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Andrew McGowan
Inquiry Secretary
The House of Representatives Standing Committee on
Infrastructure and Communications
PO Box 6021, Parliament House
CANBERRA ACT 2600

Dear Mr McGowan

VICTORIAN SUBMISSION TO THE COMMONWEALTH NBN INQUIRY

The Victorian Government welcomes the opportunity to contribute to the Committee's *Inquiry into the Role and Potential of the National Broadband Network (NBN)*.

The attached submission reflects Victorian Government views on the availability of current broadband services, the potential of emerging broadband networks to address coverage gaps and consumer needs, and potential risks associated with the Commonwealth Government's NBN plan.

The submission also expands on the Victorian Government's views on the importance of understanding user issues and the role of government in encouraging broadband use to drive productivity gains and innovation.

If you have any queries in relation to this submission please do not hesitate to contact Mr Matthew Dummett, Director, Science and Technology Policy, Victorian Department of Business and Innovation on . This submission may be made publicly available.

I wish the Committee well in its deliberations on this vital area of national policy.

Yours sincerely

THE HON GORDON RICH-PHILLIPS MLC
Minister for Technology
Encl.

Victorian Government Submission**House of Representatives Infrastructure and
Communications Committee*****Inquiry into the Role and Potential of the
National Broadband Network*****June 2011*****Overview***

The Victorian Government considers that ubiquitous high speed broadband has the potential to provide substantial benefits, but that any policy to achieve this needs to be:

- implemented in an economically prudent way
- guided by appropriate public policy principles, and
- complemented by a soundly based strategy to facilitate broadband uptake and effective use.

The Victorian Government welcomes the opportunity to contribute to the Committee's Inquiry.

The Victorian Government notes that the proper implementation of the Commonwealth Government's National Broadband Network (NBN) plan is critical to the proposed benefits being realised. Furthermore, the ability of the NBN plan to sustain long run benefits could be compromised by not giving due weight to establishing the right preconditions for future market development and social outcomes.

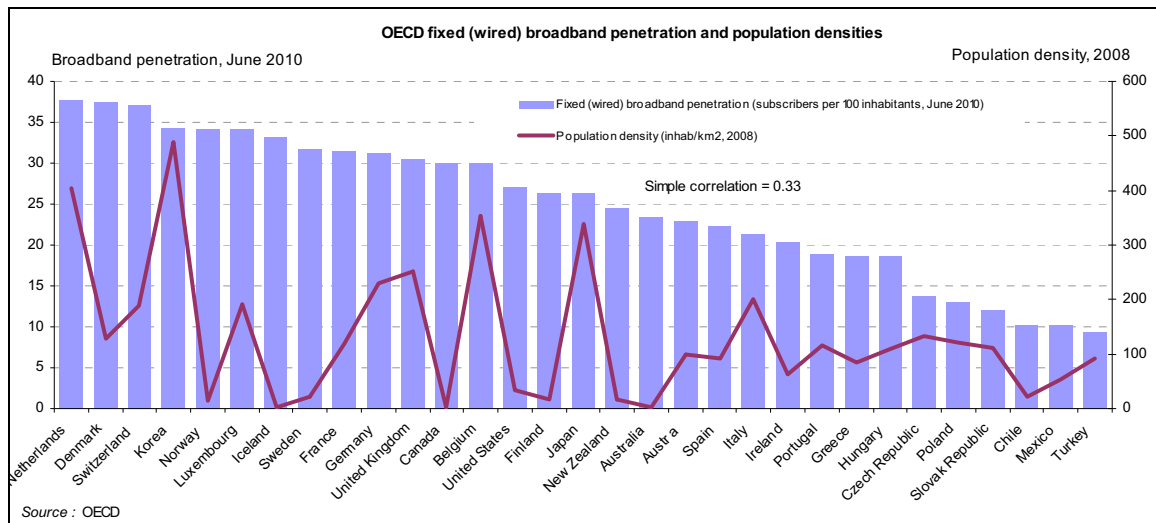
National broadband objectives

The Victorian Government strongly supports the view that the availability and quality of existing national broadband infrastructure and services are generally inadequate for existing needs in some areas, and without sustained infrastructure investment, currently adequate services will fall behind community expectations within the next ten years.

It is also well recognised that the structure of Australia's telecommunications market, particularly Telstra's ownership of the ubiquitous copper access network has hampered the development of competition and investment in fixed line broadband; and that regulation has been only partially successful in addressing this issue.

Australia also lags competitor nations in broadband uptake. For example, in December 2010 the OECD reported that Australia is ranked 18th out of 31 OECD countries for fixed line broadband penetration.

**Victorian Government Submission
House of Representatives Infrastructure and Communications Committee
Inquiry into the Role and Potential of the National Broadband Network**



Reference: OECD

In these circumstances, the Commonwealth Government’s objectives to improve the level of universal access to high quality, and internationally competitive broadband and to broadly address structural reform of the telecommunications market is important.

Potential benefits of ubiquitous broadband

The potential benefits from broadband have been well canvassed in the international literature.

While these analyses are necessarily based on the impacts of ‘first and second wave’ broadband¹, they persuasively suggest good future prospects for economic and social development from uptake of next generation or third wave broadband in the long run².

On this basis, the Victorian Government considers that the next phase of broadband development *ubiquitous high speed broadband* has the potential to enhance national productivity, employment and provide a platform to drive long run innovation. Further, it has the potential to support the delivery of equally important government objectives relating to social development and equity, such as improving health and education outcomes and improving resource use for environmental benefits.

The NBN plan

The key policy questions confronting Australian governments that ought to be scrutinised by the Committee are whether the emerging NBN plan strikes the right balance between competing NBN objectives – availability, speed, competition, cost, benefits and timeliness –

¹ These definitions of broadband are outlined in the next section.

² See for example Richard Hayes’ summary of such studies and approaches in “Valuing Broadband Benefits: A selective report on issues and options”, IBES, 7 December 2010, pp.29 – 52.

and whether the right policy mechanisms are being set to optimise outcomes and manage trade offs to ensure longer term benefits.

Further, it needs to be recognised that the NBN by itself is not sufficient to deliver economic and social benefits. Businesses and public sector organisations will only achieve productivity gains from broadband by making innovative use of the infrastructure and implementing complementary changes to business processes. This will require additional investments and resources, including the development of new applications to drive broad based uptake and productive use.

From a national development perspective, any assessment of the real benefits of the NBN must account for the full costs of the network, including policy alternatives and opportunity costs.

For a project of this size and national significance, the Victorian Government considers it is vital that the initiative is developed and implemented in an economically prudent manner.

In this regard the Victorian Government's view is that the NBN plan should be subject to transparent assessments, including assurance on the adequacy of project planning.

In the short term this greater scrutiny should come in the form of the Commonwealth Government imposing the same rigorous project development processes it has established for Infrastructure Australia or that exist within Productivity Commission analyses. In the long term, scrutiny will require the establishment of proper processes for NBN Co to report to the Commonwealth Parliament.

In addition, it is the Government's view that the NBN plan has evolved without the level of detailed consultation (within reasonable timeframes) that are required to enable States to make the best possible, considered contribution to national broadband development. Such consultation would engender greater confidence that the NBN plan is being adequately considered before it is implemented.

While the Victorian Government will continue to work with the Commonwealth Government and NBN Co to provide appropriate practical assistance supporting the NBN rollout in Victoria, it should be recognised that governments at all levels will make more effective contributions in an environment characterised by better information exchange and stakeholder engagement.

The remainder of this submission is set out as follows:

- *Section 1* describes the broadband environment in Victoria and implications for the NBN plan
- *Section 2* outlines issues with the NBN plan, including risks created by lack of rigorous government planning and process, and

- *Section 3* discusses the necessary conditions for effective use of ubiquitous broadband and identifies the proper role of government to fully realise the benefits from broadband.

Section 1

Broadband

Broadband is currently supplied over a number of different infrastructure platforms in the access network (see Figure 1 below), including the copper telephony network (*via* competitive Digital Subscriber Line [DSL] services), pay TV cable, wireless (including mobile and fixed to premises) and satellite services. All these broadband infrastructures are supported by a core fibre optic backbone network transporting aggregated broadband traffic across and between networks. There are multiple providers, but Telstra's copper network is the dominant platform, either directly retailed by Telstra or wholesaled by others under Commonwealth regulation.

Over the past decade the Victorian Government has monitored broadband supply and demand in Victoria through its 'Spend and Demand' Reports³.

The broadband market has evolved through three 'waves' of investment:

- *first wave* broadband (equivalent ADSL1 services offering speeds up to 8 Mbps)
- *second wave* broadband (equivalent ADSL2+ and cable pay TV services offering speeds between 8Mbps and 50 Mbps), and
- *third wave* broadband (equivalent fibre optic and upgraded DOCSIS 3.0. pay TV cable services offering speeds greater than 50 Mbps).

Broadband coverage in Victoria

The following map shows coverage for the three 'waves' of fixed broadband in Victoria in December 2009, and highlights that:

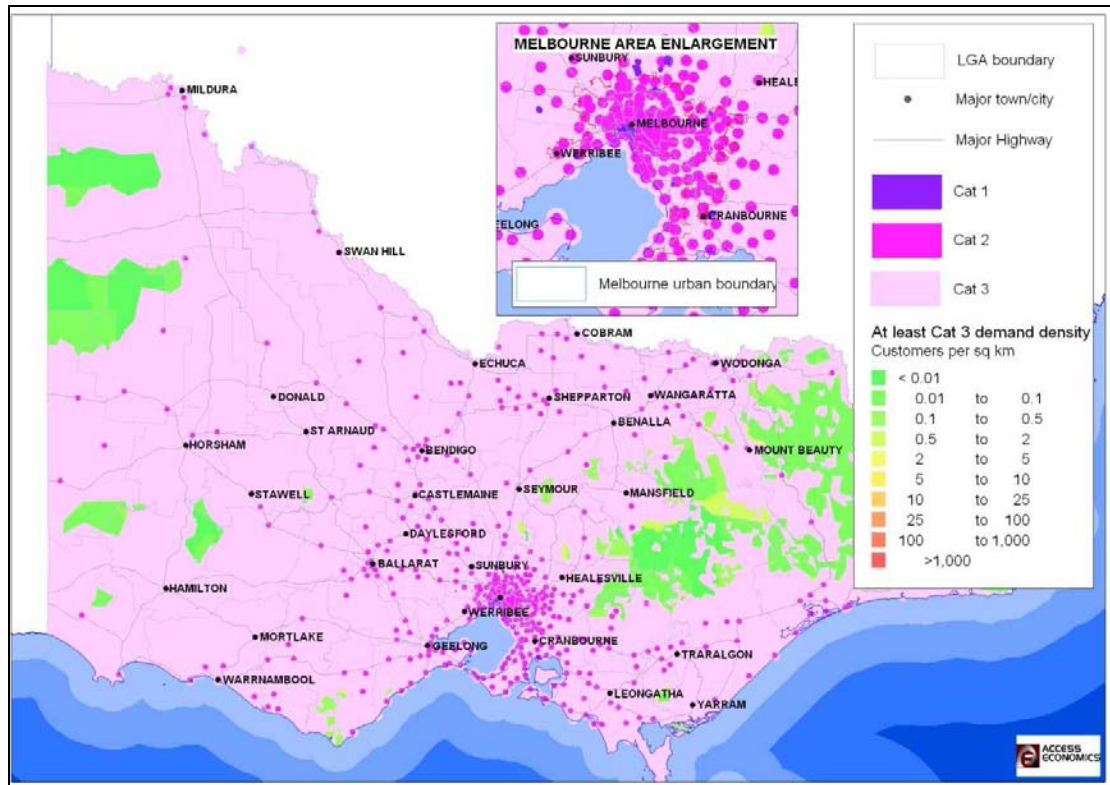
- Coverage of first wave broadband ('Category 3') is near universal
- Second wave broadband ('Category 2') is most widely available in metropolitan Melbourne and although in regional areas coverage can be patchy, it is available in most regional towns and centres of over 200 people⁴, and
- Third wave broadband ('Category 1') coverage is very low – only 0.9% of households and 3.8% of businesses in Victoria had access to third wave broadband services.

³ www.mmv.vic.gov.au/telecommunicationsandbroadband

⁴ In terms of exchanges enabled with ADSL 2+, the situation is now at a similar stage to what ADSL was approximately 5 years ago.

In a pattern similar to the growth of first wave broadband, investments in second wave broadband were initially being made in the most populous and customer dense areas and slowly moving into more regional locations. Third wave broadband coverage is very low with only a small percentage of Victorian households and businesses accessing these services.

Fig 1: Broadband Supply in Victoria, December 2009⁵



⁵ Note the map does not identify customers within coverage areas that cannot access broadband services because of technical and or geographic constraints. Not all households and businesses in the shaded areas necessarily receive coverage in all circumstances.

Broadband speeds in Victoria

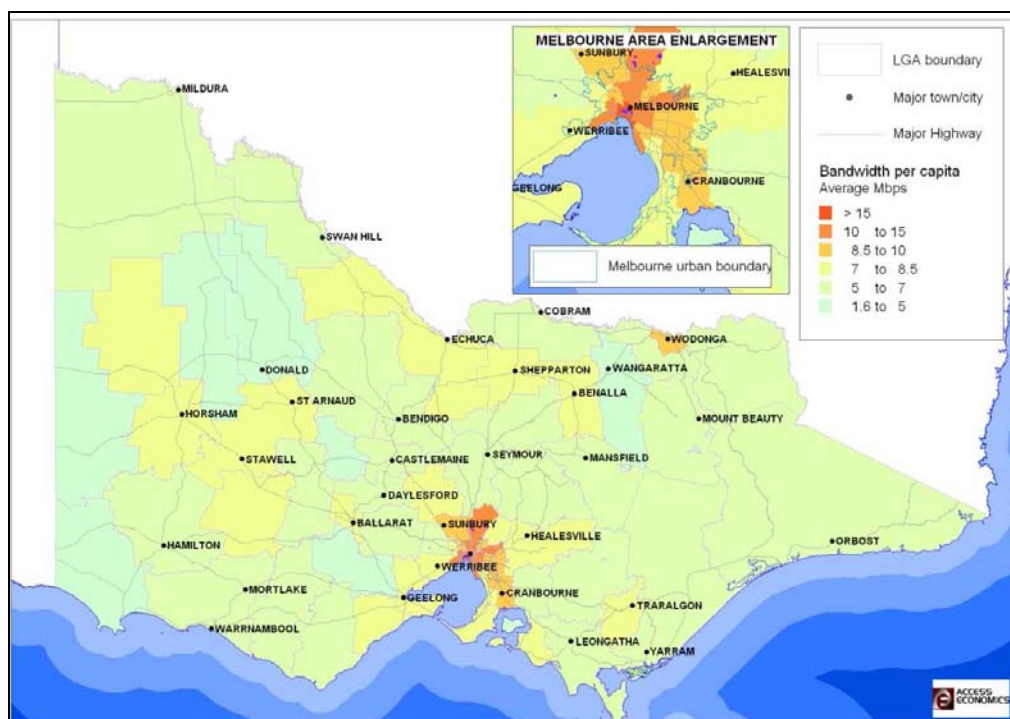
Available broadband speeds vary considerably across Victoria.

One all encompassing metric to compare broadband speeds across regions is the concept of the average maximum bandwidth per capita, meaning the average for the fastest solution available for all households and businesses of a region (irrespective of whether they are taking up that faster service or not). Figure 2 below highlights the varying bandwidth per capita across the State.

In Victoria, widespread fibre in the CBD ensures that central Melbourne has the fastest average. The largely ubiquitous ADSL 2+ and cable in the inner suburbs ensures that they also fare well, along with the urban fringe local government areas (LGAs) some of which also have some fibre in new greenfield estates.

The areas that have the slowest options are largely where ADSL 2+ services are not widespread, where the mobile and fixed wireless networks still have coverage gaps (both Telstra's NextG or fixed wireless), or where the topography means that even where wireless base stations are nearby, there are likely to still be some coverage problems.

Fig 2: Average maximum bandwidth per capita, December 2009



Broadband uptake and unmet demand in Victoria

Figure 3 shows *unmet demand* for second wave fixed broadband as a function of the residential population, while Table 1 shows actual and unmet demand for second and third wave broadband.

Unmet demand estimates the number of households or businesses that would take up a particular broadband service if it were made available to them. It is assumed that households or businesses would take up the next best service offering if they have unmet demand for a higher grade service (for example a customer may settle for a second wave broadband service and express unmet demand for third wave broadband).

Areas of highest unmet demand are those where coverage is more limited but the demographic and business characteristics generate significant demand for the service. LGAs with high levels of unmet demand as a share of the population include Towong, Golden Plains, West Wimmera and Yarriambiack.

Although these LGAs do have ADSL 2+ services, much of the demand for the service in these areas lies either beyond the reach of high speed services from the exchange, or in exchange areas that are not yet enabled.

Fig 3: Unmet demand for second wave fixed broadband, December 2009

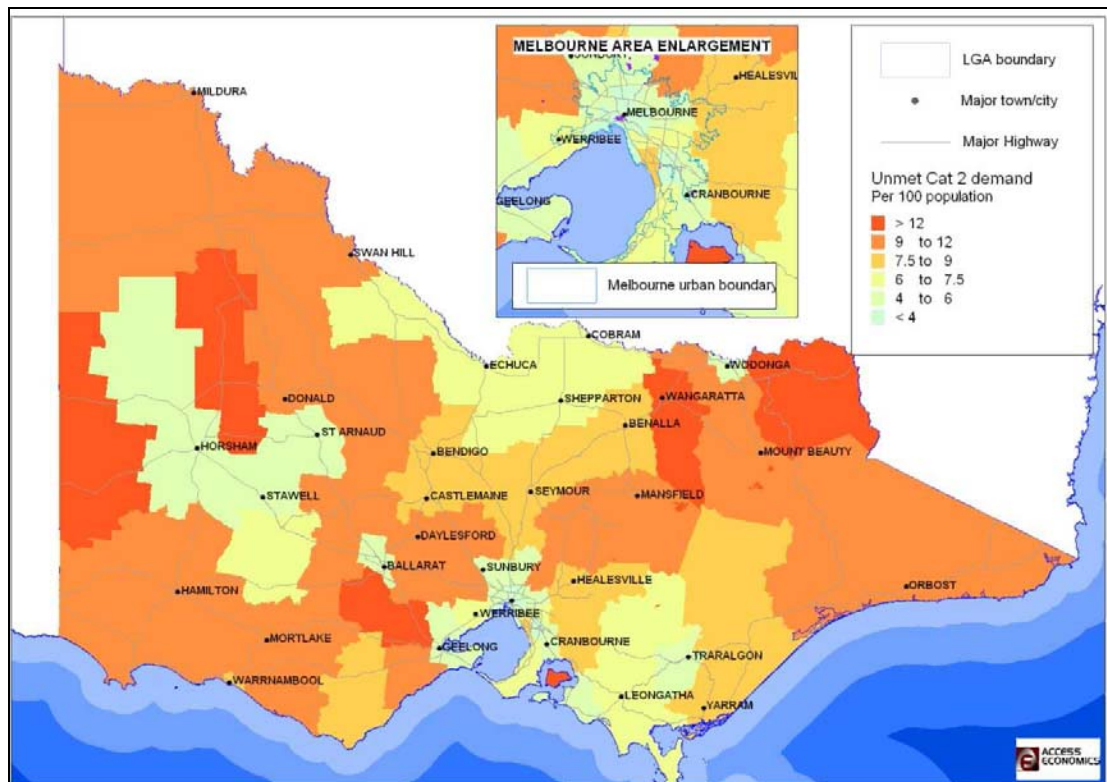


Table 1: Unmet demand for second and third wave broadband in Victoria, December 2009

Region	Second Wave		Third Wave	
	Actual*	Unmet**	Actual*	Unmet**
Metropolitan	505,447	198,329	10,828	179,265
Rest of state	101,263	113,206		39,941
Barwon South West ⁶	28,135	27,074		9,770
Gippsland	16,937	17,540		5,610
Grampians	15,451	16,890		5,852
Hume	20,282	23,061		8,559
Loddon Mallee	20,459	28,641		10,151

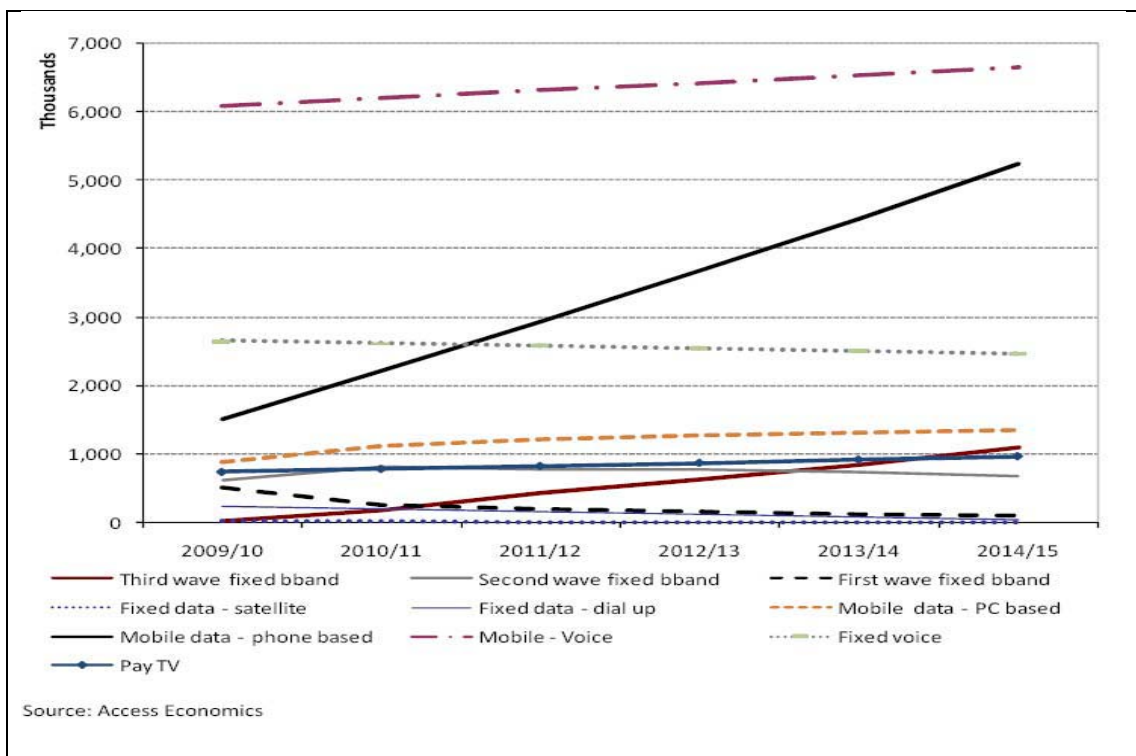
* Households / businesses actually connected to a second / third wave broadband service

** Households / businesses that would take-up a second (or third) wave broadband service if it were available to them

Mobile broadband

Mobile telecommunications is the fastest growing and largest telecommunications expenditure item in Australia. Mobile broadband (PC based and phone based) is expected to have the strongest subscriber growth over the next few years in Victoria – see Figure 4 below.

Fig 4: Projected subscribers by market category, Victoria



⁶ Victorian Government Department of Human Services regions.

While fixed (fibre based) broadband has clear advantages over wireless, it is unclear whether fixed and mobile broadband will be complimentary services or substitute each other, though clearly consumers highly value voice and data mobility.

Broadband investment

Historically, broadband coverage has been determined by the commercial investment decisions of telecommunications providers driven largely by revenue and population density, but also by the technical characteristics of broadband platforms, the availability of competitive backhaul and Commonwealth policy settings. Coverage has also reflected the general pattern of investment in the telecommunications industry whereby investments have been usually undertaken in an incremental fashion beginning from areas of highest population/revenue density.

The rapid growth of demand for mobile compared to fixed line connectivity and the trajectory of consumer demand means that there is some uncertainty about the timing and extent of future increases in demand for broadband services. It is difficult to accurately predict customer preferences for a particular combination of service offerings price, speed, quality and mobility (as illustrated by the absence of applications for a high capacity broadband consumer market⁷). Accordingly, a cautious and incremental approach to government investment in broadband infrastructure is warranted.

A more cautious approach by government could focus on building the foundations of next generation broadband networks where suppliers have been unresponsive either due to thin or inefficient markets. This could include government funding of competitive backhaul⁸ and programs that build the demand side by supporting utilisation of broadband applications (as outlined in section 3).

The Committee should be aware that, as noted above, while coverage of third wave broadband for residential consumers is very low, there has been substantial investment in layer 1 fibre network deployment (to support both fixed and mobile data coverage). There has also been substantial investment in FTTP for government (particularly for health and education) and large corporations. For example, in Victoria all State schools and hospitals and most private schools have fibre connections provisioned through Government contracts with Telstra⁹.

It is important to make the point that as there is considerable fibre already deployed deeply into the existing telecommunications network, it would be more economically prudent if

⁷ For example, note NBN Co's optimistic assumption regarding high capacity broadband application development: "NBN Co's strategy is based on the expectation that as higher bandwidth becomes available, applications that take advantage of that bandwidth will be developed." NBN Co Corporate Plan 2011-13, p. 39.

⁸ For example, the National Broadband Network Implementation Study identified the need for approximately 70,000km of additional competitive backhaul (see p.323).

⁹ Note some fibre connectivity has been provided to Independent Schools through the VICTOR project using existing Government telecommunications procurement contracts.

the NBN plan leveraged existing infrastructure rather than duplicate existing network investments. From the perspective of the Victorian Government as a broadband user, it is a concern that under the NBN plan, taxpayers are likely to pay multiple times for state government agencies' fibre connections. For example, the State has supported the funding of Telstra's capital program for FTTP connections to schools and hospitals that NBN Co is now seeking to duplicate, a very wasteful use of resources that should be avoided.

Broadband deployment in under-served regional areas will provide immediate and relatively high economic benefits

Victorian Government research suggests that the most immediate business productivity benefits from broadband are likely to be available from the extension of broadband to regional areas enabling regional users to quickly catch up to their metro counterparts.

Taking into account the existing coverage and quality constraints of broadband in Victoria, it is clear that there is potential for significant economic benefits to be derived from the deployment of broadband in currently under served regional areas. Accordingly, obtaining these immediate benefits would help to justify the prioritisation of a NBN regional rollout (noting that this would need to be balanced by the likelihood that the average cost of regional deployments would be relatively higher than an average deployment cost in urban areas).

By analogy we would also expect relatively higher social benefits to be realised in these currently under served regional markets. For example, there is a case on equity and efficiency grounds, i.e. for improving the capacity of governments to facilitate improved services directly to homes and businesses in these locations.

The need for transparency in NBN rollout plans

In regard to NBN rollout, the Victorian Government highlights the need for clear processes and principles setting the NBN's rollout priorities within the Commonwealth Government's global coverage objective of FTTP to 93% of national premises/businesses.

As noted above, the principle of achieving early and maximum benefits from a regional rollout might deliver early benefits and support NBN Co revenues. The Government notes that rollout information has been provided in an ad hoc manner that does not assist State and/or local government planning for the NBN.

Uncertainty regarding rollout and priorities will be compounded by the position recently announced in the Commonwealth's Statement of Expectations that communities may extend the FTTP rollout by paying 'incremental costs' to NBN Co. Without information on NBN rollout priorities and business rules (for example, understanding the incremental costs in different locations), community expectations have been raised without a clear process for delivering such outcomes.

Technology neutrality and efficient investment

The current NBN plan makes an *a priori* assumption that FTTP is the best infrastructure solution for up to 93% of premises, irrespective of the optimal capacity and technological requirements required to deliver benefits from broadband. It is clear that while FTTP may be required to deliver applications and services demanded by consumers and businesses in a 20 to 30 year timeframe, incremental improvements to existing infrastructures are likely to be capable of meeting broadband demands in the immediate future.

The goal of ubiquitous access to high quality services should be achieved more efficiently if the best available fit for purpose infrastructure is deployed. This approach would enable the use of lower cost alternatives to FTTP where it meets needs, and which leverage rather than duplicate existing infrastructure. Further, by undertaking incremental builds on existing infrastructure as demand grows, it would also allow a more orderly and economically efficient network development – provided that the incremental upgrades are consistent with a long term infrastructure plan¹⁰.

Such an approach would require clear rollout prioritisation principles, including that efficient infrastructure investments are likely to be achieved by decisions made in a commercial/market environment. Where this results in an under investment in some markets from a social perspective (for example, reducing social welfare and reducing network benefits), there is the option for governments to transparently subsidise infrastructure and access.

The Victorian Government recognises that the current NBN plan has evolved out of a long process of successive Commonwealth Governments grappling with how to promote telecommunications market development and frame appropriate policy reform. However, the current NBN plan to predefine the optimal capacity and technological requirements of the network could lead to an over investment uncoupled from the timing of potential benefits.

The risk from a national perspective is that the cost of providing broadband access in markets that can be efficiently served by the existing market will be excessively high (through both duplication and over investment) and that national benefits from broadband will potentially be diminished (notwithstanding the achievement of ubiquity) from a lower broadband uptake in these densely populated locations¹¹.

¹⁰ For example, from NBN Co's [Corporate Plan 2011-13](#) it is clear that incremental investments to the existing HFC networks are quite capable of meeting likely user demands over the next 10 years plus.

¹¹ A similar argument applies to loss of benefits when the timing of rollout of broadband in some markets is slower than what the market might otherwise have delivered.

Section 2

Emerging risks from the NBN plan

Decisions made now could potentially result in unnecessarily higher broadband costs or put in place barriers that hinder infrastructure based wholesale competition to the NBN. This could do long term damage to the development of Australia's broadband market, and create market structures that are difficult if not impossible to unravel.

The Commonwealth must be mindful of the risks associated with the establishment of NBN Co as a large public monopoly, particularly given past experiences utilising this type of structure in the telecommunications sector in Australia.

In the short term a high cost broadband network will slow broadband uptake and work against the expected productivity benefits.

The Commonwealth appears to have given little serious consideration of the relative costs associated with the creation of an entirely new network infrastructure and new corporate entity and its impact on roll out and network operation costs, given this is a market traditionally driven by rapid technological change.

Long run competition

The current NBN plan also poses substantial and serious risks to the long term development of competition in broadband markets, potentially holding back future broadband investment, market development and innovation.

The Commonwealth appears to have put in place excessive protections for NBN Co from long term competition. For example:

- pressing for the removal of the supply of broadband services over the Telstra and Optus Pay TV networks
- extending the impact of NBN services through design of the NBN network into upstream markets (such as the inter regional backhaul market), and
- the introduction of regulation to prevent 'cherry picking' of the NBN (preventing NBN Co's potential infrastructure competitors from entering viable segments within NBN Co's market).

Further, the NBN plan also risks additional inefficiencies by employing market distorting financial arrangements, including internal, non transparent cross subsidies (such as universal national wholesale pricing) and through public sector financing at non commercial rates of return.

After over two decades of national economic and financial reform the NBN proposal in its present form represents a very serious threat to the long term competition in the

telecommunications sector and an impediment to the most efficient use and allocation of resources and investment.

Long run market development

The increasingly apparent risk is that the Commonwealth could, over time, fully replicate a dysfunctional telecommunications market structure that has hindered investments in the current broadband market. This would be the result if it simply replaces Telstra's market power with an NBN Co infrastructure monopoly with all the attendant inefficiencies and constraints on investment, innovation, and future policy making.

The NBN planning needs to include clearly identified options to address the potential risk that NBN Co's wholesale fixed broadband monopoly will adversely impact future broadband market development. This planning should include consideration of a range of options for future governments to:

- unbundle NBN Co's taxpayer funded infrastructure elements
- reserve capacity on NBN Co's taxpayer funded fibre infrastructure for public sector use and or to facilitate entry of a competitive wholesaler should competition not eventuate, and
- remodel NBN Co's corporate structure to match future circumstances.

Section 3

NBN infrastructure is necessary but not sufficient to deliver benefits

A ubiquitous national broadband network is a general purpose technology platform that can be leveraged to improve productivity and innovation across the economy and society. However, infrastructure is a necessary but not sufficient condition for the realisation of benefits.

To deliver the potential range of benefits the NBN plan must also be complemented by a sound strategy to support the changes that will facilitate broadband uptake and effective use.

It is to be expected that these changes will be far reaching as they involve substantial innovation in service delivery, as well as changes to institutional arrangements, and government and business practices and structures.

This view is based on the Victorian Government's experience of how benefits have been derived from first and second wave broadband.

It is also important to understand, as is noted above, that there is already significant deployment of fibre infrastructure connecting parts of the Victorian health, education, and

a high proportion of metro based business premises, and that these will not benefit directly from a national FTTP rollout.

For example, nearly all universities are connected to a national and international high speed fibre network by Australia's Academic and Research Network (AARNet), and almost all State funded Victorian schools and hospitals are connected by fibre.

In this context the focus of NBN enabled benefits will necessarily need to be on the innovative use of the new high speed connections to homes and small businesses.

Supporting the effective use of broadband

In the Victorian Government's experience¹², the investments and changes required to drive the uptake and effective use of broadband are not trivial.

These include:

- development of new applications for the transformation of service delivery (both for new services and substitutes)
- investment in software, hardware and IT platforms
- human capital development
- business process, behavioural and organisational change
- policy and regulatory reform, and
- development of appropriate incentives for change and the adoption of new services and service delivery models.

The cost of accessing the NBN service may represent only a small percentage of the total cost of designing, implementing and sustaining a broadband application over time. As explained above this is particularly the case for the implementation of applications that require significant business change or innovation.

Two Victorian case studies are attached to this submission to illustrate the range of investments and changes required for a single broadband project. These are:

- *BreastScreen Victoria Rural Broadband Digital Mammography Project*, and
- *Central Highlands Agribusiness Forum Using Web 2.0 Platform to improve Farm and Environment Management*.

In general, some of the lessons learned from these projects include:

¹² This is supported more generally by OECD research. For example, investments in "software, human capital and new organisational structures" – many of which are essential for fully realising the productivity gains and efficiencies from new technologies OECD, *Interim Report in the OECD Innovation Strategy* (2009).

- productive use of higher capacity broadband involves organisational and system level change. It is not just a matter of plugging in new technology, it requires strong commitment at all levels of the organisation
- early adopters and 'broadband pioneers' face great uncertainties and bear high risks. A pilot project approach can provide the opportunity to investigate the business case for broader deployment with minimal exposure of the business to risks, and to enable 'learning by doing'
- there are high non network costs in application development and related technologies
- collaboration across the service/business organisation is important, including with network and related technology providers and between staff and clients, and
- a key output is rich and deep data that requires innovative approaches to share, mine, interrogate and visualise to create value.

These lessons suggest an important role for the public sector to support and accelerate this innovation process, most naturally in relation to improving Government service delivery, productivity in the non traded sectors, and reducing some of the risks of change by undertaking pilot and proof of concept projects.

Innovative government service delivery has the benefit of promoting better public outcomes as well as industry spill over benefits.

However it should be noted that in an NBN broadband environment where high capacity broadband is ubiquitous, the key challenge for governments is how to systematise effective use across the economy and society to realise higher potential network benefits.

In particular, there are fundamental reforms and regulatory changes required, both in the telecommunications sector and application sectors, to suit the scale and pervasiveness of a ubiquitous broadband environment. A new round of reforms will be required to reduce risks and uncertainties of the system wide changes possible from ubiquitous broadband, analogous to the privacy and transaction security reforms that supported development of the Internet and e commerce required for the first wave of broadband applications.

A further role of government will be to establish appropriate incentives for system wide adoption of the effective use of broadband.

The Victorian Government is reviewing its broadband utilisation strategy, with the objective to ensure that Victoria is better placed to take advantage of a ubiquitous high speed broadband network when it is delivered.

Broadband utilisation initiatives

The Commonwealth Government has recently announced a National Digital Economy Strategy (NDES), which describes the Commonwealth Government's strategy and funded projects to encourage online participation.

There has been minimal effective engagement from the Commonwealth with the States and Territories in development of the NDES policy and projects, and potential opportunities for cooperation in key areas were not explored prior to its announcement. Consultation on the implementation of NDES initiatives will be critically important as States and Territories play the major role in delivery of key public services, such as health and education.

To enable system wide adoption, there are a broad range of policy levers available to the Commonwealth including regulatory reform, government service innovation, as well as funding programs or provision of other financial incentives for both the public and private sector (such as R&D and tax incentives).

As the attached case studies illustrate, innovation utilising broadband requires strong collaboration and flexibility within supportive project structures that provide adequate funding, institutional support and risk reduction.

The Victorian Government would welcome the opportunity to work with the Commonwealth, State and Territory Governments and the private sector to support development of a rich high capacity broadband applications environment to maximise the potential benefits of high capacity broadband.

ATTACHMENT: Victorian Broadband Projects**BreastScreen Victoria Rural Broadband Digital Mammography Project****About BreastScreen Victoria**

BreastScreen Victoria (BSV) is a public health program established in 1992 to provide mammography (breast x ray) screening services to Victorian women. It is part of a national screening program and is co funded by the Victorian and Commonwealth Governments. BSV operates a network of services around Victoria, including eight regional assessment centres, over 40 screening centres and two mobile screening units (as shown in the picture below).



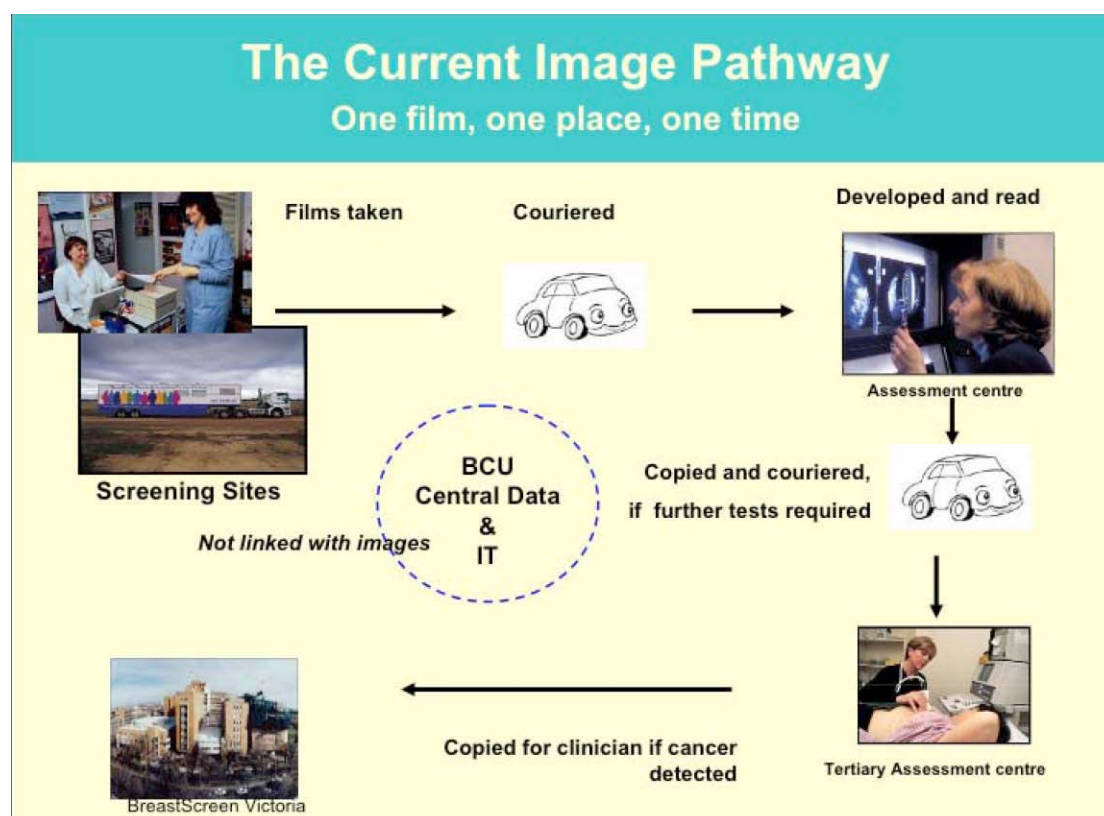
BSV aims to detect breast cancer early in its development, particularly in women aged 50-69, and through early detection, to reduce deaths from breast cancer the most common cancer affecting women in Victoria.

Since its inception BSV has conducted over 2.4 million screens and serves more than 200,000 women each year. Almost half of invasive breast cancer cases diagnosed each year in Victoria is detected by the BSV program.

Background to the project

Recognising the opportunity to use broadband

Until recently, breast screening services were conducted without the use of digital or networked communications technologies. A typical scenario (illustrated below) would involve a woman travelling to a screening centre for a breast screen using conventional analogue radiography equipment, which produces a physical x ray cassette. The cassette is then physically transported to a screening assessment centre where it is processed onto film and viewed by a radiographer to assess the technical quality of the image. The image is then analysed at a tertiary assessment centre by a minimum of two radiologists and an assessment made. Results are recorded on a client file and conveyed to the woman and/or her doctor, and the x ray stored in the patient's hard copy file.



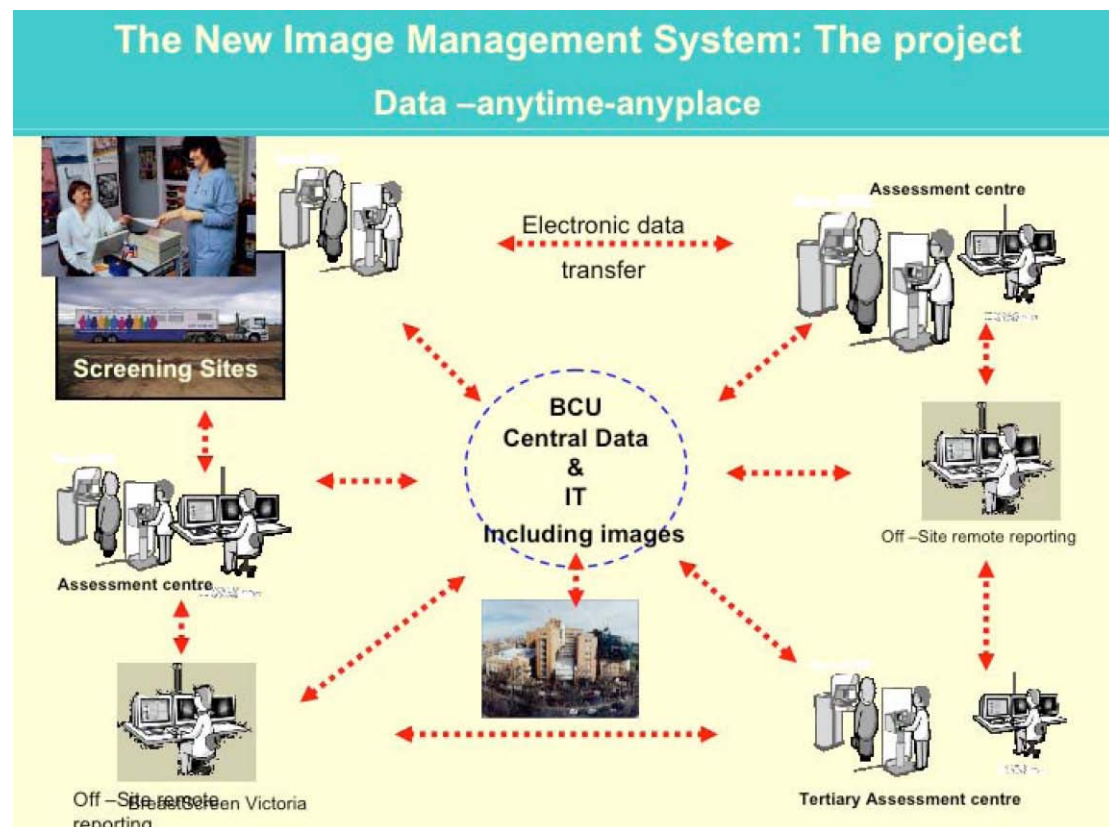
The analogue breast screening system is centred on the physical production of x rays, and is therefore limited by constraints which include:

- The need for some rural patients to travel vast distances to screening centres or mobile vans where physical x rays can be taken
- The need for some women to make repeat visits when technical issues arise with x rays
- Risks inherent in transporting unprocessed cassettes from screening centres to assessment centres

- Separation of hard copy patient records from x rays.

BSV began investigating new technology in breast imaging in 2003. By 2004 BSV had identified the need to conduct a trial which would investigate, on a small scale, the viability of digital mammography from a practical, systems, human resources, technological, financial and quality of service perspective.

The idea was to pilot a system that would replace hard copy analogue x ray images with digital images and allow digital image files to be transmitted from the mobile screening service across the BSV network of services using broadband technologies. Breast screen images could be captured digitally in either a mobile or fixed screening centre, integrated with an electronic patient record, sent to a BSV assessment centre, and stored electronically in a picture archiving communication system.



The pilot was intended to move BSV technologies and processes from a “one film, one place, one time” paradigm to a more flexible, responsive and contemporary image management system facilitating “data, any time, any place”.

Broadband, rather than dial up, was necessary because of the size of digital breast screen images, at an average file size of between 30 and 50 megabytes. Wireless broadband enabled image transfer from the mobile service centre, overcoming the logistical problems of installing temporary fixed broadband services.

Raising support and funding for the project

The pilot was to involve the purchase of expensive digital image capture equipment; its installation in a mobile van and three fixed location screening centres; deployment of a new, high speed wireless broadband solution utilizing the CDMA network in 15 locations around Victoria; re development or customization of processes to accommodate changes in workflow arising from the new technologies; education and training of personnel; employment of staff; customization of existing client management software; and purchase of a picture archiving management system and digital storage facilities as well as a disaster recovery solution.

To Breast Screen Victoria's knowledge nowhere else in the world had such a pilot been undertaken. No precedents existed to learn from, and at the time, BSV had both limited funds and limited technical expertise to finance and implement the pilot.

Realising that collaboration was the key, BSV set about identifying potential partners and sources of funds. The project was given a high priority within BSV and by 2005 the organisation had defined a three year pilot project with a set of clear objectives and milestones, and had secured funding for the \$5.4 million project budget from a range of public and private sector sources.

BSV also formed alliances with key stakeholders who would support the pilot, including the Victorian Regional Health Alliances, public hospitals, doctors and technicians in the medical community, systems and software vendors. The pilot commenced in 2005.

Main outcomes and benefits of the project

Although the project is yet to be completed and its results fully documented, the project is widely recognized as a success and has attracted the interest of screening services in other Australian states and also internationally. The project has shown that state of the art digital mammography can be successfully integrated into the Victorian breast screening services network, to improve the screening process.

A range of additional benefits and outcomes have arisen from the project. It has:

- Strengthened BSV's ability to demonstrate a case for funding of a wider implementation of the digital breast screening service
- Improved BSV's capacity to meet the demands of the trend in private sector clinics towards replacement of analogue with digital breast screening technologies
- Improved BSV's capacity to attract and retain staff in a sector experiencing mounting workforce shortages
- Raised morale at BSV and added to a sense that the organization is involved in a cutting edge project of real significance
- Increased the level of technical skills and the rate of new technology adoption within BSV

The evaluation phase of the project will enable BSV to assess other potential benefits such as productivity improvements and cost reductions.

Lessons learned

With the pilot almost completed, BSV has learned some valuable lessons that may be useful to other organizations intending to undertake broadband projects.

Planning the project

1. Clearly scope the project with distinct milestones

In order to manage risks and ensure a formal evaluation of outcomes against objectives, the pilot was scoped in three phases, starting with a discrete implementation limited to one mobile van and one breast screening assessment centre, extending to a broader rollout in phase two, and completing with a project evaluation in phase three.

2. Make the project an organizational priority and support it with an internal champion

The impetus for the project was driven by the CEO and Board of BSV, whose ongoing commitment to the project gave it real strength. The project was positioned as a strategic and business priority and given regular attention and profile in the organization's communications, e.g. annual reports, newsletters etc. A high profile and an internal champion gave the project momentum and added to its chances of success.

Financing the project and working with funding providers

3. Understand that securing funds is time and resource intensive, and a tailored approach may be required

Arranging finance for the project was time and resource intensive for BSV. When initially conceived, the project was far more oriented towards image capture rather than image transfer. However, in order to obtain funding, BSV found that it needed to tailor the project objectives to the requirements of funding providers. To gain funding from Multimedia Victoria, this meant focusing more on the use of broadband technology than the use of digital screening equipment.

Although sources of funds were readily identifiable through the Victorian and Commonwealth governments and the private sector, ease of access to these funds varied. Ironically, one of the challenges BSV faced was to educate and convince some potential funding providers that the project was not just about technology: that rather than being an end in itself, technology was being used as an enabler of an improved health delivery service.

Managing and implementing the project

4. Bring a dedicated project manager on to take responsibility for project implementation and ensure adequate support from internal project teams

Before the project commenced, BSV recognized its lack of experience in technical project management could jeopardize the project's success, so it employed an experienced project manager to lead the project. This established clear lines of accountability and responsibility,

and helped to ensure that the project was delivered on time, with minimal variation to the original project budget, and to expectations.

5. Recognize that the project might put extra strain on people and systems, and be prepared to accommodate this with additional resources

Ambitious targets were set, especially for the early stages of the project in order to get it up and running. BSV found that this put some pressure on personnel – particularly technical staff who had to manage both their “ordinary” responsibilities and those associated with the project. A flexible approach was required to accommodate these extra demands.

6. Be prepared for a steep learning curve, especially if your organization is not well experienced in undertaking technology projects

Even with a dedicated project manager and dedicated staff the project forced staff and users of the digital systems to learn and rapidly adapt to new technologies and the changes to existing processes that they introduced. Future rollouts would benefit from more resources to support the rollout of technology.

7. Be flexible enough to accommodate a rapid rate of technological change

Technology changes very quickly. BSV’s experience was that it changed even faster than was envisaged at the project planning stage. For example, by the time the pilot commenced, the wireless broadband solution originally identified could no longer be implemented it was part of a network service slated for decommissioning by the network provider. An alternative had to be sourced that stayed within the project budget within a short timeframe.

Working with stakeholders

8. Understand that the project is as much about communications and change management as anything else

To be successful, the project depended on the involvement of a range of internal and external stakeholders – from BSV staff through to funding organizations, technology suppliers, technicians, medical professionals, hospitals and end users of the breast screening service. For many stakeholders, the project required changes to existing systems and procedures.

By instituting regular and timely communications with stakeholders, communicating with them early to make them aware of upcoming milestones and change requirements, working in multidisciplinary teams to develop practical solutions, and including feedback loops, BSV helped to:

- Reduce surprises
- Enable stakeholders to transition smoothly from old to new practices, and
- Build internal and external support and commitment for the project.

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Victorian Government Submission

House of Representatives Infrastructure and Communications Committee

Inquiry into the Role and Potential of the National Broadband Network

Central Highlands Agribusiness Forum (CHAF) - Using web 2.0 platform to improve farm and environment management

About the Central Highlands Agribusiness Forum

CHAF is a not for profit organisation based in Ballarat that represents agriculture and agribusinesses from the Macedon Ranges Shire to the South Australian Border. The organisation works to support agriculture and agribusiness operators in the region to become more economically viable through the introduction of new and innovative practices.

Background to the project

Crop farmers are working in increasingly adverse conditions characterised by rapid economic and environmental change. The implications of these conditions can be better managed with access to timely and relevant environmental information from sensor technologies that can help farmers improve operations and decision making regarding planting, spraying and harvesting of crops.

However, many farmers do not have access to sufficient, consistent, timely or usable data or sensor technologies, due to outlay costs and complexities associated with deploying this technology and interpreting data.

This situation results in a loss of opportunities for improved efficiency, revenues and environmental outcomes. An innovative response could help more farmers benefit from existing deployed sensor technologies and enable them to receive and share information that improves their farming operations and decision making.

Project approach

This project is building an accessible, interactive live web environment for farmers and agriculturists that enable the capture, analysis and sharing of detailed information and knowledge relating to climatic and environmental conditions in and around their properties and surrounding regions.

Systems of sensors and weather stations have been deployed across the properties and environs of participating stakeholder properties. These systems transmit data back to a central repository where it is processed and analysed. Once this process has been completed, the results are published on a Web 2.0 portal that has been tailored to be relevant for farmers. Results can also be deployed to mobile technologies for use in the field – such as tablets, smart phones and SMS alerts. Results will be maintained for longitudinal analysis that could assist in cropping operations and decision making.

Farmers and agriculturalists have been actively engaged so that their requirements can be met in a manner that does not require a high level of IT literacy and information can be presented in a format and within parameters that are relevant to farmers. Additionally, the data and information is being presented in a way that can be quickly understood and

applied by the end users. Web 2.0 tools have also been incorporated to facilitate knowledge sharing amongst users of the system.

Project investment

Victorian Government cliff funding was a crucial catalyst in enabling earlier investment in the technologies developed on this project. This is the first ICT innovation project CHAF has undertaken.

Project collaboration

The project has enabled CHAF to collaborate with a range of project partners, the key ones being:

- Lateral Plains based in Ballarat, Lateral Plains works with government bodies and regional businesses and service providers on web applications. Lateral Plains has had an ongoing relationship with CHAF and DBI and was positioned to introduce cliff and its benefits to CHAF
- Farm Works International – again, based locally, Farm Works brought international experience and knowledge relating to sensor technologies that has been instrumental to tackling one of the biggest challenges on the project; developing the protocols and interfaces needed to collate data from a wide variety of sensor technologies
- Telstra Countrywide – providing communications support and T Tablet technology to trial in the field
- City of Ballarat and Moorabool Shire – providing support through economic development resources and funding toward weather stations and sensors
- IPV6 Now – providing support for development of the project business case.

Looking ahead, the project has reached a point where interest is now being shown from a number of potential new collaboration partners who are keen to be part of future development of the system. For example, Ballarat University has expressed interest in participating – through incorporating geo spatial data and mapping functionality that supports data analysis and system use by farmers.

Project benefits and outcomes

Although yet to be completed, early indications suggest the following benefits and outcomes are likely to be delivered by this project:

1. Economic benefits to farmers

Access to the right weather, soil and environmental data, at the right time and in the right format is expected to help Victorian farmers improve operations and optimise decision making regarding planting, spraying and harvesting of crops. As a result, farmers are expected to benefit from:

- Increased revenues from:

- Increased crop yields. Determining optimum sowing dates will improve germination, plant growth and minimise risks associated with potential frost and heat damage during and after flowering. Based on work undertaken by DPI in Dunkeld, CHAF estimate this could equate to a 10-20% improvement in crop yields. On an average farm¹³ and applying current prices for wheat, this would equate to an extra \$15,000 to \$30,000 in revenue per farm per annum
- Increased crop quality helping farmers to attract premium prices for crops
- Additional crops. Improved information relevant to planting and harvesting has the potential to help farmers time cropping decisions that support planting of additional crops – providing additional sources of income from crops or avoidance of costs associated with needing to buy feed for stock.
- Reduced costs from:
 - Avoiding the need to re-sow crops as a result of poor timing of planting decisions in sub-optimal conditions. Re-sowing is a relatively common occurrence – CHAF estimate that, over the past 10 years, 80% of farms would need to re-sow at least once each year. Re-sowing costs the average Victorian farm between \$30,000 and \$40,000 each time this occurs¹⁴
 - Applying improved information – including Delta T modeling – to optimise timing of fertiliser applications and spraying for pests and disease. This reduces the significant risks and costs associated with spray drift and damage to neighbouring crops and the environment
 - Avoidance or mitigation of costs and consequences of failed crops. For example:
 - Avoiding planting decisions for crops where conditions will not support successful germination or growth. CHAF estimate this could help avoid costs on an average sized farm of up to \$135,000 in a season
 - Mitigation of costs associated with planted crops where conditions will not support crops coming to fruition – e.g. supporting decisions early to convert grain crops to hay, so that farmers can realise income from otherwise failed crops. On an average sized farm, and considering average yields and prices for hay, this could turn an otherwise failed crop in to \$124,000 revenue.
 - Considering the benefits associated with improved yields and reduced need to re-sow crops, the economic benefit for farms that use the CHAF application could amount to \$39,000 to \$62,000 each year¹⁵.

Within its first year of deployment of the system, CHAF conservatively aims to have at least 30 farms benefiting from access to timely, relevant environmental data to support their cropping operations and decision making. The aggregate economic benefit of this

¹³ CHAF sourced ABS data – average Victorian farm area sown to crop is 207ha per farm

¹⁴ CHAF estimate based on average cropped area per farm (207ha) and sowing costs of \$150-\$200/ha

¹⁵ Based on economic benefits for average farms

application could therefore amount to \$1.2m to \$1.9m in its first year. These savings represent around 10 times the total cost of the project. Note: this figure does not attempt to aggregate other economic benefits outlined above – which are significant when realised.

Longer term, CHAF plans to extend the application to its expanded member base and to new end users in farming regions throughout Victoria and interstate. Within Victoria alone, there are an estimated 2,500 grain farms that could benefit from this application¹⁶.

2. Improved skills and confidence of participating farmers

In addition to economic benefits, participating farmers stand to realise significant benefits associated with improved skills and confidence flowing from:

- Greater connectedness and collaboration with other farmers, agriculturalists and government agencies to share knowledge and experience that leads to improved operations and greater certainty in decision making
- Development of new skills in cropping operations and ICT – through utilisation of tailored information for farmers on web 2.0 platforms.

3. Improved environmental outcomes

Improved decision making regarding the timing and use of sprays and fertilisers helps to avoid adverse environmental impacts such as drift to neighbouring properties and excessive build up of urea from fertilisers.

4. Support sustainability of CHAF

CHAF stands to benefit from:

- Provision of a valuable service to attract and retain members
- Elevated brand and reputation as a supporter of innovative practices and solutions that benefit farmers and the environment
- Membership subscriptions that can be directed toward improvement of the application and longitudinal analysis of results to improve cropping operations and decision making.

In addition to the benefits and outcomes identified above, the project has already triggered interest in new and interesting application areas such as:

- Deployment by councils and shires to optimise management of reserves and recreation facilities – and improve irrigation efficiency
- Application by vignerons to manage planting and harvesting of grapes
- Extended application in new regions such as the Southern Farmers in Victoria (with a membership base of 300 400 farmers and agriculturalists).

¹⁶ CHAF estimate, based on ABS data

This interest and the opportunity to replicate and scale this application should increase over time once it has been launched and benefits are realised.