology.

In 2003, the Broadband Advisory Group reported that the creation of a ubiquitous "True Broadband Network" would deliver $12-30billion growth in GDP[17]. The definition used for a True Broadband network is one that can deliver a Symmetrical 10Mbps. Why Symmetrical? Because it is the upstream capacity that provides the benefits even our common Internet applications need today. However applications which provide more value to the community that demand the high upstream capabilities include teleworking, video conferencing, e-Health, and Education to mention only a few.

The Myth of FTTN is the belief that it can deliver ubiquitous 12Mbps symmetrical capacity as demanded by the Government in their National Broadband Network policy. Existing FTTN proposals cannot deliver on these Government requirements. Certainly this statement may be seen as contentious but the engineering evidence can certainly back this up.

Today the Annex M extension to ADSL2+ can provide up to 24Mbps in the downstream, but this is significantly dependant on the quality of the copper and distance from the node. However the upstream is limited to a maximum of 3Mbps over short distances, however typical loop lengths see the speed more in the 1.5 – 2Mbps range. Even the new VDSL2 technology – frequently quoted as delivering 100Mbps over copper – cannot deliver symmetrical 12Mbps over the existing copper infrastructure using FTTN.

Previous proposals lodged last year with the former Government where based on the installation of nodes ensuring every home is within a maximum of 1500 metres of Fibre. At this range VDSL2 offers a maximum of 25Mbps downstream and 5Mbps upstream using 24AWG cable. However the current copper deployed within the existing telecommunication network is at best 26AWG and frequently the smaller 28AWG.

We also know there are many bad joints and bridge taps in the aging plant which cause high attenuation, thus reducing the speed even more. These speeds are also based on transmitting at full power. Discussion within the Communication Alliance working group on VDSL2 deployment has suggested lowering transmit power levels at Nodes to lessen the impact of mid-span crosstalk.

The following graph from the DSL forum shows both the downstream and upstream performance of VDSL2. At full power (US 24) using 24AWG cable, VDSL2 can deliver 12Mbps upstream at a maximum distance of 750 metres. Cable based on 26AWG reduces the distance to approximately 600 metres, and 450 metres for 28AWG. These are the best possible distance with minimal attenuation losses caused through bad or corroding joints.

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[17] National Office of Information Economy, 2003, "Australia's Broadband Connectivity", *The Broadband Advisory Group's report to Government,* Australia, ACT

When taking all these issues into account, it will be highly improbable for a FTTN network to meet the 12Mbps Symmetrical speed requirement set by the Government. The only way to get the speeds higher (particularly the upstream) is to push the nodes closer (within 300-500m) to the home and/or to replace the copper. This means more nodes, more cost and more problems (both technical and environmental).
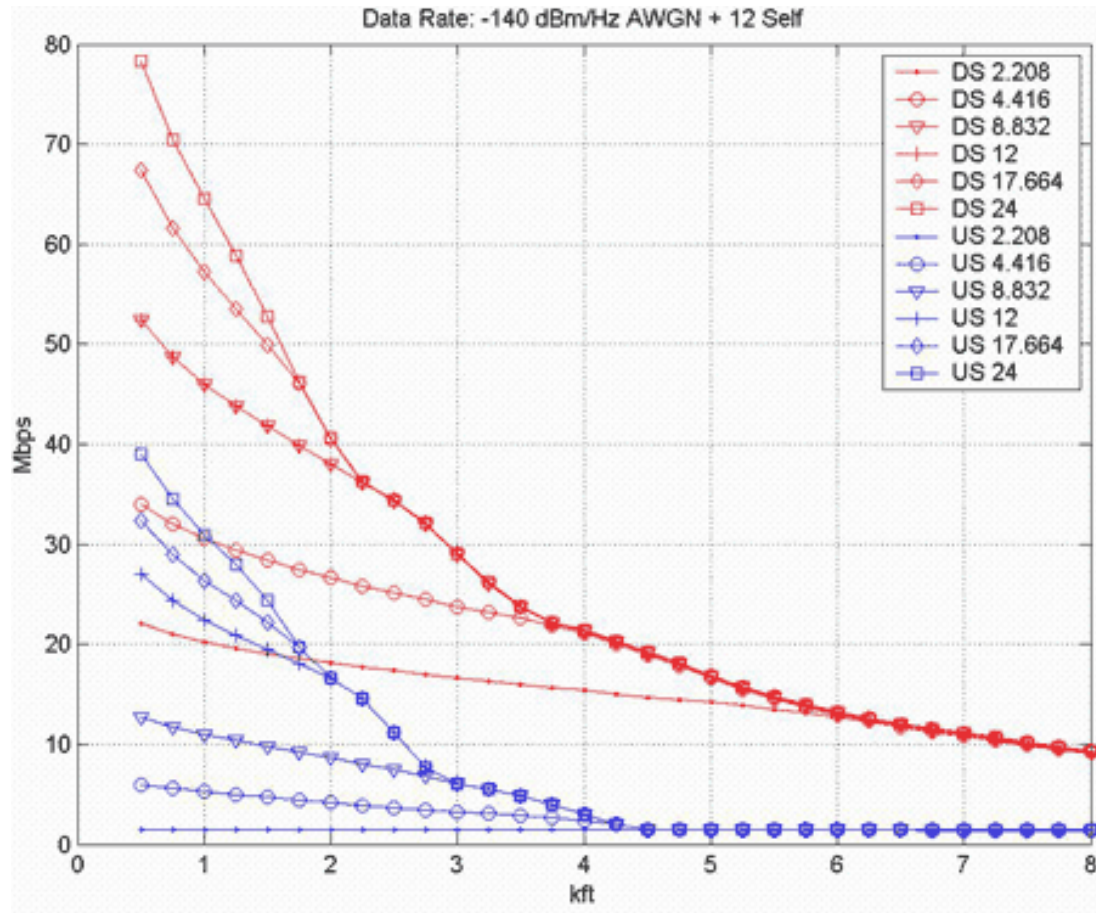
Furthermore while 12Mbps today may be sufficient to meet the immediate demand, the introduction of even a basic application such as IPTV will drive bandwidth demands to greater than 40Mbps. A typical HD television stream is about 14-16Mbps[18], and if we run multiple channels at the same time (i.e. watch one – record one), we could easily be streaming 25-35Mbps of TV alone.

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[18] Channels 7, 9 and 10 all transmit their High definition channels within a range of 14-16Mbps.

Appendix D – Australian FTTH Communities

Information provided by Stephen Davies, TitanICT.

Estate/Location	State	Lots	Passed	Connected	Developer	Provider	Technology	Type	Status	URL
Applewood Lifestyle Village	Vic	400	400	400		Private	EPON		Active	http://www.applewood.com.au
Ashley Park	VIC	650	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	-
Aurora	VIC	8000		100	VicUrban	Arise	PtP		Active	http://www.auroraliving.com.au
Austin Cove	WA	2500	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au
Banksia Grove	WA	3700	180	0	Walker Corp	Service Elements	EPON	Closed	Active	http://www.banksiagrove.net.au
Bayonet Head	WA	2600	0	0	Heath Development	Telstra	GPON	Closed	Proposed	http://www.heathdevelopment.com/pages/projects/oyster-harbour-albany.php
Beach Ridge	WA	1000	0	0	Ardross	Telstra	GPON	Closed	Proposed	http://www.ardross.com/beachridge.htm
Belswan Village	WA	190	15	15	Pindan	Private	EPON	Closed	Active	http://www.belswan.com.au/
Bingara Gorge	NSW	1165	0	0	Delfin	Telstra	GPON	Closed	Proposed	http://www.bingaragorge.com.au
Bluestone	SA	835	0	0	Walker Corp	Telstra	GPON	Closed	Proposed	http://www.bluestonemtbarker.com.au/
Bluewater	QLD	500	0	0	Multiplex	Telstra	GPON	Closed	Proposed	http://www.bluewaterliving.com.au
Boonaroo Views	QLD	32	0	0	Tralee	Telstra	GPON	Closed	Proposed	http://www.boonarooviews.com.au
Brighton	WA	6000	6000	1000	Satterley	BES	EPON	Open	Active	http://www.satterley.com.au/go/residential-estates/brighton-estate/community-development
Brighton - The Green	WA	4000	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au/go/residential-estates/brighton-estate/community-development
Jindalee Beachside	WA	450	-	-	Satterley	BES	EPON	Open	Active	http://www.satterley.com.au
Broadwater Park	WA	125	-	-	IronBridge	Telstra	BPON	Closed	Active	http://www.broadwaterpark.com.au/
Brookwater	QLD	-	-	40	Medallist	Telstra	BPON	Closed	Active	http://www.brookwater.com.au
Burns Beach	WA	1500	-	-	Peet and Co	BES	EPON	Open	Active	http://www.burnsbeachestate.com.au
Burswood	WA	600	600	1	Brownfield	Bright	EPON		Shutdown	-
Byford Central	WA	740	0	0	Arbitrage	Telstra	GPON	Closed	Proposed	http://www.byfordcentral.com.au/
Canopys Edge	QLD	300	0	0	K and V Enterprises	Telstra	GPON	Closed	Proposed	http://www.canopysedge.com.au
Captial Hill	WA	100	0	0	Gondiniland	Telstra	GPON	Closed	Proposed	http://www.kalbarrivision.com/default.aspx?MenuID=39
Cascade Gardens	QLD	600	0	0	Quarterback Group	Telstra	GPON	Closed	Proposed	http://www.cascadegardensresidential.com.au/
Cascades on Clyde	VIC	1004	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	http://www.cascadesonclyde.com.au

Estate/Location	State	Lots	Passed	Connected	Developer	Provider	Technology	Type	Status	URL
Centrus	QLD	-	0	0	M2	Telstra	GPON	Closed	Proposed	http://www.centrus.com.au/
Champion Lakes	WA	700	0	0	Landcorp	Telstra	GPON	Closed	Proposed	http://www.landcorp.com.au
Chancellors Park	QLD	?	?	?	Jopadoo	Telstra	GPON	Closed	Proposed	-
Como	WA	300	300	0	Brownfield	Bright	EPON		Shutdown	-
Coomera Waters	QLD	2500		1300	Austcorp	Pivit	EPON	Closed	Active	http://www.coomerawaters.com.au/
Cornells Hill	VIC	222	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	http://www.cornellshill.com.au
Dalyellup	WA	10000	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au/go/residential-estates/dalyellup-beach
East Ridge Park	VIC	-	690	-	KFT Investments	Telstra	GPON	Closed	Proposed	-
EcoVillage	QLD	150	70	70	Land Matters	Private	EPON	Closed	Active	http://www.theecovillage.com.au/
Ellenbrook	WA	10000	0	0	LWP	Telstra	GPON	Closed	Proposed	http://www.ellenbrook.net
Emerald Lakes	QLD	1600	-	-	Nifsan	Telstra	BPON	Closed	Active	http://emeraldlakes.com.au/
Eynesbury	VIC	2900	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	http://www.eynesbury.com.au
Fair Water Gardens	NSW		0	0	Clarendon Residential	Telstra	GPON	Closed	Proposed	http://www.fairwatergardens.com.au
Fern Bay	NSW	950	-	-	Aspen	Ikusi	CPON	Closed	Active	http://www.fernbay.net
Fernbrooke	QLD	1100	180	40	UrbanPacific	Opticomm	EPON	Open	Active	http://www.fernbrooke.com.au/
Forde Estate	ACT	1000	-	-	CIC	TransACT	GPON	Open	Active	http://www.ciclimited.com.au/
Gainsborough Greens	QLD	1900	0	0	Mirvac	-	Unknown		Proposed	http://www.gainsboroughgreens.com.au/
Genesis	QLD	700	-	-	Heritage Pacific	Telstra	BPON	Closed	Active	http://www.genesiscoomera.com.au
Gladstone Estate	QLD	-	0	0		Telstra	GPON	Closed	Proposed	-
Gracefield Living	NZ	218	-	-		Pacific.Net	EPON	Closed	Active	http://www.gracefieldliving.co.nz/
Harrington Grove	NSW	-	0	0	Dandaloo	Telstra	GPON	Closed	Proposed	http://www.harringtonpark.com.au
Heritage Park	WA	630	0	0	Rockingham Park	BES	GPON	Open	Proposed	http://www.heritageparkestate.com.au/
Heron Park	WA	600	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au/go/residential-estates/heron-park
Highbury Park	QLD	-	0	0	Scottsdale	Telstra	GPON	Closed	Proposed	http://www.highburypark.com
Hindmarsh Island Marina	SA	150	0	0	Kabro	Telstra	GPON	Closed	Proposed	http://www.tmhi.com.au/
Huka Falls	NZ	-	-	-	Kensington Properties	Private	PtP		Active	http://hukafallsresort.co.nz/
Huntington Downs	QLD	300	0	0	Hatia	Telstra	GPON	Closed	Proposed	http://www.huntington.com.au
Ibis Gardens	WA	150	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au/go/residential-estates/ibis-gardens
Kaiuma Park	NZ	280	-	-	Peter Yealands	Pacific.Net	EPON	Closed	Active	http://www.kaiumaparkestate.co.nz/
Kelvin Grove	QLD	1000	-	-	QLD Housing	Pivit	EPON	Closed	Active	http://www.kgurbanvillage.com.au/

Estate/Location	State	Lots	Passed	Connected	Developer	Provider	Technology	Type	Status	URL
Kensington Park	NZ	850	60	60	Kensington Properties	Private	PtP		Active	http://www.kensingtonpark.co.nz/
Keppel Bay	QLD	200	0	0	Young Land Co	Telstra	GPON	Closed	Proposed	http://www.keppelbay.com.au
Lakewood Shores	WA	2500	125	30		Geomedia	EPON	Closed	Active	http://www.lakewoodshores.com.au/
Laurimar	VIC	2300	-	-	Delfin	Telstra	GPON	Closed	Active	http://www.delfinlaurimar.com.au
Lochiel Park	SA	120	0	0	LMC	Opticomm	EPON	Open	Proposed	http://www.lochielpark.com.au
Lyons	NT	600	0	0	CIC	Telstra	GPON	Closed	Proposed	http://www.ciclimited.com.au/
Magenta shores	NSW	-	-	-	Mirvac	Private	CPON	Closed	Active	http://www.magentashores.com.au/
Main Drive Kew	VIC	380	75	75	Walker Corp	Telstra	BPON	Closed	Active	http://www.kewinfo.com.au
Martha Cove	VIC	1150	200	200	City Pacific	Telstra	BPON	Closed	Active	http://www.marthacove.com.au
Mission Heights	NZ	450	-	-	Fletcher Residential	TelecomNZ	BPON	Closed	Active	http://www.newhome.co.nz
Moore Park Estate	NSW	-	0	0	Tamworth Land Co.	Telstra	GPON	Closed	Proposed	-
Mt Cotton Village	QLD	677	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	http://www.villawood.com.au
MyVista Village	WA	80	80	0		Private	EPON	Closed	Active	http://www.myvista.com.au
Narnu Waters	SA	1000	0	0	Plancom	Telstra	GPON	Closed	Proposed	-
Northgate	SA	2000	120	0	LMC	Opticomm	EPON	Open	Proposed	http://www.ciclimited.com.au/
Ocean Heights	WA	1000	0	0	Satterley	BES	EPON	Open	Proposed	http://www.satterley.com.au/go/residential-estates/ocean-heights
Pacific Harbour	QLD	200	0	0	QM Properties	Telstra	GPON	Closed	Proposed	http://www.pacificharbour.com.au
Pegasus Town	NZ	2000	-	-	Infinity Investment Group	TelstraClear	Unknown	Closed	Active	http://www.pegasustown.com
Perennial	QLD	69	-	-	Austbuild	Telstra			Proposed	http://www.ausbuild.com.au
Pioneer Valley	QLD	300	0	0	Hatia	Telstra	GPON	Closed	Proposed	http://hpcorporation.com/projects.html
Plantation Plams	QLD	600	0	0	Xcel	Telstra	GPON	Closed	Proposed	http://www.plantationpalms.com.au
Port Geographe	WA	1200	0	0	Hanson	Telstra	GPON	Closed	Proposed	http://www.portgeographe.net/
Price Henry	NSW	700	-	3	Landcom	Pivit	EPON	Open	Active	http://www.princehenry.com.au/
Provence	WA	2000	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au/go/residential-estates/provence
Rapids Landing	WA	600	0	0	Lester Group	Telstra	GPON	Closed	Proposed	http://www.rapidslanding.com.au/
Riverside Ridge	QLD	300	0	0	Glen Alpine	Telstra	GPON	Closed	Proposed	http://www.riversideridge.com.au
Riverstone Crossing	QLD	718	0	0	Stockland	Telstra	GPON	Closed	Proposed	http://www.stockland.com.au
Sanctuary Cove	QLD	800	-	-	Mulpha	Pivit	EPON	Closed	Active	http://www.sanctuarycove.com/
Sanctuary Lakes	VIC	2500	-	-		ClubLinks	PtP	Closed	Active	http://www.linksliving.com.au
Sandhurst Golf Estate	VIC	1850	-	-		ClubLinks	PtP	Closed	Active	http://www.linksliving.com.au

Estate/Location	State	Lots	Passed	Connected	Developer	Provider	Technology	Type	Status	URL
Smithfield Village	QLD	-	0	0	Satterley	Telstra	GPON	Closed	Proposed	http://www.satterley.com.au
Solis	TAS	-	0	0		Telstra	GPON	Closed	Proposed	http://www.solistas.com.au
Somerley	WA	2200	2200	2000	UrbanPacific	BES	EPON	Open	Active	http://www.somerly.com.au/
South Perth	WA	1000	600	0	Brownfield	Bright	EPON		Shutdown	-
Springhill	NSW	-	0	0	Regional Developments	Telstra	GPON	Closed	Proposed	http://www.springhilltamworth.com.au/
St Andrews	WA	10000	0	0	Toyku Corporation	Telstra	GPON	Closed	Proposed	http://www.standrewsproject.com.au
Stonesfields	NZ	3000	-	-	Landco	TelecomNZ	BPON	Closed	Active	http://www.stonefields.co.nz
Tannum Waters	QLD	2000	0	0	Reward Developments	Telstra	GPON	Closed	Proposed	http://www.tannumwaters.com.au
Tascolt Davenport	TAS	-	-	-	Brownfield	TasTel	EPON	Open	Active	http://www.tascolt.com.au
Tascolt New Town	TAS	-	-	-	Brownfield	TasTel	EPON	Open	Active	http://www.tascolt.com.au
Tascolt South Hobart	TAS	-	-	-	Brownfield	TasTel	EPON	Open	Active	http://www.tascolt.com.au
Tea Gardens Grange	NSW	-	-	-	Crighton	Private	EPON	Open	Active	http://www.teagardensgrange.com.au
Tea Gardens Hermitage	NSW	220	-	-	Crighton	Private	EPON	Open	Active	http://www.thehermitage.com.au/
The Boulevard	QLD	372	0	0	CEC Group	Private	EPON	Open	Proposed	http://www.theboulevardecairns.com.au/
The Chase	WA	200	-	-	Peet and Co	BES	EPON	Open	Active	http://www.thechasebaldivis.com.au
The Glades	WA	3500	0	0	LWP	Telstra	GPON	Closed	Proposed	http://www.beyondtheplan.com.au/en/WA-Metro/TheGlades/
The New Rouse Hill	NSW	1800	0	0	Delfin	Telstra	GPON	Closed	Proposed	http://www.thenewrousehill.com.au/
The Observatory	QLD	600	-	-	Stockland	Telstra	BPON	Closed	Active	http://www.theobservatory-estate.com/
The Reef	WA	444	-	-	Zebra Properties	BES	EPON	Open	Active	http://www.thereef.net.au
The Tuarts	WA	750	0	0	IronBridge	Telstra	GPON	Closed	Proposed	http://www.thetuarts.com/
The Vale	WA	4500	1500	1500	Multiplex	BES	EPON	Open	Active	http://www.multiplexliving.biz/page.asp?PartID=3802&depth=4
THIS	QLD	-	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	http://www.modaproject.com.au/
Tuart Ridge	WA	630	-	-	Satterley	BES	EPON	Open	Active	http://www.satterley.com.au/go/residential-estates/tuart-ridge
Valley Lake	VIC	600	-	-	VicUrban	Arise	PtP	Closed	Active	http://www.valleylake.com.au
Varsity Lakes	QLD	-	-	-	Delfin	Silver Telecom	PtP	Open	Active	http://www.varsitylakes.com.au/
Vasse Newtown	WA	2000	0	0	Hanson	Telstra	GPON	Closed	Proposed	http://www.vassenewtown.com.au
Wakefield Waters	SA	2700	0	0	Plancom	Telstra	GPON	Closed	Proposed	http://www.wakefieldwaters.com.au/
Windmill Hill Estate	NSW	970	0	0	Marloelle	Telstra	GPON	Closed	Proposed	http://www.windmillhill.com.au/
Wollert	VIC	-	0	0	MFS Diversified	Telstra	GPON	Closed	Proposed	
Yarrabilba	QLD	19000	0	0	Delfin	TBA	Unknown	Open	Proposed	http://www.yarrabilba.com/

FTTH Communities by State

States				
	Communities	**Lots**	**Passed**	**Connected**
WA	36	78,489	1,1600	4,546
QLD	33	36,518	250	1,450
VIC	14	21,956	1,365	775
SA	6	6,805	120	0
NSW	12	5,805	0	3
TAS	4	0	0	0
NT	1	600	0	0
ACT	1	1,000	0	0
NZ	7	6,798	60	60
Total	**114**	**157,971**	**13,395**	**6,834**
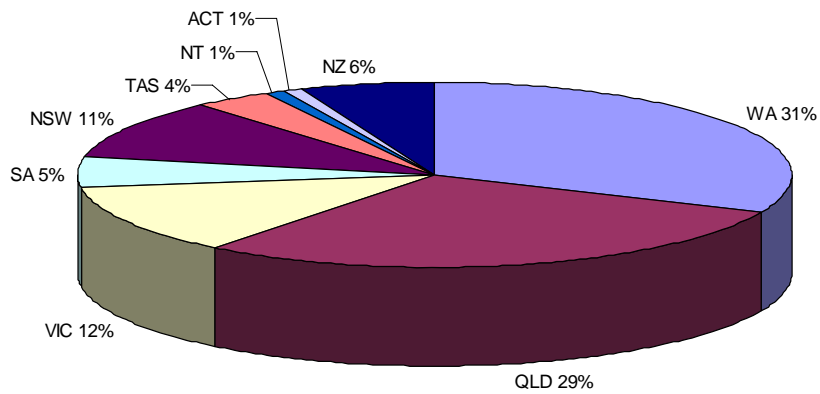
Percentage of FTTH Communities by State
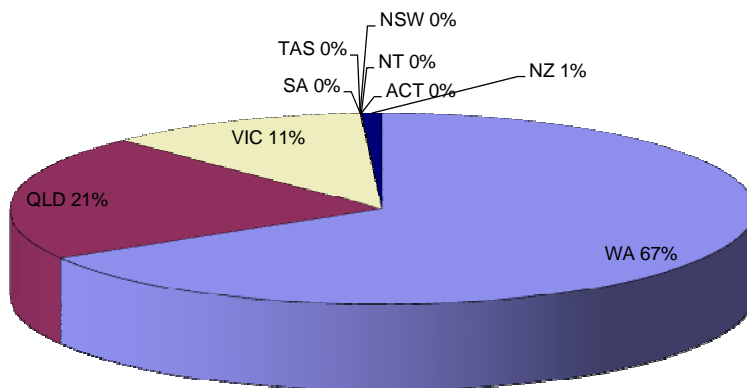
Percentage of FTTH Communities Connected by State

FTTH Developments by Developer

Developers				
	Communities	**Lots**	**Passed**	**Connected**
Satterley	11	2,7330	6,000	1,000
MFS Diversified	7	5,453	0	0
Delfin	5	24,265	0	0
Walker Corp	3	4,915	255	75
Crighton	2	220	0	0
Stockland	2	1,318	0	0
VicUrban	2	8,600	0	100
LWP	2	13,500	0	0
Multiplex	2	5,000	1,500	1,500
Hatia	2	600	0	0
UrbanPacific	2	3,300	2,380	2,040
LMC	2	2,120	120	0
Landcom	1	700	0	3
IronBridge	2	875	0	0
Peet and Co	2	1,700	0	0
Hanson	2	3,200	0	0
Landcorp	1	700	0	0
Brownfield	6	1,900	1,500	1
Others	58	52,275	1,640	2,115
Total	**114**	**157,971**	**6,255**	**1,175**

FTTH Communities by Provider
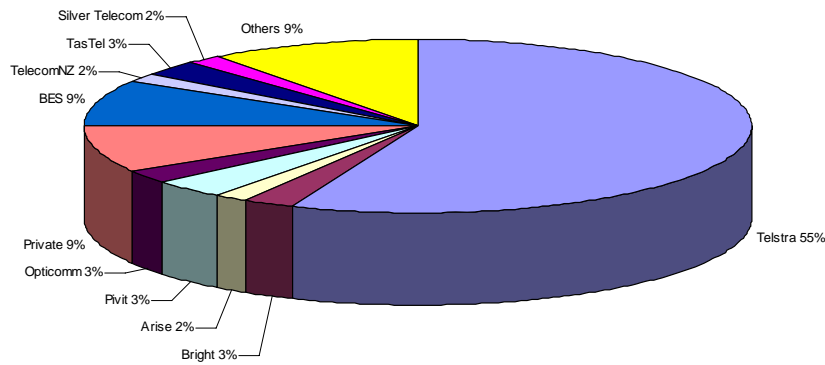
FTTH Connections by Provider
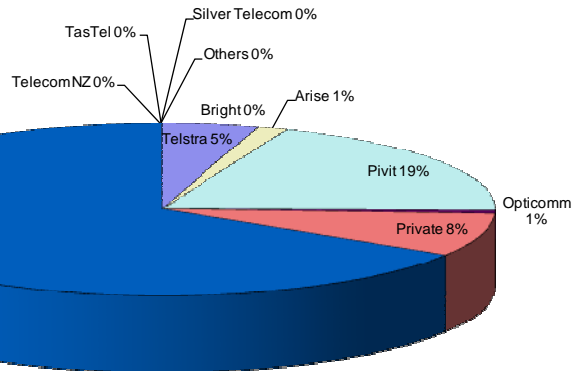
Appendix E – International FTTH Growth

Fibre to the Home Deployment Spreads Globally As More Economies Show Market Growth

FTTH Council AsiaPacific

(TOKYO) - The number of countries where fibre to the home connections are showing significant gains in the broadband services market continues to expand, according to an updated global ranking issued today by the Fibre to the Home (FTTH) Councils of Asia-Pacific, Europe and North America.

The new ranking released today at the FTTH Council Europe's annual conference in Paris and based on statistics gathered at the end of 2007, lists 14 economies where more than one percent of households are connected directly into high speed fibre optic networks. On the three councils' first-ever ranking, released last July, 11 economies exceeded the 1 percent threshold. Slovenia, Iceland and Singapore were the new entries on the list.

Globally, 2007 was the best year yet in terms of numbers of new subscribers to FTTH services, thanks primarily to strong growth in Japan, China and the United States, where a total of nearly 6 million new FTTH households were added for the three countries.

"What this indicates is the unrelenting vigour of the FTTH industry here in Europe - where we surpassed one million connections - and worldwide," said Joeri Van Bogaert, President of the FTTH Council Europe. "This phenomenon is driven by something that never slows down, and that is the consumer appetite for ever-higher bandwidth."

The updated ranking shows that Asian economies continue to outpace the rest of the world in terms of FTTH market penetration, with South Korea moving into the top slot with 31.4 percent of households connected, followed by Hong Kong at 23.4 percent and Japan at 21.3%.

A large gap separates third place Japan from fourth place Sweden, where 7.1 percent of homes are wired with FTTH, followed closely by Taiwan at 6.8 percent and Norway at 6 percent. Denmark, at 2.5 percent occupies seventh position on the chart.

The United States, by more than doubling its penetration rate to 2.3 percent, moved up three places to eighth position, followed by two of the three countries making their first appearance on the chart, Slovenia at 1.8 percent and Iceland at 1.5 percent. The People's Republic of China moved from tenth to eleventh place as direct fibre connections in that country moved up slightly to 1.5 percent. Netherlands, Italy and Singapore rounded out the list with market penetration rates ranging from 1.1 to 1.4 percent.

The three regional FTTH Councils joined together last year to create this official global FTTH ranking in order to provide the telecommunications industry, governments and regulators with a unique snapshot of international fibre access penetration.

Economies with the Highest Penetration of Fiber-to-the-Home / Building+LAN
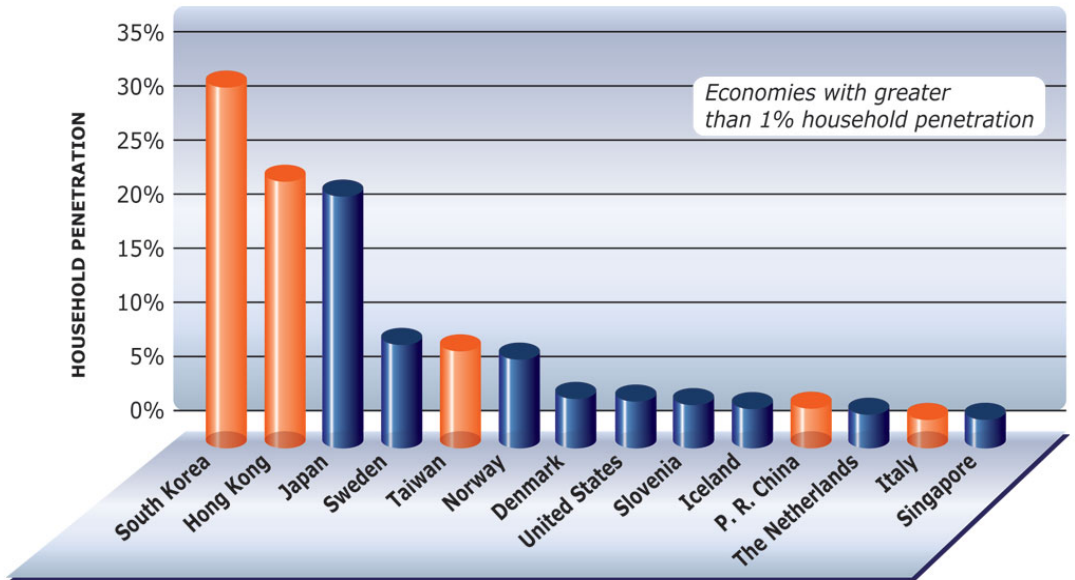
Year-End 2007 Ranking
Source: Fiber-to-the-Home Council
Feb 08

Economies where majority architecture is **Fiber-to-the-Home**

Economies where majority architecture is **Fiber-to-the-Building+LAN**

"We're delighted to see the U.S. moving up the global ranking, indicating a good beginning is underway. FTTH leadership, demonstrated by those leading countries, shows full national deployment is achievable" said Joe Savage, President of the FTTH Council North America. "The future belongs to those countries that satisfy the broadband consumer's need for speed. Our members - the FTTH equipment vendors and the service providers - are ready to help make it happen on a wide scale across North America."

"It is no accident that Asia-Pac continues to be the fastest growing region for FTTH in the world, with more subscribers connected on fibre than all other regions combined," said Schoichi Hanatani, President of the FTTH Council Asia-Pacific. "The rollout of FTTH has been encouraged by forward-looking governments and regulators in the Asia-Pac region for several years now. They understand that FTTH is a key strategic national infrastructure."

The global ranking follows the unified definition of FTTH terms announced by the three councils last year, and which has formed the basis for recent market research by each council. For completeness and accuracy the ranking includes both FTTH and FTTB (fibre-to-the-building) figures, while copper-based broadband access technologies (DSL, FTT-Curb, FTT-Node) are not included.

About the Fibre to the Home (FTTH) Council Europe The FTTH Council Europe *www.ftthcouncil.eu* is a market development organisation with a mission to accelerate the availability of fibre-based, broadband access networks to consumers and businesses. With few exceptions, Europe lags well behind the US and Asian tiger economies in the availability of high-speed broadband services (100 Mbps and upwards). The Council believes that the development of fibre-based access networks is fundamental to the deployment of such services, and hence to reaping their benefits for European citizens and businesses. The Council's charter is to work with European governments, policy-makers and opinion leaders qualify and quantify the benefits to be

gained from fibre-based broadband access networks, and to identify and help to erode the barriers to their development. Council members are drawn from the telecoms (vendors), broadband content and academic sectors.

About the FTTH Council Asia-Pacific The FTTH Council Asia-Pacific *www.ftthcouncilap.org* is a non-profit organization whose mission is to educate, promote and accelerate FTTH and the resulting economic and quality-of-life enhancements across the Asia-Pacific region. Formally registered in February 2005, and with over 40 member organisations spread across the Asia-Pac region; this Council maintains close links with sister organisations in Europe and North America. The Council is a group of leading telecom, networking, and infrastructure companies whose mandate is to promote the extension of fibre access across the Asia Pacific region including Greater China, Korea, Japan, SE Asia, India, Thailand and Australia

About the FTTH Council North America Now in its seventh year, the Fibre-to-the-Home Council is a non-profit organization established to help its members plan, market, implement and manage FTTH solutions. Council membership includes municipalities, utilities, developers, and traditional and non-traditional service providers, creating a cohesive group to share knowledge and build industry consensus on key issues surrounding fibre-to-the-home. Communities and organizations interested in exploring FTTH options may find information on the FTTH Council web site at *www.ftthcouncil.org.*

Appendix F – Supplementary Information on Access Seekers Topic

ACCC commentary on the FANOC (G9) suggestions

In handing down its draft decision on FANOC's Special Access Undertaking in relation to the Broadband Access Service in December 2007, the Australian Consumer and Competition Commission (ACCC), noted it was not its role to determine the type of FFTN network or all the measures necessary to ensure 'open access'.

Importantly it did, however, provide some general guidance on its thinking about the operation of a future FTTN network which, in most respects, provide a firm foundation upon which the Expert Panel and the Government should rely in its consideration of the future open access and regulatory regime.

Pricing

The ACCC was generally comfortable with FANOC's proposed long-term approach to pricing. It stated that it would provide a high degree of regulatory certainty for significant new investments, and noted the initial prices for the first three year access period may be in the appropriate range.

Vertical Separation

The ACCC also considers that a vertically separated ownership model could reduce incentives for the access provider to discriminate between downstream users of the access service and, therefore, facilitate strong and effective competition between access seekers in retail markets. Where such an ownership model is in place, the ACCC considers the need for regulatory oversight of non-price terms and conditions of access, in particular, could be relatively low.

Access issues

The ACCC indicated concerns that the SAU gives FANOC too much discretion to determine access prices over the 15 year undertaking period without sufficient regulatory audit and review of the key inputs in the pricing methodology, including actual costs, demand forecasts and the depreciation profile. In addition, the ACCC was concerned that FANOC has too much unconstrained discretion in relation to determining non-price terms and conditions of access, including in relation to introducing or withdrawing BAS products, varying the service specification and setting notice periods for network changes over the life of the SAU.

It said it was not satisfied that the proposed ownership and governance structure supports the significant discretion reserved to FANOC to determine price and non-price terms and conditions of access for 15 years.

In relation to the BAS service specification, the ACCC's draft view was that FANOC has addressed many of the needs of a low level, bitstream access service over an FTTN network, although the it has some concerns as to whether the proposed approach to voice services is appropriate, at least during the initial transition period.

ACCC General Guidance On The Implications Of An FTTN Network

The ACCC did provide guidance in its report on what would be expected of third party access on any FTTN broadband access network in order to promote the long-term interests of end-users.

The ACCC noted that all FTTN network upgrades would be likely to exhibit essentially the same bottleneck characteristics over the 'last mile' as Telstra's existing copper loop access network.

Appropriate terms and conditions of third party access to the bottleneck will be critical for competition in downstream retail communications markets and to promote the long-term interests of end-users, including Australian households and businesses.

It stated the terms of access should give network infrastructure investors the right incentives to invest and to recover their costs, with an appropriate return on risk, and also give access seekers the ability to invest in their own businesses, to compete and to innovate.

It said that as many of the same third party access issues are likely to arise regardless of how an FTTN broadband access network is built, or by whom.

Third Party Access To A FTTN Network

The ACCC considers that the lower the 'layer' in the network at which access is granted and the closer it is to the basic physical infrastructure that makes up the bottleneck, the greater the ability of access seekers to control their own costs and supply chain, differentiate service offerings, innovate and improve service quality.

The ACCC said that an approach to regulation that provides access seekers with greater control over their own business and products, to the extent that it is economically efficient, is likely to promote competition, innovation and investment in new services, and be in the long-term interests of Australian end-users.

Currently these requirements are met by access services such as the unconditioned local loop service (ULLS).

An FTTN access network upgrade is likely to make the current use of unbundled access to the copper loops via the ULLS more difficult, if not impossible. The ACCC expressed no view as to whether a ULLS service should continue to be available after an FTTN access network is deployed.

Regardless of the future approach to the ULLS, the ACCC says it will be possible to offer an access service of some kind over the bottleneck. This could be some form of bitstream access service. The access service should be as close to unbundled access to copper as is feasible and give the access seeker as much control as possible over its own customer traffic. Regardless, it is the ACCC's view that an appropriate approach to a ULLS replacement access service over an FTTN access network would normally include the following:

- A bitstream access service over the bottleneck, at as low a layer within the network as feasible, so as to give the access seeker as much control as possible over its own customer traffic.

- Access prices that reflect efficient costs (whether actual or estimated) and give investors a return that reflects their investment risk.

- Non-price terms and conditions of access that meet minimum quality of service standards and do not discriminate anti-competitively.

- It notes that a smooth migration to the new services for current access seekers and their customers would also be critical.

Bitstream Access Service

The ACCC says a future bitstream access service would need to be at a much lower level in the network than a wholesale xDSL service.

If end-users are to reap the benefits of next generation broadband, access seekers need to be able to directly control their own customer traffic so they can innovate on services and applications and avoid simply reselling the access provider's product.

The user of a wholesale xDSL service has little control over the service and is often able to do little more than add its own marketing and call centre. By contrast, the proposed replacement for ULLS should be designed to give access seekers as much control as possible over their own customer traffic.

The ACCC notes that where the network owner is vertically integrated and has substantial market power in the retail market, a service which gives access seekers a lot of control over their traffic is also important to restrict the ability of the network owner to discriminate against access seekers. Therefore, the service specification of a bitstream access service is critical to promote competition and the long-term interests of end-users.

The ACCC stated that a bitstream access services should meet the following criteria:

- A Layer 2 bitstream access service, which may be offered at a variety of speeds but should include a product that is not throttled as well as a product that is symmetric to the extent the technology permits. Products should be available to all access seekers on a non-discriminatory basis.

- A service (whether the bitstream service or another service) that allows access seekers to provide a voice service.

- Points of interconnection as close to customers as is appropriate and efficient, which in the first instance is likely to mean at or near existing local access switches and other points of interconnection for current ULLS and LSS products.

- Interconnection protocols based on well-accepted standards for broadband, voice and, if applicable, video, which are sufficiently well-described to allow access seekers to design and build their own interconnecting facilities.

- Arrangements for access to buildings, shelters and facilities for interconnection.

- Well-described and appropriate protocols for how packets are to be prioritized and handled.

- Well-described and appropriate protocols for how congestion in shared network elements is to be handled.

- Equivalent treatment of access seekers in relation to quality of service parameters such as jitter, delay and packet loss.

- Interaction by access seekers with operations support systems.

- No barriers to multicasting and IPTV by access seekers.

- An appropriate process for amending service specifications in later periods as needed or desirable.

The ACCC considers a bitstream access service with a service specification that addresses these minimum elements would be likely to provide access seekers with sufficient flexibility and control over the access service to allow any-to-any connectivity and enable access seekers to compete effectively and make appropriate decisions in relation to the efficient use of and investment in infrastructure.

Therefore, the ACCC considers that such a service description would be likely to promote the long-term interests of end-users.

Access Prices

The ACCC says access prices should give network infrastructure investors the right incentives to invest and to recover their costs and an appropriate return on risk. If there is an increased degree of risk in an FTTN investment this should be appropriately reflected. At the same time, access prices should give access seekers the ability to invest in their own businesses, compete and innovate.

In making reference to the TSLRIC+ pricing methodology and it notes the Australian Competition Tribunal has endorsed TSLRIC+ in relation to historic, sunk networks.

The ACCC says it expects this approach may remain appropriate for such networks. However, it says there is no reason to rule out proposals for different pricing approaches, especially for new networks where efficient and prudently incurred actual costs can be known.

Therefore, it is unlikely to be possible to set an accurate schedule of fixed prices for any firm for much more than three years.

It may, however, be possible to set reasonable prices for the initial period and set a methodology for adjusting these prices over time. Such an approach is used in the gas industry, for example, where prices are set for the first year of an access arrangement period and prices for subsequent years within that period are adjusted according to the pricing methodology contained in the access arrangement.

The ACCC states that any methodology for setting access prices to essential bottleneck infrastructure would require effective, independent regulatory audit or review of the key inputs and parameters in the pricing methodology in instances where the undertaking period is very long, regardless of whether the access provider is vertically integrated.

Further it states that while it may be appropriate for the ACCC to accept an access undertaking for a period of 15 years that contains initial period prices and a pricing methodology for setting subsequent access prices, the ACCC would need to be confident that the access provider would exercise its discretion in applying the methodology in an efficient and prudent manner.

It says this confidence could be achieved through providing the ACCC with a power to audit or review the key inputs in the pricing methodology (such as demand forecasts and forecast capital and operating expenditure) at appropriate intervals during the SAU period.

To be able to do this the ACCC notes that it would require new regulatory functions through an amendment to Part XIC of the TPA along the following lines:

If the undertaking provides for the Commission to perform functions or exercise powers in relation to the undertaking, the Commission may perform those functions or exercise those powers. If the Commission decides to do so, it must do so in accordance with the undertaking.

In relation to FANOC's initial prices the ACCC notes that if it is assumed that the cost of accessing Telstra's sub-loops is at the top of FANOC's estimated range of $5-15 per line per month, FANOC's proposed initial access prices for broadband services will be between $29 and $50 per month, depending on the speed of the service. FANOC has proposed to set initial prices below the long-term average and have prices rise over time to build the market. The ACCC's draft view is that this approach may be appropriate. As a result, these prices may be in the appropriate range of initial prices for a network of this type.

Smooth Migration To The New Services

The ACCC considers that a smooth migration to the new services is critical, rather than a new network builder necessarily continuing to offer all existing services. While the ACCC considers

that existing services should be replicated under new networks where appropriate, there are some services that may need to be altered significantly or may not be replaced if an FTTN network is deployed.

The ACCC considers that it would not be in the long-term interests of Australian consumers and business end-users to block network modernisation indefinitely to avoid any form of disruption to existing carriers and carriage service providers.

The ACCC notes previous Australian Competition Tribunal decisions in relation to these matters accepting that access seekers do not have an unlimited right of access to Telstra's ULLS, or the right to prevent network modernization.

It says carriers and carriage service providers investing in a dynamic industry would usually be expected to factor into their business plans the risk of technological obsolescence. In line with this, the ACCC notes its role is to protect the competitive process rather than specific competitors.

However, the ACCC considers it is appropriate for access seekers to expect reasonable notice and appropriate migration paths to ensure a smooth migration to the new services.

If access seekers' investments are subject to sudden arbitrary stranding on unreasonable grounds, incentives for access seekers to compete, invest in facilities and create innovative new services for consumers and business users would likely be reduced. This would not be in the long-term interests of end-users. Similarly it is in the interests of Australian consumers and business end-users that the industry has sufficient time to develop solutions to migrate important services (such as payphones, EFTPOS and voice) to an FTTN access network.

Again, it notes previous Australian Competition Tribunal decisions and says they [access seekers] ought not to be placed in a position where their substantial investments in infrastructure might be isolated and made redundant as a result of [the network owner's] timing and location of network upgrades. Such a situation is not in the long-term interests of end-users of the services provided to them by access seekers using the ULLS.

The ACCC notes that issues surrounding network modernisation are inherently complex.

It considers that such terms and conditions would more usually be determined by bilateral or multilateral commercial negotiation or by agreed operational procedures through self-regulatory mechanisms. It would be preferable that key network modernisation terms and conditions are not determined unilaterally by the access provider or solely through bilateral negotiations in circumstances where one negotiating party has little countervailing bargaining power. The ACCC may have a role where industry procedures prove insufficient.

Appendix G – Working Groups of FTTP Industry Special Interest Group

These are the representatives from the Working groups of the FTTP Special Interest Group who contributed to the writing of this paper.

Brownfield FTTP Working Group

Stephen Davies*	Titan ICT Consultants
Phillip Stevens	Tellabs
Barry Roberts Thomson	Hutchison 3
Giovanni Yogore	3M
Jim Wyatt	Dep. of Economic Dev. Tasmania
Michael Gallaty	ADC KRONE
Perry Poehlmann	Nokia Siemens
Rob Jolly	NewSat
Ross Yelland	Converging Trails
Stephen Negus	Connell Wagner
John Paola	VPI Systems

*Chair

Greenfield FTTP Working Group

Bruce Duyshart*	Lend Lease
Michael Sparksman	OPENetworks
Stephen Davies	Titan ICT Consultants
Phil Smith	Opticomm (Hills Industries)
Carmine Petrone	VicUrban
Alexandra Vella	Landcom
Ger Vloothuis	PBN
Michael Gallaty	ADC KRONE
Wayne Roach	Connell Wagner
Tim Phipps	Connell Wagner
Peter Thompson	Pivit
Brian Currie	Hutchinson 3
Iain McGregor	Fujitsu
John Paola	VPI Systems
Su-Vung Chung	Corning

*Chair

Access Seekers Working Group

Stephen Dalby	iiNet Ltd
John Lindsay	Internode Systems Pty Ltd
Malcolm Halsmith	Amcom Telecommunications Ltd

Appendix H – Members of the FTTP Industry Special Interest Group

These are the companies who are represented in the FTTP Special Interest Group.

3 Australia

3 E Property Pty Ltd

3M Australia Ltd

ActewAGL

Active Broadband Networks Inc

Acuity Ventures Pty Ltd/Ausanda Communications Pty Ltd

ADC Communications (Australia) Pty Ltd

ADC Krone (Australia)

Agile Communications/ Internode

Alcatel - Lucent Australia Ltd

Agility Management Pty Ltd

Alinta Asset Management

Allied Telesyn Int. (Aust)

Alpha Global Partners

Ambrose Dean

Anritsu Pty Ltd

ATUG (Australian Telecommunications Users Group)

AWA Networks

BADJA Interconnect

Baulderstone Hornibrook

Broadcast Australia

Broadcast Engineering Services Australia

Callpoint Pty Ltd

Capsicum Corporation

C-COR Broadband Australia Pty Ltd

CEOS Pty Ltd

Cheiron Pty Ltd

Chime Communications

Cisco Systems Australia

Communication & Information Technology Training (CITT)

Communitas Pty Ltd

Community Telco Australia Ltd

ComTel Network Solutions

Connell Wagner

Consultel

Converging Trails Pty Ltd

Corning Cable Systems

Corning Noble Park Pty Ltd

Corning International

Country Energy

Creator Tech

Destra Corporation Limited

Digital Distribution Australia

EDS Australia

Elders Telecommunications

Elton Consulting

Emtelle Australia Pty Ltd

Endeavour Connect P/L

Energex Limited

Energy Australia

Ericsson Australia Pty Ltd

Fujitsu

GDI Consulting

Global Connect Communications

Global Reach Telecoms Pty Ltd

Google Australia

Hills Industries Ltd

Horizon Broadband Communications

Huawei Technologies (Australia) Co Ltd

IBM Australia

IceTV Holdings Limited

Integral Energy

Intel Corporation (Intel Australia)

International Information Security Consultants Pty Ltd

Internet Community Networks (ICN)

ISPhone Australasia Pty Ltd

Itron Australasia Pty Ltd

John Fairfax Limited

Kingfisher International

Landcom

Lend Lease

M2/WCG

Madison Technologies Pty Ltd

Market Clarity

Matchmaster Communications

MCB T Group Pty Ltd

Motorola Australia Pty Ltd

Multimedia Victoria

NEC Australia Pty Ltd

Nextep Broadband

NewSat

Nextgen Networks

NICTA

Nokia Siemens Networks

Nortel Australia Limited

OPENetworks

Opticomm

Optimal Cable Services Pty Ltd.

Optilinx

Optus Pty Ltd

Orion Satellite Systems

Pacific Broadband Networks

Pivit

Power & Water Corporation

Powerlink Queensland

Primus Telecommunications

Qualcomm Incorporated

Schneider Electric (Australia) Pty Ltd

Senko Advanced Components

Service Elements

Silk Telecom

Smart Home Networks

Swinburne University of Technology

Teligent

Tellabs Australia

Titan Recruitment & Consulting

TransAct Communications Pty Ltd

Transgrid

TR Corporation/Telecom

Unifier2 Pty Ltd

United Customer Management Solutions (UCMS)

Universities Australia

Unwired Australia

Vanco Australasia

Vermast Business Partners BV

VicUrban

Visionstream

VPIsystems

Westnet

Wireless Broadband Services Pty Ltd

xiB/OSS

Yokall.Com Pty Ltd

Observers:

Australian Competition & Consumer Commission (ACCC)

Australian Communications and Media Authority - ACMA

Brisbane City Council

City of Whittlesea

Department of Finance & Deregulation

Department of Further Education, Employment, Science and Technology - Science, Technology and Innovation Directorate

Department of Industry & Resources

Department of Public Works, Information Economy Queensland

Department of Public Works, Information Economy, Sport and Recreation Queensland

French Trade Commission

Wyong Shire Council