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SENATE

SELECT COMMITTEE ON THE NATIONAL BROADBAND
NETWORK

Reference: Implications of the proposed National Broadband Network

WEDNESDAY, 7 OCTOBER 2009

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**SENATE SELECT COMMITTEE ON
THE NATIONAL BROADBAND NETWORK**

Wednesday, 7 October 2009

Members: Senator Fisher (*Chair*), Senator Nash (*Deputy Chair*), Senators Birmingham, Ludlam, Lundy, Ian Macdonald and Sterle

Senators in attendance: Senators Fisher, Ludlam, Lundy, Ian Macdonald, Barnett and Birmingham

Participating members: Senators Abetz, Adams, Back, Barnett, Bilyk, Mark Bishop, Boswell, Boyce, Brandis, Carol Brown, Bushby, Cameron, Cash, Colbeck, Jacinta Collins, Coonan, Cormann, Crossin, Eggleston, Farrell, Feeney, Ferguson, Fielding, Fierravanti-Wells, Fifield, Forshaw, Furner, Heffernan, Humphries, Hurley, Hutchins, Johnston, Joyce, Kroger, McEwen, McGauran, McLucas, Marshall, Mason, Minchin, Moore, O'Brien, Parry, Payne, Polley, Pratt, Ronaldson, Ryan, Scullion, Stephens, Troeth, Trood, Williams, Wortley and Xenophon

Terms of reference for the inquiry:

1. To inquire into and report on:
 - a. the Government's decision to establish a company to build and operate a National Broadband Network (NBN) to:
 - i. connect 90 per cent of all Australian homes, schools and workplaces with optical fibre to the premise (FTTP) to enable broadband services with speeds of 100 megabits per second;
 - ii. connect all other premises in Australia with next generation wireless and satellite technologies to deliver broadband speeds of 12 megabits per second or more;
 - iii. directly support up to 25,000 local jobs every year, on average, over the eight year life of the project.
 - b. the implications of the NBN for consumers and taxpayers in terms of:
 - i. service availability, choice and costs,
 - ii. competition in telecommunications and broadband services, and
 - iii. likely consequences for national productivity, investment, economic growth, cost of living and social capital.
2. The committee's investigation should include, but not be limited to:
 - a. any economic and cost/benefit analysis underpinning the NBN;
 - b. the ownership, governance and operating arrangements of the NBN company and any NBN related entities;
 - c. any use of bonds to fund the NBN;
 - d. any regulations or legislation pertaining to the NBN;
 - e. the availability, price, level of innovation and service characteristics of broadband products presently available, the extent to which those services are delivered by established and emerging providers, and the prospects for future improvements in broadband infrastructure and services (including through private investment);
 - f. the effects of the NBN on the availability, price, choice, level of innovation and service characteristics of broadband products in metropolitan, outer-metropolitan, semi-rural and rural and regional areas and towns;
 - g. the extent of demand for currently available broadband services, the factors influencing consumer choice for broadband products and the effect on demand if the Government's FTTP proposal proceeds;
 - h. any technical, economic, commercial, regulatory, social or other barriers that may impede attaining the Government's stated goal for broadband availability and performance in the specified timeframe;
 - i. the appropriate public policy goals for communications in Australia and the nature of any necessary regulatory settings to continue to develop competitive market conditions, improved services, lower prices and innovation;
 - j. the role of government and its relationship with the private sector and existing private investment in the telecommunications sector;
 - k. the effect of the NBN on the delivery of Universal Service Obligations services;

- l. whether, and if so to what extent, the former Government's OPEL initiative would have assisted making higher speeds and more affordable broadband services available.
3. In carrying out this inquiry, the committee will:
 - a. expressly seek the input of the telecommunications industry, industry analysts, consumer advocates, broadband users and service providers;
 - b. request formal submissions that directly respond to the terms of reference from the Australian Competition and Consumer Commission, the Productivity Commission, Infrastructure Australia, the Department of the Treasury, the Department of Finance and Deregulation, and the Department of Infrastructure, Transport, Regional Development and Local Government;
 - c. invite contributions from organisations and individuals with expertise in:
 - i. public policy formulation and evaluation,
 - ii. technical considerations including network architecture, interconnection and emerging technology,
 - iii. regulatory framework, open access, competition and pricing practice,
 - iv. private sector telecommunications retail and wholesale business including business case analysis and price and demand sensitivities,
 - v. contemporary broadband investment, law and finance,
 - vi. network operation, technical options and functionality of the 'last mile' link to premises, and
 - vii. relevant and comparative international experiences and insights applicable to the Australian context;
 - d. advertise for submissions from members of the public and to the fullest extent possible, conduct hearings and receive evidence in a manner that is open and transparent to the public; and
 - e. recognise the Government's NBN proposal represents a significant public sector intervention into an increasingly important area of private sector activity and that the market is seeking openness, certainty and transparency in the public policy deliberations.

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Committee met at 9.10 am**WYLER, Mr Gregory, Founder and Chief Executive Officer, O3b Networks**

Evidence was taken via teleconference—

CHAIR (Senator Fisher)—I declare open this further hearing of the Senate Select Committee on the National Broadband Network. I welcome Mr Greg Wyler from O3b Networks. I will just deal with some formalities, Mr Wyler, and then we will hear from you. The proceedings of this committee are public and, in providing evidence to the committee, you are protected by parliamentary privilege. It is an offence for a third party to attempt to interfere with evidence given by a witness to a Senate committee and potentially a contempt of the Senate, as it is indeed for a witness to give false or misleading evidence to the committee. If at any stage you wish to provide your evidence in camera, please make that request—and it would be very interesting! But the committee would of course consider it.

I will introduce the members of the committee for you, going from left to right: Senator Guy Barnett, Liberal, from Tasmania; Senator Scott Ludlam, the Australian Greens, from Western Australia; I am Senator Mary Jo Fisher, Liberal, from South Australia; Senator Kate Lundy, Labor, from the ACT; and Senator Ian Macdonald, Liberal, from Queensland. The committee has your submission, Mr Wyler. Are there any amendments that you want to make to it?

Mr Wyler—No.

CHAIR—Would you like to make a brief opening statement, after which we will fire some questions at you and try to get the benefit of your wisdom.

Mr Wyler—I hope I can live up to the wisdom part! I appreciate the introduction. I am actually speaking to you from Geneva, as I am at the ITU Telecom World conference. I was on a panel today reviewing broadband economic stimuluses, which was kind of interesting since I was going to have this phone call tonight. I got the benefit of hearing some of what India have done, their successes, and they hope to soon have more successes in certain areas. I appreciate your allowing me to give you some of my thoughts on broadband. I believe it to be very important to level the playing field economically for all people around the world, not just people who happen to live in the cities. That is an area that I have focused on for the past 10 years of my life. But I will open it up to questions; I am sure you have a lot of questions from some of the probably overly technical details I supplied in my briefing.

CHAIR—Thank you, Mr Wyler. Who would like to begin? Senator Macdonald.

Senator IAN MACDONALD—Mr Wyler, can you elaborate just a little more about the difference between the configuration of satellites in your network and the configurations in other satellite networks. I understand yours is a different system; is that correct?

Mr Wyler—Yes, it is very different to the current satellites that are out there in terms of its configuration—and when I say ‘current satellites’ I mean the geosatellites that exist today. There are a number of other satellites in similar orbital configurations as ours—in other words, in similar places of space or circling the earth in similar ways—but typically most of the satellites

that you are familiar with are geosatellites. They have been providing video very successfully, which is a one-way service where the distance from the earth does not matter. These satellites are very far from earth—about 36,000 kilometres. When they are providing a television service the fact that CNN arrives at your home through your DTH service half a second after it would arrive at your home through a terrestrial cable TV service would not impact the quality of performance.

Geosatellites have been very expensive—about \$250 to \$300 million to produce. Our satellites are much less expensive to produce—about \$22 million to produce. We put them in orbit at I think about 8,062.7 kilometres, which is 4.6 times closer to the earth than a geosatellite. The satellites being closer to the earth means they can use a lot less power to bring just as much capacity to the earth or to the customer. On top of that we have been allocated 4.3 gigahertz of capacity, which is much more than any of the geosatellites.

So it is a combination of where the satellites are located—being closer to the earth—having a much larger spectrum to be able to provide very high capacity—the capacity that is not typically available on a geosatellite—and being able to provide the low latency that geosatellites cannot provide because of their distance. There are a few other odds and ends, but that is an overview.

Senator IAN MACDONALD—Why don't other operators have their satellites closer? Is it because it is cheaper to put them further away and it does not really matter with video or with pictures?

Mr Wyler—When you are doing one-way video, the latency is not an issue because you are not interacting with the satellite, you are just receiving. The problem with bringing satellites closer to the earth is that they move very slowly. In order to cover areas away from the equator, you would have had to have done a very sophisticated orbital pattern, which would require in some cases 48 or 66 satellites in order to cover the globe. In our case we have designed the satellites to only cover the equatorial region from plus or minus 45 degrees north and south. That means we cannot cover Canada, but we can cover all of Australia.

CHAIR—Did you say that 03b satellites were more or less expensive?

Mr Wyler—Substantially less expensive.

Senator IAN MACDONALD—Australia was looking at launching satellites from Christmas Island a few years ago and, as I recall, they were to be low-orbit satellites. Is that correct? Where do you launch your satellites from?

Mr Wyler—Our satellites are launched from French Guiana. I am not familiar with your Christmas Island launches, so I cannot speak to that.

Senator IAN MACDONALD—Had you finish what you were saying before? If not, you can go back to that.

Mr Wyler—I can go on. I forget where I left off precisely. The key factor is that our satellites are closer to the earth and they are travelling around the equator. They are limited in that they cannot reach more than 45 degrees north or south, but within that band there are a lot of people today who need broadband and ours are designed to provide broadband to those people.

Senator IAN MACDONALD—Who takes advantage of your services at the moment?

Mr Wyler—The satellites are in production right now, so they have not been launched. We have already sold approximately \$600 million worth of backlog in the past 10 months. The main customers are telecom operators who will use it for backhaul. That means that we will provide services directly to a cellular tower and then the cellular tower will use 3G or WiMAX for the access network to the customer. The other areas that will use it, excluding the military, are hospitals, universities or any large building that would want anywhere from 20 to 150 megabits per second at low latency. An alternative use is what is called the core network for countries. Countries have purchased it for the main backhaul to their country where they do not have access to any fibre for the country themselves.

Senator LUNDY—I want to ask you some questions about latency and its effect on web performance. You make quite a strong point in your submission about the problems relating to latency and how they can be resolved. Can you describe for the committee's benefit what the general problems with latency are when it comes to a high-bandwidth satellite connection? The current state of play is lowering latency thereby making satellite a better quality experience for internet users.

Mr Wyler—Latency is paramount in the quality of internet access. Latency is not to be confused with throughput. It is not related to the amount of megabits per second that you may have. It is purely the response time. As we move into newer, rich desktop type environments, you want a faster response. As you move your mouse and click on something, you want a response. You want the new webpage to load as if it were operating like a desktop system—for instance, as Microsoft Word would operate. Latency is key.

The issue is that the geosatellites are so far from the earth that their latency is about 600 milliseconds at a minimum. That is five to six times more latency than our satellites and five to six times or maybe even eight or 10 times more latency than you would find in a terrestrial network. Latency is really a question of the distance between your computer when you click on Google and where the server is for Google that responds to it. If that server happens to be in Mountain View, California and you are sitting in Canberra then you are going to go through all the fibre networks up to Mountain View where it is going to talk to the server and the response will come from Mountain View, California probably across to Hawaii and all the way back to your computer. That time difference—and in that case it is probably 150 milliseconds—makes up the speed at which something appears on your screen and the responsiveness of your web systems.

Geosatellites are so far from the earth that they have this high-latency response issue, over half a second. People will do things to try to help the throughput, meaning how many megabits per second you can download something at but downloading something—a big file transfer, for instance—is very different from the responsiveness of clicking through websites and using Web 2.0 type rich environments.

There is no real answer, whether it is satellites or a long distance fibre—for instance, Australia trying to talk to a server in Iceland—to latency because you cannot predict where somebody is going to click. The newer websites have more latency related problems because a webpage—Facebook, Yahoo or so on—is really an amalgamation of small web panels coming from many

different servers from around the world. Your computer goes out to all of those servers, picks up the pieces and reassembles them on your desktop for you. What you see is a webpage, but your computer sees bits and pieces pulled from all different servers from all different locations. You cannot accelerate that. Therefore, the geosatellites, while they are improving their throughput with the spot beam geosatellites, they have not been able to make any headway on the latency issues. The latency issues will become bigger for us as we move to richer web content.

Senator LUNDY—I think it is important to get this on the record. It does not matter how fat the pipe is with respect to the satellite connection, there will still be poor performance if there is high latency within that connection?

Mr Wyler—That is correct. The lower the latency, the better the performance of your web connection.

Senator LUNDY—I want to ask you about the prospects for the type of satellite you describe for Australia in the context of the National Broadband Network. How many of the O3b satellites are currently functioning? What plans are there for an Australian footprint for this type of satellite service?

Mr Wyler—Today there are none in the sky, because we are in production. The good news is that most of the back end of the satellites is also in production for another company called Globalstar, which will be launching 24 of them before us. There is quite a lot of history and heritage in the components in the system. There is nothing particularly new about each of the components. It is just the way we are using them that is new. In 2011 we will be launching them.

In terms of the footprint for Australia, something that is unique about the O3b satellites versus, for instance, a high-throughput geosatellite is our beams are steerable, which means that the footprint of the beams can be wherever you would like them to be and can change them as you would like them to change. If you put a number of footprints of these spot beams on Australia and you find that one area has a significant amount of take-up then you can point another beam to that area. This is very different to a geosatellite that has spot beams because in a high-throughput geosatellite environment you cannot move the beams around. You have to design it and for the life of the satellite the beams and the amount of capacity dedicated to each area are locked. You have to put a lot of forethought in the design and layout of those beams.

We do not have a footprint designated for Australia; however, if Australia wanted a footprint on it, we could easily work that out for Australia. It is just commanding the satellite to light up different areas of Australia.

Senator LUNDY—I also have a question about the way O3b is funded. I understand it is Google, Liberty Global and HSBC. Can you describe the structure behind the O3b Networks please?

Mr Wyler—Liberty, HSBC and Google have been funding us, along with a couple of other smaller investors. We have also received about \$465 million of debt guarantees from the French government. Plus we have two more investors we are seeking to finalise in the next few months, providing the approximate \$800 million of funding for O3b. That provides for the initial satellites, all of the design and all of the one-off services that take place in order to create the

satellites and the network. The follow-on satellites and networks are very inexpensive. In the \$150 million to \$200 million range we can launch four new satellites. Just four satellites would create an Australian footprint.

Senator LUNDY—So four satellites at \$200 million each?

Mr Wyler—No, in total.

Senator LUNDY—Total?

Mr Wyler—Altogether.

Senator LUNDY—So once your service is launched you could provide coverage of Australia for less than \$200 million?

Mr Wyler—Yes.

Senator LUDLAM—Thank you very much for staying up late for us. It is greatly appreciated.

Mr Wyler—It is no problem.

Senator LUDLAM—Some of the detail in your submission makes it look as though effectively you are going after areas with very low telecommunications at the moment, and your name refers to the other three billion who do not have these services. Are you looking to markets such as Australia to help finance coverage of those parts of the world?

Mr Wyler—That could help. Where we can provide capacity that will help offset the costs or provide revenues will then allow that same satellite as it travels around the world to be used in other areas where they may have significantly lower economic structures.

Senator LUDLAM—What is your timeline for having the first one of these satellites in place?

Mr Wyler—In about 20 or 22 months we will have the official launch—so mid-2011—with the first four and then 45 days later we will have the second four.

Senator LUDLAM—Does the performance degrade the further you get from the equator? Would a satellite system like yours be able to reach Tasmania, for example?

Mr Wyler—It can reach Tasmania. There would be a minor change in the latency, about a one or two per cent change, so it is not significant. As you get to the most southern parts of Tasmania, you would not have performance degradation but you would have to make sure that you do not have anything interfering between your dish and the satellite. As long as your dish on the ground can see the satellite that is pretty high in the sky then you would have no performance degradation.

Senator LUDLAM—You talk about two things: latency, which we have talked about a little bit, and oversubscription. Can you tease out for us what oversubscription means in the context of satellite services?

Mr Wyler—Really what we have is a microwave that is coming from the sky. It is a very tall tower. Whether we are running a satellite or not it is identical in the sense that it is a microwave transmitting data back and forth. Oversubscription is a key factor. A lot of times I hear people talk about megabits per second. Humans like to boil everything down to one number, then hear the one number, make a decision and then move on to the next thing. The reality is that it is a little more complex than how many megabits per second a customer gets offered because oversubscription, like latency, really defines the quality of the network.

I will give you an example. If you provide 12 megabits piped into a town and then put up a WiMAX tower and then offer everybody 12 megabits to their home and you have 100 customers then you have 100 times oversubscription. You have promised 100 people 12 megabits, but the reality is that there are only 12 megabits leaving the town so they could not all use it at once. That is oversubscription. Unless you watch the oversubscription, or at least take note of it, it is possible to find that the quality you are hoping for is not really achieved.

Senator LUDLAM—You described before how a system of four satellites for \$200 million could reach all of the Australian landmass. Would those four satellites be all that we would need to cover the 10 per cent of the population that fibre will not reach or would that be oversubscribed as soon as more than a few thousand people tried to log on?

Mr Wyler—It would be four additional satellites on top of the eight. We already have eight up there, we would add four more and then we would take the ones over Australia and point them at Australia and you would have pretty solid coverage of Australia. Now, you are hitting on the right question, which is: how much capacity will end up in what area and what location? There will definitely be oversubscription. There is oversubscription in every single network; it is inherent. But you do not want to have too much. I think to do that we would have to do a bit of a study. We would just take a little bit of time to walk through the population densities of each of the areas, understand how much capacity each area needed and then map out the number of satellites or the number of beams that were required for each area. So I think it would quite possibly grow from the initial four. You might want to add another four at some point. In terms of total throughput, off each satellite, into the types of locations you are talking about, you would be getting about 12 gigabits of throughput for each four to all the towers, and then you would have to look at how many towers you hit and how many customers were connecting through those towers.

Senator LUDLAM—Okay. So the satellites are basically transmitting to a series of towers, similar to mobile phone towers?

Mr Wyler—Exactly.

Senator LUDLAM—Okay. That is great. Thanks again for staying up late to provide us with your evidence.

Mr Wyler—No problem. I appreciate your listening. By the way, at the same time you connect to the cell towers you can also connect to hospitals and schools. You could put dishes at each of the larger locations, but it is not designed really for going direct to the consumer. That is not the way you would really want to use it, most likely, in this application.

CHAIR—Senator Barnett.

Senator BARNETT—Thanks very much for your evidence today, Mr Wyler. It is a bit of a learning experience for me, and perhaps for others as well, so I appreciate your knowledge and indeed your wisdom. With these four additional satellites—and they are additional to the eight, is that right, that are already in operation?

Mr Wyler—That will be in operation. That is correct. They are not in operation yet.

Senator BARNETT—So that would be a total of 12?

Mr Wyler—Correct.

Senator BARNETT—And the four additional satellites will cost approximately \$200 million?

Mr Wyler—That is correct.

Senator BARNETT—Right. You say it would be transmitted to the towers. In a country like Australia, to the best estimate possible, do you have any idea of how many towers we would need and the costs of the towers? You have indicated the possibility of direct connection to schools and hospitals as well; obviously, they would be separate costs. Can you give us a bit of a feel for the towers required.

Mr Wyler—Towers are changing in price as we speak. The price for 3G back-offs and WiMAX equipment is continually coming down. I do not know the volume of towers. If you look at 10 per cent of your population—there is some math that can be done, but I just do not know the volume of towers that you would need. You would really want to do a bit of a detailed analysis, which is not too huge, or I could certainly look at one, to determine approximately how many towers you would want place, how many schools and hospitals, and there may be areas of community density or civic centres at which you would want to locate some sites. You could do a study and walk through that and come up with a fairly solid answer as to what you want to do, but it is hard to say without looking at the mapping. The reason I mention that is that, for example, you may have a farm and you say, ‘I want that farmhouse customer to have good quality internet,’ but there is so much area there it is not worth putting up a tower. It is cheaper just to put the dish at his house. So it is hard to make a general statement about how many towers are needed—at this moment, at least, for me.

Senator BARNETT—Yes. So, with regard to covering this 10 per cent of the population, there is the issue of capacity—I think Senator Ludlam was asking about that—and in what areas, and you were sort of indicating that that is a key question. And you have got the issues of both latency and oversubscription. Just to clarify, you are saying you could undertake a study. I presume it would be a reasonably extensive study, so how long would that take? Would that then

provide information to determine how much area would be covered and what capacity there was to deal with both the latency and oversubscription issues?

Mr Wyler—Yes. I think a study, depending on how detailed an answer you wanted, could take anywhere from four to six weeks or two months to dive into some of the detail, provided some of the core information were available, and I am assuming it is. That could get you a pretty accurate answer as to the performance and the quality that you could expect.

But in terms of the oversubscription—the number of customers and the number of customers you would expect and the take-up rates in the various areas—you would need to look at each area individually. For instance, if you wanted Tasmania covered, or if you wanted different parts of Australia to be covered, we would want to take a look at each one and come back with some sort of a report so that you could look at your area specifically and what you think the results would be for that area. You would probably want to underlay on that some amount of what you might be doing in terms of your 90 per cent. In other words, when we put down a beam and light up an area, it might light up a circle that is 500 kilometres in diameter. Within that there will be some pockets where you will have fibre and people served already and you would want to take them out of the equation. You would want to find out where, so to speak, the last 10 per cent is, because sometimes they may be mixed in close with the 90 per cent that you are dealing with using other topologies.

Senator BARNETT—Thank you very much, Mr Wyler.

CHAIR—Mr Wyler, you have talked about the cost of setting up the infrastructure, and I understand that you would not contemplate necessarily directly interfacing with the subscriber or the customer. But given that we are probably talking about 10 per cent of the Australian population, do you think satellite connections are a price-competitive option?

Mr Wyler—In this case, certainly, compared to running backhaul or fibre across great distances and maintaining it or running large microwave networks with multiple repeaters. The O3b Networks system—and at least I can talk about our system—is designed specifically to do this—to reduce the cost of providing very high-quality internet access into areas where there is not the population density or the economic density to bring in fibre, multiple redundant and resilient fibre networks and things like that. It is certainly designed to do exactly what you are talking about.

CHAIR—Given your experience, how responsive is satellite to different climatic conditions? Your submission talks about having satellite as a direct substitute for fibre, and you refer to having stability always on connections, but can they be affected by changes in weather or climate?

Mr Wyler—Absolutely, and that is a good question. The reliability of satellite is very high even in comparison to fibre and microwave and things like that. In terms of our satellites that use Ka-band, which are more affected by rain than other frequencies however, you have to design your system to handle and manage that. There are millions of direct-to-home subscribers using Ka-band today and certainly in Wild Blue, that I am sure you are familiar with, they are using Ka-band for direct-to-home internet. So it is done today and it is done quite well. All of these studies about how it works and how rain stacks the signal path are very well known and there

have been many, many years of scientific study on them so we know exactly how they behave in all sorts of environments. So you would have to design the system to operate in that environment.

Nothing is foolproof. There can be moments of outages in any topology whether it is fibre—and I have run fibre networks—or microwave. In microwave networks you can lose power at the tower or they can be affected by rain and such things. Our satellites operate on very similar frequencies to the microwaves so, to the extent that you would use microwave to do microwave hops, you could also be affected. Fibre is not affected by rain, typically, unless there is flooding; it is more affected by backhoe phase or power losses at regeneration stations and things like that. So every topology has its thing but all of the things you are talking about, if designed correctly, will provide a quality of service that is very, very high.

CHAIR—But you are nonetheless saying that in many respects satellites can be geared to be less sensitive to those variations than fibre, are you?

Mr Wyler—Satellites can certainly be designed to have very limited sensitivity to weather conditions, but there will be ultimate weather conditions which would reduce the signal strength for the period of time that the weather condition is at that level and operating in that way. Fibre has its own issues, with people digging it up, with cuts, with anchors in undersea fibre and things like that. So everything has areas where it could be cut or prevented from operating. We focus obviously on ours, because satellites do not have the same issues that fibre does.

CHAIR—If you gear satellites to deal with those sensitivities, does that materially affect the cost of the infrastructure that you outlined earlier? It must affect it, but how materially?

Mr Wyler—It certainly does affect it, but from our perspective we do not contemplate designing a system that is not done—I do not want to use the word ‘properly’, but to a level of availability that is required by the customer. In our designs we are looking at 99.5 per cent or 99.8 per cent availability. For instance, for the level 3 international fibre network, if you buy capacity on it you will get 99.5 per cent availability. We design all of our systems to that availability level, unless the customer requests something different, and we have not really looked at reducing it. So I do not know how much impact it has because everything I am talking to you about is at those types of availability levels.

CHAIR—I have one further question before we will let you sign off and take a kip. Senator Conroy, our federal minister, has been quoted as telling a regional forum here last month that if the government cannot do a deal with operators who have got satellites in the sky then we are looking to do it ourselves. In your opinion, is that objective achievable by a government?

Mr Wyler—Is it achievable for a government to do what? I am sorry, I missed that.

CHAIR—In Senator Conroy’s own words, he said that if the government cannot do a deal with operators who have got satellites in the sky, ‘we are actually looking to do it ourselves’. You can impute what he means by that statement, but that is what he said. Do you have a comment you would offer?

Mr Wyler—Building a satellite is, I would have to say, less challenging than it sounds. If you put out a bid, there are plenty of consultants who would help you with the bid and they would put out a bid to the manufacturers to build it. It is done all the time, and it is done by lots of companies with less than a long track record in satellites. That is for geosatellites; that is very common. If you were looking to do something with us, if there was an interest in having your own satellites and your own methodologies, then that also is something we would be happy to discuss. But my mission today was just to give you some ideas of how satellites worked or not, not to go into the details of O3b and how we might work together.

CHAIR—Thank you very much. From our perspective it has been worth while having you stay up; I hope you feel it has been so from yours.

Mr Wyler—Certainly; I really appreciate the opportunity. I hope it was helpful. I am sorry I could not be more exact on some answers. I fear that some of the answers require a little bit of preknowledge and detail, and even some pictures, so this might not have been the best forum to give you exact answers on certain things but, hopefully, you got an understanding.

CHAIR—Thank you very much, Mr Wyler—and goodnight or good morning!

Mr Wyler—Thank you very much.

[9.51 am]

BARNETT, Ms Elizabeth May, General Counsel, VERNet Pty Ltd

CHAIR—Welcome. The proceedings of this committee are public and you are protected by parliamentary privilege in the evidence you are about to provide. It is unlawful and potentially in contempt of the Senate for a third party to attempt to interfere with the evidence that you might provide or, indeed, for a witness to give false or misleading evidence. If at any stage you wish to provide your evidence in camera, please make that request and the committee will consider it. The committee has received your submission. Do you wish to amend it in any way?

Ms Barnett—No.

CHAIR—I invite you to make a brief opening statement.

Ms Barnett—VERNet is a private, not-for-profit company operated by the nine universities in Victoria and the CSIRO. I would like to describe a little about VERNet and what we do and put forward a few points in support of the interests of the sector that I serve, which is the research and education community. We feel it is quite unique in many respects and there are some things we would love the NBN committee to have regard to when making recommendations about how the process operates.

VERNet operates a purpose-built network of some 1,800 kilometres. These details, I think, are all in our submission. We own very little physical dark fibre ourselves. About 98 per cent of our network is held in the form of IRUs or long-term leases. We hold the rights and supply transmission capacity services on to the universities, which are very experienced in putting equipment on the glass, working with it and so on. We found that generally dark fibre is more satisfactory for our purposes than wavelength services—we have had a couple of issues there—and we are also finding that the members are very good at finding some quite creative uses for the infrastructure we give them. Because we were fairly capital-constrained at the start-up, all of our network, apart from the very tiny bits that we own, is purpose-constrained. Our suppliers have basically put research and education limits on it. We are not allowed to use it or supply it for any other purpose. So, although in some cases those purposes can be interpreted quite broadly, we would be unable, for example, to provide general wholesale services or commercial types of services.

The major point I want to make is that research and education has extremely high bandwidth requirements. It is an unusual sector. You are moving massive amounts of data; you are doing real-time interstate and international collaboration; you are trying to get concurrent access to large datasets and so on; you are trying to reach remote instrumentation. Our backbone network runs at one gig a second at the moment. We have upgraded to 10 gig in a number of areas and we are offering fibre channel. We are progressively upgrading to 10 gig as the members get the funding to do that.

Recently we have had a large amount of research demand and it has even been suggested that we skip 40 gig altogether and go straight to 100 gig to meet the capacity requirements. That is

consistent with REN, research and education networks internationally. Often the national backbone runs at 10 gigs and there are some, such as SuperJANET 5 in the UK which is already trialling a 100-gig backbone service. We really need scalable capacity, and that is why we have used dark fibre rather than managed services. VERNet really came about because the universities were buying managed services, because that is what was available, but, in terms of scalability and cost effectiveness they could not meet capacity and demand increases in a cost-effective way. It was simply not possible. They designed it to have dedicated dark fibre, which is us. We are scalable and, with the equipment we have, we can easily jump up the bandwidth as we need to and as demand drives it.

That segues to my next point, which is that research and education need to expand the network and connectivity to non-economic areas. That is the other reason we exist—because research and education does not simply happen in the metropolitan capital cities. There are remote centres, there are regional centres, there are rural centres, and there are metropolitan centres. For example, we connect to Lakes Entrance, Churchill and Dookie campus and we offer one gig to all of those places. In many of those, there is simply no competitive backhaul service available. There is nothing. It is not even a question of not being able to afford what is there; there is nothing there to buy. Again, because we were capital constrained, there are still very many places we would like to get to where the members have a great deal of demand but we cannot reach yet. A really good example is Mildura. La Trobe University has campuses there. There are a lot of sustainability and research and environmental projects going on, but it will cost tens of millions of dollars to get there, so, unless we get a very major amount of funding, it is not going to happen any time soon.

Funding is difficult. Higher education research tends to be institution-specific in terms of applications. It is a very competitive funding environment and, by and large, they understandably tend to focus on big-ticket infrastructure: new buildings, complex equipment and so on. Multi-project, multi-institution, enabling infrastructure such as fibre networks tends to come fairly last in the train. That is why it is difficult for us to get the funding we need to get to places, because it would be a brave university to put up its hand to us for a \$20 million link to get to Mildura. They have much higher priorities.

We found that the NBN itself is having a bit of interesting effect on the marketplace. It seems to us that dark fibre is being withdrawn as a service. I believe that if you were a new entrant into the market, it would be quite difficult to procure dark fibre. We have seen price increases in lease terms. In fact, in our own construction costs, we have seen a threefold increase in the three or four years that we have been building fibre.

As we set out in our submission—and I do apologise for the begging-bowl attitude—we think that the solution is to simply leverage off the existing networks that are out there, because there is already a very significant investment in research and education networking in Australia. To leverage off the NBN and dedicate fibre wherever the NBN goes, you can pretty much guarantee there will be an education or a research need very close to it, and you can provide two pairs to the research and education network that is responsible for the area. That gets around the double-dipping problem, where the government has already invested funds to build a research and education network, it has invested funds to build the NBN, or it will be, and it does not make sense for it to then issue government grants so that we can buy capacity in the NBN, or the

universities can buy capacity. It seems simpler to roll the NBN into us or us into the NBN, as part of a network-of-network approach. That is all I really have to say.

CHAIR—Thank you very much, Ms Barnett. I will kick off with a couple of questions. I begin, if I may, with your final point—your suggestion that you either roll into or out of the NBN but essentially leverage off it. How do you think that might impact on the cost and the roll-out of the NBN?

Ms Barnett—I do not think it would impact the cost. We are asking for two pairs. I understand the NBN is talking about constructing thick fibre—172 pairs more. We are not proposing that the NBN diverts from its operative path to reach our sites. That is what we do. We build the tails and the lead-ins—we are very good at doing that; we can do it cost effectively. What we are saying is that—and I probably did not make myself very clear—as an example, at least two of the places we would like to get to, Warrnambool and Mildura, came up consistently in a number of the submissions for the regional backhaul black spots initiative. Those are places that are already identified as lacking in competitive backhaul technology. If the NBN decides to go there, there would be no additional cost apart from the lost revenue opportunity of those pairs, presumably to the commercial operator.

CHAIR—All right. Have you had discussions with the government about your proposition; and, if so, what is the government's response?

Ms Barnett—I am not a party to those discussions. I am not the person within our organisation who does that. We are in discussion with the other RENS operating in Australia, who I understand have very similar views, although I obviously cannot speak for them.

CHAIR—So can you say whether the government is considering the request, or are you not in a position to say—

Ms Barnett—A formal request has not been made, and I do not think I would be in a position to say. We are in regular discussions with, for example, DEST in relation to specific funding initiatives and the management of the AREN; the Australian Research and Education Network—I am going to get the terminology wrong—coordinating committee considers national priorities. There is probably another entity you would wish to speak to about that national strategic level discussion, which is AARNet Pty Ltd, which operates the intercapital backbone.

CHAIR—Can I ask you to take on notice, and confirm with others in your organisation, to what extent you have made your request or suggestion known to the government, and to what extent the government appears to be actively considering that request.

Going now to your comments about the potential of the NBN to detract, in a way, from what research and education networks have been able to do thus far, you talked about seeing costs increase and fibre being withdrawn. You said 'with the NBN' and then you talked about 'over the last four years'. What do you mean by 'the NBN' in that context? It cannot be the government's planned NBN because that has not been in existence for that long. Can you expand a bit on what you mean.

Ms Barnett—Certainly. VERNet was incorporated at the end of 2004, and we have been building for the past four or five years. Initially we were able to secure certain prices for aerial and underground construction. We have certainly found in the last six to 12 months that those prices no longer hold; they increase—and that, in my view, is consistent with expectations of construction work and opportunities for the NBN. I cannot say that dark fibre being withdrawn from the market is necessarily reflective of the NBN. It may well be simply that the providers decide it is far more profitable to offer managed services. Unfortunately, nobody offers a managed service that is any good to us; we are not interested in it. But, for example, there are some state government funding initiatives that were announced towards the end of last year, early this year, which were planned for implementation this year but appear to have now been put on hold—and I understand this is reflected in the state government's submission to the NBN—apparently, for the purposes of rolling those projects up with the NBN. So something that was going to be delivered in 2009 is now going to be delivered at a time to be determined, according to the NBN's plans and rollout and the extent to which the two organisations can work with each other. That is the sort of thing I mean.

It is not the market it was two years ago, where there were a number of dark-fibre suppliers. Now we have some existing relationships, so we can continue to do those, but even those are increasing in price. They are decreasing in terms. We like to get 15- to 20-year terms on our IOUs, and now in some cases we are being offered five years with a five-year option to renew. In that sort of scenario you have to look at building your own because then you get the 20-year effect of a life's worth of fibre with no constraints.

CHAIR—All right. To what extent are RENs publicly funded? I ask that because I am wondering whether there is the capacity, in a way, for the NBN to effectively undermine the provision of necessary services to REN end users. Do you have a view on that?

Ms Barnett—I do, Senator. RENs are very largely publicly funded. I cannot speak for the other entities that operate in the sector, but in the case of VERNet about 30 per cent of our funding came from the member shareholders—they put up capital themselves—and, as I understand it, the remainder came from Commonwealth government funding, through the shareholders, into VERNet for the purposes of VERN. We also received assistance from the state government in the form of an opportunity to deal with their carrier, VicTrack.

It really depends on how the NBN operates in respect of the sector. If, for example, the NBN provides freely available dark fibre that is available to VERN or to members, provided they have got the necessary regulatory arrangements in place, then it would be as with anything else. We would work with our members to see whether it was best to leverage off and add to the existing network or whether the members were better off to make some arrangement themselves. I am not sure whether that answers your question.

CHAIR—It does in part. It does not really deal with the spectre of what may be a perception of double-dipping into the public purse to the extent that the NBN itself is publicly funded and also the RENs.

Ms Barnett—The best way to think of it is that it is not an overbuild situation where you are paying twice for exactly the same thing. The RENs have an existing network, which is unique. Depending on the design architecture, I do not think you will necessarily get that with the NBN.

For example, so far as possible, we have designed the VERNet to be resilient. It is a loop architecture rather than a star architecture or a spur architecture, with some exceptions where we simply could not afford to do a return path.

You are going to have the double-dipping problem in any respect because that investment is a sunken investment in the REN. You have now got a long-term piece of dedicated infrastructure that has been paid for and the universities are paying the operating costs for it. That fact is not going to change the government's decision to build an NBN. You are also going to have a very large sunk cost in the construction of the NBN. So those two things are not going to change. It is more of a future possibility that either the government triples its cost by providing funding to the universities to extend their RENs, perhaps overbuilding on the NBN or perhaps complementing it—I do not know—or it triple dips by giving the universities funding to acquire capacity from the NBN. I do not really see any alternative to those.

CHAIR—Thank you. I have one further area of questioning. You talked about the rural black spots, and you have given some examples, such as Mildura. Is there any rhyme or reason—geographical or otherwise—for these black spots?

Ms Barnett—Do you mean: why the services we need are not available?

CHAIR—Yes. Is there any pattern?

Ms Barnett—There is no pattern for us. They probably tend to be distributed in communities towards the edges or in the centre of the state where there are small communities and low levels of business. We can only assume that it is not economic for a provider to go there.

CHAIR—Do you have an analysis of where these places are?

Ms Barnett—I would refer you to our original black spot submission which sets it out much more eloquently and accurately than I could recall here.

CHAIR—What is your view of how the government's NBN proposition proposes to deal with this dilemma?

Ms Barnett—I can only speak from VERNet's very particular perspective. We believe that we will not be able to participate as a constructing entity for several reasons. We are unable to make a contribution in cash or in kind. Again, I am just looking to the tender model that was released recently for stage 1. Quite frankly, we do not have the cash. We are research and education constrained, so we cannot offer infrastructure. We are quite simply not set up to provide retail-wholesale services to the sector in return. So it is not an opportunity we can participate in for us. Generally speaking, I think the model of an entity and, ultimately, the government owning the infrastructure and providing IRUs back as required would work very, very well for us. As I said at the outset, that is the model on which we operate most of our network. As long as we have got capacity rights, it does not matter too much whether we have the title to the underlying asset. It is not really what we are here for.

I cannot really comment in terms of timing and selection of the starting regions. The areas I am interested in are those where my members need to get to. They are places where the

universities or CSIRO have a research presence or an education presence and they are relying on microwave links or prohibitively expensive managed services if they can get them. That is what I am looking to replace.

Senator LUDLAM—I have only a couple of questions, because I think you have described the situation reasonably well. I am interested in the degree to which you understand how AARNet is interacting in negotiations with the Commonwealth government or with NBN Co. Are they underway?

Ms Barnett—I cannot comment on that. AARNet is a totally separate, incorporated entity. We are complementary to each other. We have some shareholders in common, and we have commercial discussions from time to time in terms of acquiring services from one another or dealing with common member issues. You would really need to speak to AARNet about the discussions they were having.

Senator LUDLAM—All right. That is possible. Is it your understanding that, as far as requests for dark fibre go, all the states and territories are putting in separate submissions either to NBN Co or to the government?

Ms Barnett—I do not think so. What has happened is that VERNet has chosen to make a submission. Another incorporated state REN, SABRENet, was probably instrumental in its state government's submission. AARNet made a submission to the regional black spots tender, but I understand it did not make a submission as such to the committee generally. I do not know to what extent there is a coordinated approach. We are trying to get some of these things happening, particularly with research and education. It is an interesting sector, it is a fairly dynamic sector and it is not necessarily speaking with one voice at all times.

Senator LUDLAM—I have just had a quick look at our program for tomorrow. What is the equivalent Tasmanian research network?

Ms Barnett—That is the TREN, which is primarily the University of Tasmania. I understand it runs on the gas pipe fibre operated by Aurora. I am not completely sure but I think AARNet is the operator of that network. Again, I am not certain of that. We play a role in that because they come up to the mainland on the Basslink interconnector, and we pick them up at Loy Yang and bring them into the AARNet PoP in Melbourne—at least that is the primary purpose of that link. Other than that, it is not something that I can really comment on. I know we have had discussions with Tasmania in the sense of keeping them informed about our progress to provision the Loy Yang service. I think they participate in the regular meetings of the Victorian directors of IT, which are the peak IT professionals for the universities and research institutes in Victoria. But, unfortunately, that is as much as I know.

Senator LUDLAM—It might be worth the committee contacting the Tasmanians directly—because obviously they are a step further down the track than we are on the mainland—about how the negotiations are going or whether they are even underway. Have the governments said that the NBN needs to be, within limits, commercially viable and what the impact will be on the viability of the NBN from the universities quarantining two pairs?

Ms Barnett—No, we have not. It is important to realise that it is not simply the universities; it is not just higher education. It is also, for example, vocational education and, in some instances, secondary education and research activities generally. As it happens, those are aligned with the universities, but they are not necessarily so. It is research and education; it is a broad church.

Senator LUDLAM—So the TAFE network is hooked up to the same system?

Ms Barnett—No, it is not. Where a TAFE is co-located with a university—what we call ‘dual institutions’—they are hooked into the VERN and therefore into the AREN. Otherwise, I think the state government has made its own decisions on how it is going to implement the VET network in Victoria.

Senator LUDLAM—We are not catching high schools and public libraries and those sorts of institutions. It is mainly big tertiary institutions, or large and small institutions.

Ms Barnett—Yes.

Senator LUDLAM—You said before that you were not interested in purchasing commercial NBN services. Is the bandwidth not there for you?

Ms Barnett—The bandwidth is not there. We are already running at 10 gig in some instances and we are getting demand for more. One hundred meg is not going to help us. To give you an example, Swinburne University, one of my members, through VERNet now has a direct connection through the AREN to the telescopes in Parkes and the ACT. Before they had that connection live, when the astronomers went up there and did observations and so on they had to fly back 20 hard drives of data. That was how they interacted with their remote instrument. Now they can do it online. If you were providing them with a 100-meg service you may as well fly them down. It is not really very effective. You may have seen the interview with AARNet in yesterday’s *Financial Review*. An example was given there of downloading some data from the Large Hadron Collider in Europe. Again, that is happening through the AARNet through its international links and its PoP sites and through the VERNet through its links down to the campus, and it is running at 10 gig and one gig. They were trying to download 66 terabytes of data, I believe, and it took them 11 days at that bandwidth. With the sorts of datasets and the sorts of volumes we are talking about, a managed service from the NBN is not really going to add value. We are not looking for administrative support; we are looking for actual real-time research support.

Senator LUDLAM—Given the huge bandwidth you require, though, and the fact that you are already operating a system that is 10 to 100 times faster than what we are looking at providing for the rest of the country, if you did get your two pairs of dark fibre—and you also talked before about your network needing to be scalable—how long is that going to be sufficient given the geometric way in which demand seems to be expanding in the sector?

Ms Barnett—We are very confident that we already have a scalable network because we hold capacity rights in the underlying dark fibre rather than buying managed services as such. We started out with a backbone of one gig; we have upgraded to 10 gig and fibre channel in some instances and we have done that by equipment change-arounds. The technology we have chosen currently has product at the 10-gig and 40-gig levels. One hundred gig has recently been trialled

in Australia; I think Telstra did the first backbone run of that. So we are very confident that with fairly minimal change and redeployment of equipment we can keep that scalable—as long as we hold the fibre rights. We and the universities are really good at working with glass. I do not mean to sound pompous, but we are. We do have the expertise to take that capacity asset and keep on increasing it.

Also, because VERNet holds the IRUs, holds the capacity rights and has the access to the dark fibre, we can max up the fibre very easily. Our equipment can essentially split the signal into multiple very high capacity channels to service multiple sites and multiple entities. For example, for the link down to Loy Yang, we have actually provided three 10-gig services through the AREN. So we can do quite a bit of capacity.

Senator LUDLAM—If you were to get what you are requesting here, the two pair, to somewhere like Mildura, what is the theoretical maximum capacity that you could get out of that?

Ms Barnett—I am going to strike my own technical limitations because I am simply a lawyer, not a network engineer, but I understand that you can split the signal up to 72 channels, so let us say you had 72 100-gig signals. I think that is probably going to be adequate for the foreseeable research capacity of Mildura. But I cannot promise those details are accurate.

Senator LUDLAM—That is all right. I just wanted to get a sense of where what you are asking for fits into the discussion.

Senator IAN MACDONALD—Along that same line, I should know the answer to this, but I do not—and you are talking to someone who is not terribly well informed technically—how can you get 100 gigabits when we are talking about an NBN at a maximum of 100 megabits and 10 and 12 megabits for a lot of Australia? Wouldn't you be better off just keeping your own?

Ms Barnett—I am sorry, I am not sure I understand what you mean by keeping our own.

Senator IAN MACDONALD—You have a system that gives you 100 gigabits—is that right?

Ms Barnett—We have a system that provides us with 10 gigabits, but it can go up to 100 gigabits. The issue is that, no, we do not want to walk away from our current dark-fibre system in exchange for 100 megabits. This is why I am arguing that the best way to help the research and education community through the NBN is to give it dark-fibre capacity, because the NBN is going to go to places that we also want to go to but cannot afford to and do not go to at the moment. So the best way you can help us is not to give us a 100-meg service to those places but to give us some of the dark fibre that you are going to be building there.

Senator IAN MACDONALD—I am sorry—dark fibre is?

Ms Barnett—In the environment I work in there are a couple of different ways of delivering a telecommunications signal. Again, I qualify this: I am only a lawyer, I am not an engineer, so I apologise for any glaring errors. You can provide a microwave service, which is what the universities did before VERNet and what they are still doing in places we do not get to. You can buy a service from an existing carrier, which is typically a managed service where they basically

take care of all the active equipment and say, 'Here's a channel—you go A to B.' You can have satellite, which is way outside the reach of our capabilities. We would not even dream of going there. Would not be any use to us. And you can use the optical-fibre cable that carries all these different transmission methods, apart from microwave. It is essentially a big bundle of optic glass fibres. Signals travel in pairs—one in and one out—and you buy or lease the cable. It is built-in different densities. I think the lowest you generally get commercially is 12-core and it goes up to 172.

Senator IAN MACDONALD—What would enable the NBN, which is going to deliver 100 megabits? What needs to be done to allow it to accommodate your 10 gigabits?

Ms Barnett—As I understand it, the NBN is going to build optic-fibre cable and then is going to use a PON type architecture to deliver the 100-meg service to residential and workplace types of environments. All the NBN needs to do is grant research and education operators an IRU or a particular legal form of lease over two pairs of that fibre—four cores. So it simply needs to segregate four of the built cores—

Senator IAN MACDONALD—And that enables you to send 10 gigabits?

Ms Barnett—Yes. Basically, we put in our own active equipment on it, which is—

Senator IAN MACDONALD—That is the equipment you join up to the ends that gives it that capacity.

Ms Barnett—DWDM and CWDM equipment basically connects to a fibre and then takes the signal in ways that I cannot possibly understand. It essentially splits it up along the optic spectrum with each particular band carrying a different signal.

Senator IAN MACDONALD—So you are after two pairs?

Ms Barnett—Yes.

Senator IAN MACDONALD—How many pairs will be NBN have? What are we talking about? Is that one per cent or 50 per cent?

Ms Barnett—No. I am also pretty close to functionally innumerate, so I will not be very good at doing the numbers. I think that two pairs out of 172 is—

Senator IAN MACDONALD—So it is 172. It is two out of—

Ms Barnett—I believe so. It is in that line. You would expect that for a major backbone build. What you find is that most of your costs are sunk as soon as you dig a trench. It really does not make very much difference how thick your cable is, so you might as well goes thick as possible.

Senator IAN MACDONALD—Thank you for that.

Senator LUNDY—On the independence of VERNet as it currently stands, is there any reason why VERNet would need to interact in a physical network sense with the new NBN?

Ms Barnett—We would need to interact in the sense that our active equipment would need to connect to the NBN dark fibres, depending on the type of connection. There may be splicing in, for example. Generally what happens, as I understand it—I repeat my caveat about technical limitations—is that the carrier who is providing us with a service basically breaks out to the fibre and presents it to a point where they are happy for us to install equipment, and we then basically put our own lead in or trunk fibre on that, generally speaking. A lot of our partners have been, for example, utilities or transport operators, where there are certain no-go areas. We do not put our active equipment in the substations for the power companies. They present the fibres to us at a location where they are happy for us to go and we handle it from there. That is the sort of physical interaction that I would expect with the NBN too. It depends on its equipment provisions, repeaters, the location of access points and so on.

Senator LUNDY—On the issue of accessing the fibre, would VERNet expect to be treated differently than the normal wholesale access regime that one would anticipate the NBN would be providing to retail users of NBN?

Ms Barnett—We are a licensed carrier like other carriers in the market; it is simply that we have a very particular purpose in life. So we would expect to come in as a carrier rather than as a retail customer, say, an ISP or something like that. We are subject to the same regulatory regime as the other carriers are and we participate accordingly.

Senator LUNDY—With respect to the provisions for the build, I heard you say before that you would not necessarily be the person within your organisation to be conducting conversations with NBN Co., but are you aware whether VERNet has made a formal representation to NBN Co. about the type of physical interaction that you just described?

Ms Barnett—No, to my knowledge we have not, for a few reasons. NBN Co. is still a work in progress itself, and we are waiting for a little bit more certainty about things before we start to make that representation. We are an absolutely tiny fish in a very, very big pond, so we are waiting till the waters clear a little bit before we do too much. Our interactions at the government level tend to be through DEST because we are a research and education provider in a sense.

Senator LUNDY—Do you know if DEST is formulating a position to put to NBN Co. or the federal department?

Ms Barnett—It is very hard for me to say. I know that, for example, the AICTEC has put a submission in to the NBN which in many respects is very similar to the one that VERNet has proposed. As to DEST's own discussions, I would not be privy to those.

Senator BIRMINGHAM—Thank you very much for your evidence today, Ms Barnett. It has been quite enlightening. My colleagues have covered most of the issues that I wished to raise with you. The government or at least the minister has been quite clear that NBN will be built and operated on a commercial basis. Obviously that is not an appealing proposition to the education sector. In terms of community and government maximising benefits out of the NBN, I would have thought there was a lot of social capital and social benefit that you would have argued needed to be considered in that equation, not just a commercial output.

Ms Barnett—That is absolutely correct. There have been some extremely high profile reviews of both research and education in Australia, such as the Bradley review and the Cutler report. Both of them emphasise social equity and the difficulties for a community such as Australia with its very distributed small population centres to participate on the global research and education stage and equalise opportunities for other people. That is one of the reasons we have done things like going to Lakes Entrance. Nobody else in their right mind would supply a 10-gig service down to there or to Churchill, but we have because our universities have education and research centres there and so now students at those places do not need to come into metropolitan Melbourne if they want to undertake certain courses. We can do these sorts of things; we can now enable distance education with real-time videoconferencing and those sorts of things.

The Bradley review and the Cutler report both emphasised the need to enable remote and regional communities to participate fully; for students, for example, to choose where they get their education. That is really what we are about and that is what we are trying to do that. We are not for profit; we do not do these things to give a return to the shareholders. We do these things so that they can do world-standard research. They can deliver education to their users in the outer suburbs, in small towns and so on. I am not a politician, I cannot speak eloquently, but that is so important. If we cannot afford to pay a commercial operator, we cannot afford to pay a commercial operator for the NBN—it is that simple.

Senator BIRMINGHAM—You have spoken very clearly and passionately today, Ms Barnett. In South Australia I know Flinders University operates a number of remote sites that allow for 5th-year medical interns to be based in regional communities and still access lectures and those opportunities through what I assume is a similar network. Does VERNet offer or do users of VERNet offer similar services in the health field as well as education and research?

Ms Barnett—First of all, yes, I understand the Flinders University system does operate a very like network. It is called SABRENet and it is a South Australian equivalent of us, if you like. In a sense, we are very boring at VERNet—all we do is the enabling infrastructure. We do not offer any ISP services or content services or applications or anything. We simply say to the universities: ‘Here you are. It is as fast and as fat as you wanted it—go for it. Do what you need.’ You will be aware that Victoria does a lot of biomedical research, for example, and all of our major universities have teaching operations in major hospitals which would in many cases be linked into the VERN. What we do not do is health—that is outside our research and education scope. It is certainly within the purposes of the company as constituted, but it is not within the constraints that I have negotiated for my fibre leases, so that is something we would need to address if it was a forward purpose that the government had for this company. It is something we would be very keen to do and happy to do, but it would require some further negotiation with our suppliers.

Senator BIRMINGHAM—There is no equivalent in Victoria at present that does health services though either, is there?

Ms Barnett—Not that I am aware of. I believe there are a number of state government initiatives, but they are not of like breadth and capacity. They have different purposes and, as I understand it, they tend to be more application based, but I could be wrong there. We only interact with the hospitals with respect to supplying services for their teaching function.

Senator BIRMINGHAM—Do you see that similar opportunities and similar social benefits and social capital could exist and be derived from extending the concept and arguments you have put for education and research into the health sector?

Ms Barnett—One would imagine so, yes. It makes perfect sense.

CHAIR—Thank you very much, Ms Barnett, for your evidence today. Despite your self-deprecating comments, might I say you have served your profession very well.

Ms Barnett—Thank you very much, Senator.

Proceedings suspended from 10.32 am to 10.50 am

FRY, Mr Ian, Board Member, Ballarat ICT Ltd

THOMPSON, Ms Helen, Board Member, Ballarat ICT Ltd

VALLANCE, Mr Mal, Chairman, Ballarat ICT Ltd

WILLEMER, Ms Maree, Board Member, Ballarat ICT Ltd

CHAIR—I welcome representatives of Ballarat ICT Ltd. Thank you very much for appearing—I understand it was not necessarily straightforward for you to be here. The proceedings of the committee are public. In giving your evidence you are protected by parliamentary privilege. It is unlawful and potentially in contempt of the Senate for any third party to attempt to interfere with evidence that you might give. Of course, it is much the same for a witness to attempt to give false or misleading evidence to the committee. If at any stage you want to provide evidence in camera, please let the committee know and we will consider your request. You have been very patient, thank you. You have provided us with some documents today, so senators will not have had the opportunity to examine them, although we will have all done our own background research on Ballarat ICT. Would you care to make a brief opening statement?

Mr Vallance—I understand we have five or 10 minutes to make an opening statement—could you confirm that?

CHAIR—Whatever time it takes will come out of the 45 minutes during which we will fire questions at you.

Mr Vallance—We will try to be very efficient with our opening remarks. We trust that our inputs and insights will be useful to your deliberations.

CHAIR—Thank you, I will let you know! Stay tuned.

Mr Vallance—I think we are going to get on okay! As you are aware, we have distributed a small handout to provide some structure to our opening remarks. It is going to be a shared effort this morning, so I will lead off and my colleagues are going to support me. The slide presentation in our handout provides the structure to it, as I say, and we will try to work through that quickly given the time that we have.

Regarding Ballarat ICT Ltd and its charter and mission, it is, as you can see, an incorporated body and not-for-profit partnership of industry, government and educational institutions. Our focus and our passion is ICT. The purpose of Ballarat ICT Ltd is to profile, promote and advance the ICT industry sector within Ballarat and the region. If you move to slide 3 you will see our vision and mission. Our vision looking out to 2030 is to become acknowledged internationally for our strength and innovativeness in ICT. Implicit within that is the fact that we are very concerned with rapid diffusion and effective use of new technologies. How do we go about that? What is our methodology? It centres around those things listed in the handout. We are on about providing leadership, guidance and inspiration to people. We are on about sponsoring and

supporting innovation. One of the reasons we are here today is around advocacy and lobbying. That is an important function of Ballarat ICT Ltd. Education and promotion is another important dimension to our activity, particularly around ensuring that we have a skilled workforce within the region. Partnering and networking with both private and public sector organisations is also important. I will pass across to Helen to quickly speak to the next three slides.

Ms Thompson—In terms of where Ballarat is now, through a combination of partnerships with local government and all other levels of government and through some really good collaboration between universities and the broader community, Ballarat is one of Victoria's and Australia's most vibrant and liveable regional centres, and it is becoming more and more of a hub as things like education and health, with a range of options, are increasingly expanding within that regional centre. So the City of Ballarat is seeing itself positioned more and more as the regional capital of western Victoria, and that means that there are about 400,000 people in that region that use Ballarat for a lot of their services. In the ICT area, that flows on in terms of advice, support, advocacy and lobbying, as Mal was saying before. We think that, with the ongoing efforts of that partnership approach, our growth and the strength of the communities around Ballarat will continue to be enhanced over time.

For this group, the Ballarat ICT 2030 strategy is probably what underpins and guides us in terms of what we opt into, what we put our energies behind and where we try and work with others to partner up activities. The strategy in a paper based format is this one, *Ballarat ICT 2030: a strategy and plan for the future*. It is available online through the Ballarat ICT website. You can browse through it online or request a copy of the PDF. Again, the strategy has a number of aims, a number of short-term goals and a number of longer term goals. I will not go through them all at this stage, because I think we will probably come to some of them as we go on. But it obviously includes things like having effective broadband in place so that we can actually tap into more productivity gains, foster more innovation and create products that are differentiated and have local relevance, national relevance and international adoption. It is already happening, but we want to continue to extend that activity because we can see the quality of the employment in the ICT area. That in some ways help us to manage other economic shifts in industry structure. So where we have got changes in some sectors, like manufacturing, we have got significant growth in areas like ICT. As Mal said, some of our aims are to make sure that we have got the right skills, that we understand where there may be gaps and opportunities to build skills and that we are proactive rather than reactive in some of those areas.

So as a board we hope that, by having invested in a process that has involved hundreds of people through consultation—including individual conversations with businesses, panel sessions and working groups—we have got a strategy that represents the broad view of where Ballarat and the broader region want to go in terms of ICT, and that helps us to lobby, attract resources and do things that matter in our region and in Australia.

Mr Vallance—Thanks, Helen. I might pass over to Ian now to talk about success factors.

Mr Fry—I will keep it fairly brief. There have been a lot of success factors with Ballarat ICT and Ballarat in general. If you go through that slide, there are probably seven or eight areas. To start off, it is the recognition of the local ICT sector's potential. I think this was picked up by the University of Ballarat and the City of Ballarat, and we have certainly pushed that potential, with everything in that. Our ICT strength is certainly considered to be part of Ballarat's competitive

position. That has also helped with the level of employment. We have a tech park in ICT, and IBM, which Maree will talk about. I think something like 800 people are employed just by IBM at this stage.

Another reason why we have success in ICT is the location benefits we have. We have a relatively low cost of living and a fairly strong labour pool. We are in close proximity to Melbourne. People do come from Melbourne to work in Ballarat, especially in the ICT area. We have quality education and health facilities; we have a low crime rate; and it is very nice place to live. They are some of the reasons for our success in ICT and why we need to have more success, with the Broadband Network coming in.

Mr Vallance—Reference has been made to the University of Ballarat Technology Park. There are about 30 enterprises within that precinct, which was established in 1995. There are 1,400 people that turn up there each day and so it is a really important economic platform for Ballarat, particularly with economic restructuring occurring within the region. The important statistics are that it pumps out about \$350 million in economic outputs each year, both direct and flow-on; it provides about \$100 million in household income; and, from memory, about \$165 million of value added services.

Given the economic restructuring occurring and the changing face of manufacturing in the region, it is very important to us, so obviously we want to grow that precinct. In the handout you have, we have plans indicating potential growth. The 29 hectares have been largely built out, and now we are looking strategically at where we grow to the north and to the east. We want to take the total employment in that precinct up over 2,000 people within the next three years, and that is pretty realistic given what we have got on the drawing boards. I will leave it there and pass across to Maree to talk about IBM.

Ms Willemer—IBM has been operating out of the park for approaching 15 years now. As you can see on the slide, we have currently got around 800 employees working at IBM occupying two buildings. There is a third under construction, and that will allow IBM to grow to about 1,100 employees in the next few years. IBM itself has a strong relationship with the University of Ballarat and the community generally. On the slides there you will see mentioned the Earn as You Learn program. That is a bachelor of IT degree where the students work at IBM over the course of their degree and get some valuable industry experience. The IBM involvement extends beyond that and into research through the Internet Commerce Security Laboratory, which looks at internet commerce security issues, identity management and those things. It is very big and there is lots of research happening there. They are just two things. That is a bit of an insight into IBM and the broader community.

Ms Thompson—At one end of the scale, we have a very large multinational corporation and at the other end of the scale is the 100-plus SMEs that work in the ICT sector. That is where the Ballarat ICT cluster comes in, recognising the role of those groups of small firms, understanding where they are at and what might add value to them.

Ballarat ICT Ltd has an active role in facilitating anything from networking events to breakfasts on a regular basis every month, in partnership with the University of Ballarat and the Technology Park. We run regular breakfasts. We have forums and roundtables but we also identify project areas each year. Last year we had two examples. One was the e-health capability

study, which we have included in the handouts as an example of one area where we are looking at the crossover between ICT and other industry sectors, the benefits and the capability that Ballarat has in those areas. We are keen to do a similar study with ICT and manufacturing. There are already a range of activities happening with ICT, security and cybersafety. That cluster focus helps us to move some of those actions forward in such a way that we know we are making progress.

Mr Vallance—That concludes our introductory comments.

CHAIR—I will ask a couple of questions before proceeding to Senator Ludlam. Given your focus on high-quality jobs in the Ballarat region, what do you think is the capacity of the local ICT sector to accommodate demand during the rollout of the NBN?

Mr Vallance—Can I seek some clarification, Madam Chair? Are we talking about people to actually implement, install and do it?

CHAIR—To do it, yes—to support the rollout. Are there jobs for local people in that and, if so, do they have the capacity to deliver it?

Mr Fry—Telstra had a very large training school in Ballarat, where they used to train all of their linesmen and technicians. That is no longer in existence but a lot of those people who were in Ballarat are still within Ballarat, so I think there would be some positions which could be filled by Ballarat people in the rollout of the NBN.

Ms Thompson—There are already some skills in optical-fibre infrastructure as well not only because of Telstra but also because we have neighbourhood cable in our region. Given the strength of TAFE and higher education and given the partnerships and the priority around ICT, organisations like the University of Ballarat would be very proactive in seeking to understand whether there is an opportunity in those trade skills or retraining skills for technicians who are currently very capable and experienced. Telstra Countrywide has a very large presence in our region as well. There is a high percentage of people in the broader telecommunications and infrastructure area and the retraining of those people so that they are optic-fibre experts is an opportunity that Ballarat would like to understand to see where we might be able to fit in some of that delivery.

CHAIR—What are you doing about pursuing those opportunities?

Ms Thompson—We are talking to people like you.

Mr Vallance—Critical in this is to understand the timeframes. What sort of window do we have?

CHAIR—I think that valid question is to be asked of the government.

Mr Vallance—Yes, okay. I am probably asking the questions rhetorically. If the NBN was to be launched in Ballarat in six months, there is no doubt that we would be challenged in finding the full range of skills necessary to support the implementation. If we have a window of three or four years, as Helen was saying, the University of Ballarat, particularly through its TAFE

division, is one mechanism by which we would try and ramp up the skilling of labour. As Ian said, there is a pool of people there. Whether they are engaged currently in those areas or deployed in other areas because of changes in the workforce is to be explored.

CHAIR—Time will be of the essence. I guess in the view of some we would not want to see a rollout with the rapidity that has been foisted upon local people in terms of the Building the Education Revolution and the difficulty that local people have had to get a gig, which was due largely to the timeframe.

Moving to a different issue before I go to Senator Ludlam, can I ask you about the VicTrack, Visionstream and COLT network trials? Here is my question, and if you are not placed to answer it, please say so. In 2002, I understand that then Minister Marcia Thompson, in announcing the VicTrack and Visionstream network, said things such as that it had groundbreaking benefits; full-motion video training for schools, tertiary institutions and hospitals; distance education through broadband conferencing; distribution of common teaching programs to school; faster and lower-cost internet and telephony services for homeowners; reduced costs for regional call centres and the encouragement of a strong regional multimedia industry. How many of those benefits were realised by the Ballarat community? You might want to take it on notice.

Mr Fry—I will just make a few comments on that for VicTrack. As I understand it—and it could be a different program that we are talking about—the biggest problem we had in Ballarat was having a head end, or a place for that to terminate, which made the last mile very hard indeed because it was some distance from a telephone exchange, which was Telstra's, and it was at the Ballarat station. I think that was a major problem. The last mile was one of the major problems I saw within that program.

Mr Vallance—Madam Chair, I think that to answer that question more fully we would need to take it on notice.

CHAIR—Can you please, and in so doing can you also proffer a view as to whether the last-mile experience from 2002 and that project runs the risk of being replicated with the NBN?

Mr Vallance—Yes, question noted.

CHAIR—If you want to answer that one now, do so.

Mr Vallance—In terms of VicTrack and recent developments—and I am not sure whether this is a relevant response to your question, Madam Chair—VicTrack have just recently installed a new fibre link into the technology park, which is brilliant and gives us an advantage over other regions in Victoria. It is dark fibre. It is high-capacity fibre. It gives us full redundancy to the park. That is a real plus for us, and I can only speak positively about that development. That was sponsored by the state government through their shared services activities—cross-departmental activities. That should be operational by the end of this month or early next month, and it has been a six-month development.

CHAIR—That is very positive, and you might get back to the committee on notice with the other aspects. I will ask questions about the COLT project if I have time at the end.

Senator LUDLAM—I will just be brief. It is good to hear from some people who are actually getting ahead and using the sort of technology that we have been talking about in this committee for more than a year. Can you just give us a bit of background: why Ballarat? Can you recall for us what was occurring in 1995 that led you to go down this track in the first place?

CHAIR—The answer has to be, ‘Why not Ballarat?’

Senator LUDLAM—‘Why not?’ is fine. We can move on if that is the answer.

Mr Vallance—I have been with the university for some time. I have been with the technology park as director for the last two years, so I cannot speak too comprehensively. Obviously, when the university was declared a university, there was a recognition that it needed to establish a technology park because many of the universities across the globe have technology parks as part of their operations activities—that is, the concept of linking enterprise and business with research and education. So obviously people had a really sound vision back then of developing a technology park.

Critical to its evolution has been getting a major anchor tenant, and we have done that through IBM. That relationship has been absolutely brilliant—and I am not just saying that because Maree is here! We started off with 80 employees with the first anchor tenant, and now we have almost 800. Within the next two years, we will have over 1,000 employees. Having IBM there, and the university working well with IBM, has been a major catalyst. It has spawned development. It has drawn development in, and it has gathered an impetus all of its own. I can tell you that over the last 12 months, through the global financial crisis, we have actually had a marginal increase in employment, which is amazing. We are very, very proud of that, and we want to see it continue. I am not sure whether I have answered your question as you would like, but that is the response.

Ms Thompson—I would add that leadership was really important—the vice-chancellor—and the collaboration between the City of Ballarat and state, local and federal government all through that process has been very strong. I think it is leadership, doing it ahead of everybody else. We did move early. There was a 2010 strategy that was developed back in 1995, and that process of renewing what we are aiming at has underpinned our activities as well. There has always been planning but there have always been champions and leaders who have been able to influence decision making as well.

On the technology park, again I would mention the ability for people to work for IBM for a time, or even a large manufacturing firm like MasterFoods in Ballarat, which makes Mars bars, and then to be able to spin out based on where they have identified a business opportunity that is not being met in the market. We see a lot of that entrepreneurial activity and increasing levels of that entrepreneurial activity occurring. The business incubation side of the technology park has been very important in fostering that as well. Having the space and the opportunity for businesses to grow has also been a critical factor in what the technology park set in place 15 years ago.

Senator LUDLAM—What are your thoughts on what we are here to discuss today, which is the rollout of the National Broadband Network in a much expanded form? What are your views on the approach that the government has taken so far on the NBN?

Mr Vallance—In terms of Ballarat ICT Ltd, we are supportive of the development. I would approach it this way: if you use what has happened in the technology park as a microcosm of what can be produced, you would think that you could assume that the NBN would be an important vehicle in replicating the sorts of things we have achieved at Ballarat. I would answer it in those terms, but I do not think we are in a position to go into a lot of detail in regard to that question.

Senator LUDLAM—Have you had any interaction specifically on the NBN rollout with the federal government, with NBN Co. or with the Victorian government?

Mr Vallance—No, not at this time.

Senator LUDLAM—Not yet? It is still early days. I do not know whether you were in the room for our previous witness, Ms Barnett, from VERNet, who was talking about quarantining a certain amount of capacity on the fibre as it is rolled out to regional centres. Do you have a view on that proposal, and would that have any material impact on the way that you work?

Mr Vallance—Could you repeat the question, please.

Senator LUDLAM—The proposal by Ms Barnett was for a certain amount of capacity to be set aside for tertiary institutions, research institutions and so on. Presumably, you already have a quick connection out to your campus, but are you supportive of that general approach that she outlined before?

Mr Fry—Whether you have to reserve it or not depends on the build of the network, I would think, but with the links between, say, the likes of Melbourne and Ballarat, where a lot of these will come from, I would imagine that fibre will be able to carry all that is required. Whether they have to reserve it or not I would doubt at this stage.

Senator LUDLAM—Do you have a dedicated line running out to your campus?

Mr Fry—I think there is a dedicated line. VicTrack is a dedicated line.

Mr Vallance—Yes, VicTrack is a dedicated line into the technology park, as I said before. Full redundancy comes in from the north and the south. In addition to that, we also have Telstra and a neighbourhood cable, TransNet, so we are quite well serviced.

Mr Fry—We are fully serviced, yes.

Ms Thompson—At the same time, there are gaps. The neighbourhood cable, for example, does not go into all parts of our community at this stage, because that is an overhead solution. Broadband being more broadly available will pick up some of the gaps that are in the residential areas or—because a lot of people who come and work in a technology area do not just want to go to the office; they are coming for the lifestyle as well, so the opportunity to address some of those gaps is something that NBN should help with.

Senator LUDLAM—Yes. I think you have said in your presentation here that Ballarat is the gateway to a regional community of around 400,000 people or thereabouts. What is the level of penetration of broadband in that larger area?

Ms Thompson—There is the ABS data with a different ICT, not Ballarat ICT but Moorabool ICT, in one of our neighbouring shires. I am involved in a study at the moment which is looking at some of those issues. It is quite high. One of the biggest issues, though, is coming out through that survey. There are probably about 180 responses to date. If it were cheaper and if it were faster, people would use the internet more. That is very clear.

Senator LUDLAM—That is fine. Thanks very much.

Senator IAN MACDONALD—Just on that point, it goes without saying that you are eagerly awaiting the NBN but have you looked at the possible cost of using the NBN?

Mr Fry—It is very hard for us to estimate any costs for the NBN because we have not got information on how it is going to be run or what equipment is going to be used. I cannot answer at this stage what cost it is going to be the average consumer because there is not enough information.

Senator IAN MACDONALD—I certainly agree with that. That is one of the roles of this committee, of course. Various commentators who have done some back-of-the-envelope figures, dividing \$43 billion between the number of users there are in little old Australia, suggest that it is going to cost two or three times what Telstra or Optus now cost for a similar circumstance. I am just curious whether in your justifiable enthusiasm you have had a look at whether you will actually be able to run your conglomerate or cluster if costs are going to increase substantially.

Mr Vallance—I do not think we are actually in a position to talk too much about cost, but we are very pleased and proud of the developments that have occurred in the region up to this point. What we are on about is the enhancements that one would hope that the NBN would produce in increased applications that can be provided through the NBN. I do not profess to have a handle on costs.

Senator LUNDY—Senator Macdonald is just speculating.

Senator IAN MACDONALD—I am repeating what respected columnists are saying.

CHAIR—Indeed, it may be a good idea to have a handle on the cost, mightn't it?

Senator IAN MACDONALD—My point was that you are a not-for-profit partnership and, as I said, you are justifiably excited about the prospects, but those plans may come to naught if you find that you cannot connect with the NBN and it is much more cost-effective for you to stay with Telstra, Optus or your own network.

Ms Thompson—In the regional context there would already be the argument that a lot of people who are using internet services, whether they are narrowband or broadband, are paying a higher price already. The average cost of connectivity is still higher in regional areas. But some of the best connectivity that we have in the region would never have occurred without seed

funding from government at all levels. We would be more confident saying the business case once the broadband is available to us is very clear but we are not experts in understanding what the cost of getting that broadband connectivity there in the first place is. But obviously people will opt for more when there is an individual business case for them to adopt. They have to understand the benefit of the faster broadband.

Senator IAN MACDONALD—The minister is on record as saying the NBN Co will stand on its own feet and be profitable, and he wants 49 per cent private investors. They are not going to put in money unless they are getting a return on their investment. I think the minister is also on record as saying the costs will be the same everywhere in Australia. So up in Burketown in north-west Queensland where I hang out a bit it will be the same price as you are paying in Ballarat, which means that you will be paying a bit more to cross-subsidise the thing. Without dampening your enthusiasm and excitement—which, as I continue to say, is justifiable—I just wonder whether as corporate bosses of Ballarat ICT Ltd you have had a look at those possible impacts on your bottom line.

Ms Thompson—We are community members; we just also happen to be directors of Ballarat ICT, but it is not our day job.

Senator IAN MACDONALD—You would have directors' obligations—

Ms Thompson—Absolutely.

Senator IAN MACDONALD—even though you are just community members. Thank you for that.

Senator LUNDY—I am quite familiar with Ballarat's history of innovation in the area of ICT and the work you have done, but I am interested in hearing your view about how critical bandwidth and the range of initiatives and projects, including the presence initially of Neighbourhood Cable in the city of Ballarat, are to your region's capacity to really leverage ICT as a growth sector. Could you comment regarding the relative importance of the availability of higher bandwidth speeds to your region's economic success in ICT.

Mr Fry—I was a CEO of Neighbourhood Cable, so I can comment on some of the broadband issues there. On speed and broadband, Neighbourhood Cable is a HFC network, which is fibre-to-the-node and then a coaxial line from there. On the speed issue, Neighbourhood Cable introduced DOCSIS 2—I introduced it while I was there—which has speeds up to 30 megabits per second. We were asked what the take-up would be. We were then owned by a company in Hong Kong. The take-up of that was extremely good. It was one of the best take-ups we had of all. Even though it was a premium price and a premium product, the take-up on that was better than the cheaper priced products. I think that is still the case and it probably will be if they go to DOCSIS 3. Speed is very important in regional areas. Going back to Senator Macdonald's question, if you could have more coverage with the NBN—and, as far as I know, we will have more coverage—I think that will help with the costs. At this stage Neighbourhood Cable goes past—and do not quote me on this—3,000 homes or something like that.

Senator LUNDY—It is now owned by TransACT, isn't it?

Mr Fry—Yes. If it went past a lot more, you would pick up a lot more customers. Unfortunately, or fortunately, in the country not everyone is within two kilometres or so from a telephone exchange. ADSL, which is the other alternative in country areas, is very dependent on distance from exchanges. I do not think you will find, as I gather, that that would be the case with the NBN. I think the uptake on NBN will be much better and it will also help businesses. Especially in the rural areas, they will be able to do more things like conferencing, cloud computing or hosting, which they cannot do now because of the speeds of the broadband. With capacity, as I said before, as far as I can see, if you are going to have fibre links between major centres, I do not think capacity, if they plan it properly, should be a problem.

Mr Vallance—If you look at the development of technology, there is a strong correlation between the infrastructure in place, including really good optical fibre into the park, and the developments that occurred. The reality is that to attract investment out of the capital cities you have to provide the appropriate infrastructure.

Senator LUNDY—By ‘appropriate infrastructure’ you mean high bandwidth, don’t you?

Mr Vallance—Exactly.

Senator LUNDY—You would not have got those businesses coming to Ballarat without having a high bandwidth network to offer them?

Mr Vallance—We probably would have got a different profile of business. It might have been a different sort of park. It would have impacted—there is no doubt about that.

Ms Thompson—It definitely gives us an economic development advantage at this stage. There are organisations like IBM, half of the state revenue office, the emergency services telecommunications group and Rural Ambulance Victoria. Their staff work in both locations—in both a metro context and a regional context. They need to have the same experience when they are using technology, no matter where they happen to be located that day. The thing with speed is that you notice it when you have had it and then you lose it. That would change certainly the investment attraction capacity of our region. We would not be able to say, ‘You can get not only compatible infrastructure but other benefits by locating in our region that are harder for a metro area to present in the same way.’

Mr Vallance—We are currently in discussions with a major developer in regard to an investment of somewhere between \$30 million and \$50 million in the park. I am hopeful that we can get that over the line, but the broadband infrastructure is critical to that investment being made.

Senator LUNDY—You mentioned in your opening presentation that the Ballarat economy has experienced modest growth through a period of global economic recession. Can you expand upon that and offer the committee an insight into how related you think that that may be to the presence of the ICT business cluster operating in the Ballarat region?

Mr Vallance—I think that you are making reference to the fact that I talked about a marginal increase in employment within the technology park. I cannot speak with full confidence—

Senator LUNDY—So the comment was in relation to the growth in the technology park?

Mr Vallance—Yes.

Senator LUNDY—Sorry—I misinterpreted that. Anyway, can you expand on that point and give any insights that you may have on how that relates to the provision of bandwidth and that whole approach that you have taken.

Mr Vallance—The observation that I was making was that within the region—and our region is no different to many other regions across Australia—over the last 12 months certain industry sectors have been hit very hard. This is only anecdotal advice that I have received, but I know that a large number of people have been retrenched, particularly within manufacturing. I did make the observation that within the technology park, despite all this happening within our region and some of the bad news, the positives are that the ICT sector in particular has held up very well. In actual fact, we have had a marginal increase in employment. We are still talking to further investors in this sector in what are perceived as pretty tough and challenging times. That tells us that the impact of the global financial crisis has not been even or consistent across industry sectors. Some have performed better than others. It gives me added confidence to continue to push to grow the ICT sector within Ballarat. It is almost like a risk mitigation sector.

Senator LUNDY—A buffer against some of the worst impacts.

Mr Vallance—Yes. I hope that helps clarify.

Senator LUNDY—What about the prospect of high bandwidth networks for residents? While I appreciate that it is not something that you are directly involved in, I know that you would all be familiar with the various initiatives over time to get higher bandwidth services to residents in the region. Can you provide the committee with some comment about the interrelationship between high bandwidth services to residents and an ICT growth cluster and the use of high bandwidth within businesses? I am keen to see if you have observed any relationship or workforce related issues about having higher bandwidth services in homes as well as in local small businesses.

Ms Thompson—As I said, a lot of the ICT firms are not as large as IBM. A lot of them start off as one- or two-person businesses. Their experience if they are not located on the technology park, and a lot of the businesses that are in the IT area are not located on the technology park, may be from a home office. Personally, my primary office, even though I am a director of a University of Ballarat research centre, is a home office. So the thing with ICT is if that is one of the main vehicles you use in doing your work then it should not matter where you are. What we see is that a lot of people have moved to Ballarat for employment. They have not often moved to Ballarat to have a city experience. They are on the fringes of town in the more rural parts of the city of Ballarat or they are living in the shires that surround us. High bandwidth for residents is much broader than just the residential use of bandwidth that we normally see. It is people being able to opt to work from home. If they are commuting to Melbourne for employment, it is the same thing. That means that they can stay in Ballarat at least two days a week or something like that. That can create a balance while enabling them to have the same experience no matter where they are.

Mr Vallance—The other thing is that what Ballarat ICT Ltd wants to see is an increased number of applications being provided to the home in health, financial services and community services. We are talking to various agencies and institutions in our regional patch about that. But it does require you to have that basic infrastructure there to make it happen—bandwidth.

Senator LUNDY—I want to leave you with one final question, which I would be happy for you to take on notice. Are there any figures or analysis that Ballarat ICT Ltd has on the prevalence of home based businesses generally but also specifically related to the ICT sector? Could you also provide any figures, reports or analysis that you have on the issue of commuting and people choosing to work from home because they have available to them a higher bandwidth network. That would be most helpful.

Mr Vallance—We can take that on notice.

Senator BARNETT—You mentioned earlier in response to a question something about the take-up rates. Can you tell us what they are? I think that you referred to the ABS rates and you said that you did not know for sure the figures for in and around Ballarat. Do you know what the take-up rates are in Victoria and your neck of the woods? Do you have an estimate of that?

Mr Fry—I would have, but I would not be able to quote it off the top of my head. I would have those figures somewhere, yes. I know that some of country areas where broadband is available, like Ararat, had a high take-up rates for broadband closer to exchanges.

Senator BARNETT—What is the definition of ‘high’? Give me a guess.

Mr Fry—Thirty or forty per cent. Because of the tyranny of distance, that old saying, they cannot get ADSL. But, like I said, in neighbourhoods where there are 30,000 homes or 40,000 homes around Ballarat, they may still only have a 30 per cent uptake. But the major uptake is for ones with speeds like 30 megabits per second.

Senator BARNETT—The reason that I ask is that industry figures in Tasmania have recently estimated a take-up rate of some 20 per cent or maybe a little bit more than that. This was the Tasmanian Chamber of Commerce and Industry representative. The take-up rate affects the potential viability, which is the question that Senator Macdonald asked. Frankly, I think that that is an incredibly important question, because the government has guaranteed and made a commitment that their objective is to make it commercially viable. But at this stage nobody knows exactly what the consumers and the users will be paying for this service. Are you advising this committee that you have not made any estimates or made a best guess in terms of the likely cost to use this new services? I am surprised if that is the case. If you have, could you provide the committee with your best guess in terms of the likely cost and the likely take-up rate.

Mr Fry—On the take-up rate of businesses that you mentioned for Tasmania, the three centres that I know—Ballarat, Geelong and Mildura—have a business take-up rate of 60 per cent at least. I am quite surprised that Tasmania is only 20 per cent, actually. I cannot think of many businesses, small, medium or large, especially in Ballarat, that do not want access to ADSL or some fast speed broadband connection. Most that I know have got that.

Senator BARNETT—Have you done your assessments of what the cost is going to be based on 60 per cent, let us say, which you call a high take-up rate?

Mr Fry—I think that, realistically, one could not estimate the costs, because one does not know how they are going to build the infrastructure or what their links are going to be. I just cannot see how one could estimate the costs at this stage. Having been in costing in those areas, I do not think it can be done.

Senator BARNETT—Do you think it will be higher than what we are paying at the moment?

Ms Thompson—That is not our area of expertise. Under our strategy we want to achieve investment in communications infrastructure. We recognise that as one of the most significant areas where government can make a difference. We believe that in terms of developing a region it is really important that we have the same infrastructure in place. We would like even better infrastructure in place in our region, but it is not our job. We are not telecommunications suppliers.

Senator BARNETT—I can fully understand that. It is just that the government has said that it should be commercially viable. I take your point about investments, but the proviso that it must be commercially viable does impact very importantly on that.

You mentioned take-up rate and commercial viability. Looking at the rollouts happening in Tasmania—it has only been a year delay at this stage—can you give us an indication of the sorts of businesses and benefits that would flow to Tasmanians as a result of the rollout of broadband?

Mr Fry—I think that is a fairly generic question about the rollouts of fast-speed broadband. If a small firm of 10 people in any regional centre—and I will not take Tasmania as an example but I imagine it would be the same in Tasmania—wants the latest IT, with faster-speed broadband there could be hosted services or cloud computing, which would save on expenses and mean that the firm did not have to buy a lot of that equipment. Cloud computing is one of the hot topics at the moment. Whether or not it is practical I cannot say. I would think so. Hosted works would also be, but that is not available now to some of these people because their connections are not fast enough. That would be a major bonus for anyone with high-speed broadband, especially businesses.

Senator BARNETT—I am happy to leave it there. Thank you very much for your feedback.

CHAIR—Thank you very much ladies and gentleman from Ballarat ICT.

[11.43 am]

DU BOIS, Mr John Hilton, CEO, Senetas Corporation Ltd

WESTON, Mr John Francis, Engineering Manager, Senetas Corporation Ltd

CHAIR—The committee has your submission. Are there any amendments you need to make to it, or anything you need to fix?

Mr Du Bois—No, there is nothing, other than that I have a DVD that I would like to submit to the committee.

CHAIR—Thank you. You may wish to make an opening statement.

Mr Du Bois—Thank you very much. I am going to read from what I have prepared.

The new national broadband network will comprise a national network of fibre-optic transmission links used to connect individuals, businesses and government. Much of the information that will be transmitted across the NBN, including personally identifiable information and sensitive government and business data, must remain confidential.

It is important, before building a network of this scale, to take stock of how data should be handled and protected to prevent serious breaches. The simple fact is that fibre-optic networks are not secure. They are not secure enough to transfer confidential information that has not been encrypted. Whilst fibre optic is undoubtedly the fastest and most reliable way of transporting data across networks, it is provably insecure due to inexpensive technologies that make data theft easy using methods such as non-intrusive coupling.

Senetas regards robust security as a business enabler because unauthorised access to sensitive government, corporate or personal data not only affects the bottom line of organisations but also damages their public reputation. Often criticisms of encryption are based upon the belief that it slows down the network. However, Senetas has developed, and was recently awarded an Australian patent for, multiprotocol high-speed layer 2 hardware encryption developed here in Melbourne and sold to some of the world's most security conscious governments, law enforcement agencies, militaries and enterprises.

We are the only global player who has dual accreditation. Our USA accreditation comes from NSA's FIPS, which is 140-2, level 3—the highest level you can get in the category in which we are working, which is up to restricted. The Australian government accreditation is through DSD and is called Common Criteria, which is EAL4-plus. Our clients in Australia—we do not name them because of the probity which they have requested—include a lot of government agencies, statutory authorities and both state and federal police. We can say our single largest client globally is the US Department of Defense. We secure the Swift networks worldwide, which are all financial transactions. We are sitting in Saudi Arabia securing all communications, both civil and military. It is interesting, in terms of the organisations that have just left here, that we secure

the links between Melbourne and Ballarat for the Victorian organisation DHS and its child protection agency.

Senator IAN MACDONALD—Can we buy shares in your company?

Mr Du Bois—Please do not!

Senator IAN MACDONALD—It seems as though you are onto a good thing commercially.

CHAIR—We have a lot of questions. Have you almost finished your opening statement?

Mr Du Bois—I have finished my opening statement. John and I look forward to being able to address questions.

Senator BIRMINGHAM—Thank you very much for your time today and the interesting issues you bring to the table.

Firstly, could you just explain to us as simply as possible, given our range of technical skills at the table here, why it is that fibre-optic transmission is less secure than alternatives or poses a particular security risk?

Mr Weston—I would not suggest that fibre optics is less secure than alternatives. I think there has been a perception that it is more secure. The general vernacular they refer to is dark fibre, which implies some inherent security within the fibre-optic link. In reality, either from fibre-optic splitting or from the simple tap device we have referred to in our submission, tapping these dark fibre links is readily achievable. This is what pushed us to be here today—to highlight that with any fibre optics, including what they now regard as WDM, which is multiple frequencies going down a single fibre, there is implied security there but it is not really in existence. Any of these signals can be tapped.

The most striking device that we have shown in our video, and which we referred to in the submission, demonstrated tapping using this small-fibre coupler, which does not interrupt the original signal but relies on a Rayleigh scattering effect to recover sufficient optical power from the fibre-optic cable to reproduce what that signal was on that line. In our demonstration, we produce a copy of a streamed video from the tap device that is being streamed across the two endpoints of that fibre-optic cable.

Mr Du Bois—I think, initially, because it was copper, people felt it was electrical signals that could be easily tapped and that going to fibre would mean that it was effectively light. What John is sharing with you is that we paid US\$1,000 for the tapping device we bought three years ago and landed costs might have taken it to US\$1,400. Today, we have replaced that with a device that we paid less than \$500 for. So the cost of taps is coming down as the technology improves. What people are able to do with the fibres is put a bend in the fibres—because now we have signals going down that fibre—and divert them to other locations.

There are countless stories that have made the press and those are the ones we can refer to. The ones we have been given in confidence we do not talk about. We talk about the ATM networks in Dubai that went down for three weeks. We talk about the brute force attack in

Estonia, where the whole country came to a halt for three weeks—where the whole financial services market was brought to its knees.

What we are talking about today is the benefits of fibre-optic cable. I will openly share with the committee that we are talking to an equivalent group, back in Singapore, where we are doing proof of concepts. For those people who want to know what the Singapore prices are, they are 100 megabits for \$29.99 and one gigabyte for \$49.99—pretty low costs, but it is a small country. The benefit is that we will get access to anything we choose, such as video voice data, but the inherent risks grow even greater. Cybercriminals do not go through the firewall every single time. Cybercriminals go between your data centre and your disaster recovery centre, where you normally run fibre-optic cable. Organisations spend many millions of dollars building up infrastructure security around their own organisations and then hand their data to a telecommunications carrier, or someone else, to move it on to another building or to another geographic location. No one thinks about the inherent dangers of that information because no one is told that it is now being sent across in-clear. To tap into that fibre-optic cable and use sniffer software is not difficult and the reality is that people are then able to redirect that information.

We have an exponential growth in storage area networks. Storage is growing across all geographies, globally. Organisations are building up additional storage networks, which are 40, 50, 60 or maybe up to 100 kilometres away, using fibre-optic cable. It is on that type of fibre—we secure the Hong Kong treasury—at those points that people break in and then redirect funds. There are known losses. The World Bank had cybercriminals for more than 12 months, it came out last November, but they did not tell the world how much they had actually lost. There are countless other stories across Europe and the US. This is not just in terms of credit card fraud—because in credit card fraud we think about skimming and people putting stuff across—but is about people going into the back of the ATM where it is linked to a switch and this switch is connected to multiple ATMs—one switch can control many ATMs.

Our thrust to the senate select committee today—as part of what we think would be a very good idea for Australia, which is to have a national broadband network—is that benefits that we get from a national broadband network could be outweighed by some of the challenges that we would have if we did not secure the information. I am not talking about all information; I am talking about sensitive information—for example, patient records and personal information. Verizon is an organisation that uses our equipment in Canberra to secure some parts of Canberra. But Verizon is an organisation that came undone a few years ago, when people got into the mutual fund that was organising their announcement—two days before the announcement—and hacked into the system, found out the results and then did insider trading.

Senator BIRMINGHAM—Mr Du Bois, why is this a problem—or an opportunity to solve a problem—for the network and not a problem for the users of the network? You say in your submission that it would be better to design encryption into the core fabric of the NBN rather than try to bolt it on as an afterthought. What is the difference between doing it now—or doing it before—versus doing it afterwards, in terms of the practicalities and the costs of the build and the benefits to security?

Mr Weston—I suppose there are two distinct questions there, from my understanding—firstly, as to why you would encrypt the backbone of the network at those high speeds. I think

that is probably down to delineation of services and what the core network is offering to its clients as against what third-party, more commodity items—security products, like your home appliances and things—would add to the end points and the end nodes of that.

Senator BIRMINGHAM—Let us take them reasonably separately—encryption of the backbone or the backhaul first. Why?

Mr Weston—The encryption of the backhaul upfront and not as a bolt-on afterthought very much comes down to the architectural complexities when you design that network. In our experience, we go into both existing infrastructures and new infrastructures. It is always more readily achievable to be considered upfront, and that comes down to where you sit in the network, what sequence of the network you are protecting and what the protocols are that are running over that network.

Senator BIRMINGHAM—If you are encrypting the backhaul, doesn't that mean that everything going across that backhaul is then encrypted?

Mr Weston—Selectively, yes, it does. It can be configured by policy, based upon what the traffic type is, based on an IP packet—is it video; is it IP; is it multicast traffic? That is configurable, certainly when we are talking about a Senetas device. You can selectively encrypt or not.

Senator BIRMINGHAM—And there is no point spending the money encrypting a whole lot of YouTube videos going through.

Mr Du Bois—When you set up our system—and we are the only organisation on the government's EPL anyway—the reality is that you can choose to keep the head end open, which is what the telecommunications carriers would want to do, because you might have SLAs between yourself and the carrier and they could see what is actually happening. But the body of the text you can actually encrypt and then you make, as John rightly says, a decision on which other documents would go through. So you can be selective, but securing the backbone is probably the most important, because the intrusion actually happens potentially through that backbone. Once that is secured then—to answer your question—at the consumer end that is not our business.

With respect, we would say that, if we were looking at encryption, we could do fibre to the node but not fibre to the home, because our devices are not cost-effective enough. A thousand dollars is too much for a home to want to pay for an encryption device. That is our reason for making that comment. But there is no reason why a small-medium business would not want to protect the information that they have. As for doing it before or afterwards, some of the telcos—Telstra, for instance—will say that it is the customer's decision whether they want to run it inside the network, which is what they do for some of our clients. But there are other telcos, outside of this country, that will actually put the encryption in and sell it as an added value service. So you can buy two services—one secure and one not secure. You pay a margin up on the secured services and then it is aggregated across the life of the network, and obviously there is a better return for both parties.

Senator BIRMINGHAM—Obviously, with the range of government clients you have, you have some good entrees into government. What discussions with the department of communications or the embryonic NBN Co. have you had thus far?

Mr Du Bois—We met with a senior adviser to the minister maybe a month ago, and with about seven people in his department, to go and present what we felt were the inherent dangers that needed to be considered. We have now been included in a consortia which includes Aurora Energy and Macquarie Bank for the rollout to Tassie. So we are lobbying heavily, but, with respect, 80 per cent of Senetas's business is done outside Australia, despite the Australian customers that we have. The most security conscious region in the world is Europe, followed by the Middle East and the US—because we are a global company we can share this openly with you—followed by South Asia, particularly India.

Senator BIRMINGHAM—So you are part of the Tasmanian project?

Mr Du Bois—No, we are not part of it. We are part of a consortia bidding for business. In our meeting with the senior adviser to the minister we offered to give them two encryptors to put across the link to test just so they could validate the benefits of what they could get. We will wait to see whether it is picked up.

Senator BIRMINGHAM—You have not yet had a response to that offer?

Mr Du Bois—No, not yet.

Senator LUDLAM—Thank you very much for coming in. I will follow up the line of questioning that Senator Birmingham was pursuing because I am still not clear. The device that you talk about is a physical device; it is hardware encryption that sits in a box somewhere?

Mr Du Bois—It is military grade encryption. It is tamperproof, because it has to go through full security accreditation. If you physically try to open the box while it is running, all the keys and all the stuff inside, which are the radio encryptors, are destroyed. Effectively, it is military grade encryption which we sell to the commercial market. I can honestly openly share with you now that we are currently building secret-level encryption, which is called high grade, for the Australian government.

Senator LUDLAM—My understanding, though—perhaps I am mistaken—is that, when you are doing your online banking and so on, most traffic from the banks is already software encrypted. Is that not the case?

Mr Du Bois—Between your home and the bank is where the weakness is. Once you hit the bank, you are safe because you hit what is called a VPN, a virtual private network. But your risk area is between your home and the bank. But we are not talking about the home and the bank; we are talking about the backbone that exists between the production systems inside the bank. All banks provide business recovery services or disaster recovery services. They will be on a different power grid pattern so they could be 20, 30, 40 kilometres. That is now always fibre-optic cable, because copper is no longer used, and none of that is secure.

Senator LUDLAM—So installation of your devices on the NBN will still not help me with my personal banking between home and an institution?

Mr Du Bois—No. As I said earlier, on a commercial basis to the consumer is not the business we are in. If we had enough time and money to take the cogs down from where it is today then we probably would be in a position to do something. It depends how important your transactions are. If you pay \$1,000 to have an encryptor sitting in your home, linked back into your bank, the answer is yes, we can do it. But that is honestly not the role we play.

Senator LUDLAM—What would we be looking at? I understand you are bidding into that process in Tasmania but, just in rough numbers, in terms of cost and the number of devices and so on what would be required to encrypt to an adequate level the NBN right across the country?

Mr Du Bois—How long is a piece of string? I do not want to be disrespectful, but I do not think anyone knows what it really will look like. I can give you unit numbers in terms of costs per unit. John will share with you what we do, which is called mesh networks, which is another way of reducing your costs. We do what is called point-to-point networks, multipoint networks, hub and spoke and mesh networks. At the highest end we are running 10 gigabits per second, which is already installed and running in many locations in this country. The list price of those devices is \$130,000 each side. So that is \$260 grand. A one-gigabit device costs \$50,000 either side. A 10-megabit device costs \$3,500 each side and 100 megabit device is \$16,000, so you need two—one to encrypt and one to decrypt. So \$32,000 for a 100-meg pair, \$100,000 for one gig and \$260,000. Remember that these are covering large distances and, depending on how you design your network, you do not have to put in an encryptor at every single point. With respect, I am not trying to avoid the question? It is just very difficult.

Senator LUDLAM—You probably know already, one of the major questions we in this committee are juggling is what the network will cost, what it will be able to charge and wholesale access to ISPs and so on. Network security is a cost that should not be ignored. I am trying to get a sense of the magnitude of costs of adequately encrypting.

Mr Du Bois—We do business with one of the largest statutory authorities in this country. We cannot name them, even on camera. But the reality is they might have spent \$5 million, and the whole network is totally secure. That is \$5 million over the last four or five years where they have started implementing more what they do.

Senator LUDLAM—Without giving away trade secrets can you tell me whether your company intends to bid into each stage of the NBN rollout to try and cover the entire country? Is that your intention?

Mr Du Bois—We would love to be included to share what we think we can bring to the proposal. Yes; absolutely. Telecommunication carriers all have what they call MPLS networks—multi-protocol networks—but they are moving towards VPLS networks. That includes Telstra. Telstra does not run them in Australia; they run them outside Australia. Nextgen is probably the largest VPLS provider in this country. They happen to be a partner of ours. So, given the opportunity to participate actively, we would be more than willing to sit down with engineers who understand the diagram and just point. That is fundamentally what work we do internationally.

Senator LUDLAM—Are you waiting for an invitation to participate in that way or are you putting yourselves into the process? What has been your degree of contact with the NBN Co or the government this far?

Mr Du Bois—If we waited for an invitation we might never get one. I think it is a fair comment that we are trying to inject ourselves in to get the awareness up. The trouble is that most people still think that fibre-optic cables are safe. In Canberra, where you are based, you have an ICON network, which is dark fibre. I have written to the Prime Minister on three occasions offering to give them two one-gigabit encryptors for those links just to show them—to prove—that it can be done, because the truth is that three years ago, when we had the fibre tap, we had 26 agencies in Canberra who came and saw how easy it was to tap fibre-optic cable. It is the belief system that is the challenge.

Senator LUDLAM—I must admit that I was surprised to see this diagram showing that there is effectively enough light leaking out of a bended cable for you to tap that. What is the loss of quality? I find it hard to believe that we are not shielding these cables when there is enough bleeding out to be picked up and read.

Mr Weston—In the general case the cables are shielded. The process of tapping requires you to strip that shielding from the fibre-optic cable in question. Then that exposes the internals of the fibre-optic cable, which is the single string of glass, and the reflective sheet on the outside of that glass. That is where you get this scattering effect from leakage. The angle of that bend is quite precise. That is what that device does.

Mr Du Bois—It is like a small stapler exercise.

Senator LUDLAM—Can I buy one of these devices on eBay or are they—

Mr Du Bois—With respect, you could go into your office and get your secretary to buy one over the internet today for five hundred Aussie dollars.

Senator LUDLAM—I am not proposing that I would do that.

Senator IAN MACDONALD—What about intercepting emails?

Mr Du Bois—I do not think I understand your question.

CHAIR—Senator Macdonald was seeking to clarify what you had said.

Senator IAN MACDONALD—I will come back to that when it is my turn.

Senator LUDLAM—I am just trying to get a sense of this. If you put one of these things on a high capacity cable that was carrying tens of thousands of emails, YouTube, bank transactions and the whole lot, that would be like opening a fire hose really. Once you have that connection what can you do with it?

Mr Weston—Take the case of a 10 gigabit per second internet link. There is a receiving advice running at 10 gig. It is as simple as having another, second, receiver running at 10 gig.

Then you could pick up all that traffic. Certainly for post-processing scales, the more bandwidth there is the larger post processing and searching through that data would have to be carried out. But I think we gave an example of a typical record size for personal information.

Senator LUDLAM—They were very big numbers.

Mr Weston—Yes, they were very big numbers at 10 gigabit. So there would be 208,000 records per second at a 10 gigabit link. Equally, there are no problems storing that data at that speed because it is getting transferred and received at that speed by the normal equipment.

Senator LUDLAM—Does attaching one of these scrambling devices of yours to the line introduce any latency or is it completely transparent?

Mr Du Bois—That is a great question. The answer is: no.

Senator LUDLAM—None—zero—or just a little?

Mr Du Bois—We run it at level 2. There are seven layers in the ISO model. So for Senator Macdonald and Senator Lundy, who have their laptops, that is called presentation 6. Layer 6 is a presentation layer. Layer 1 is the physical cable and we are at layer 2. So we are encrypting all higher protocols.

There are competing technologies, so there is a version called IPSEC, which is the internet protocol security for layer 3. Layer 3 has what is called an encryption tax. It takes up to 40-50 per cent more bandwidth than layer 2 and introduces high levels of latency. Our claim, which we do for our clients globally, is that whatever the line speed is we run at line speed. So if it is 100 megs, one gig, 10 gig, we perform at line speed.

CHAIR—In response to Senator Ludlam, you understandably voiced some frustration at attempting to assess the cost of doing what you propose to do. You have postulated some unit costs. If rather than securing the NBN on the way in but rather it was shoehorned afterwards, as you refer to obliquely in your submission, what would happen to the magnitude of the cost, whatever it may be, in that event? And would it achieve the outcome?

Mr Weston—I suppose some of the reluctance to offer any advice on cost comes down to many of the architectural issues in the network layout, such as redundancy and hot swap-over of backup links and things like that. If you have a fully redundant system then obviously you have just escalated the complete by a factor of two.

CHAIR—You mean double the cost.

Mr Weston—Double the cost. If we were to design the network and then look at security as an add-on, there are levels of complexity there about how those hot-swap and standby mechanisms work that may impinge upon the quality of their overall design and the efficiency of that rollout about where we need to put encryption devices to encrypt the entire backbone. To give you an example, what I have got in mind is that there is a protocol for spanning tree hotspot that automatically reconfigures the network between nodes when a certain link is down. We interoperate within that environment. But if that was designed upfront we might have additional

units being required that would otherwise not have been required if we had been able to review the network upfront.

Mr Du Bois—And the unit cost does not change, just the number of units goes up.

CHAIR—Just to check that I understand, if it is not done on the way in but the network is secured after the event, shoehorned as you said, there are essentially two different scenarios and I guess a range in between. One scenario is that it simply needs to be done again, so at least double the cost. Would that scenario not also entail some undoing cost, because you are assuming you can just put the new one over the top. The second scenario is that, because of the way the network has been built, there are different things that will need to be done than what would have had to be done had it been done on the way in. Is that the full spectrum of scenarios?

Mr Weston—Yes, I think that is the whole scope of what may happen when rolling out a network in design. It also comes down to how many nodes, the scope in which we look at certainly within the layer 2 space. For instance, are we looking at redundant major nodes in every capital city, a number of remote rural major nodes that are going in. That all comes to the question of cost. So I think identifying an overall view of where the major nodes are and where the backbones are and what the capacity of those backbones is all leads to understanding the cost of the network.

Mr Du Bois—Because we have interoperability, it means that on some part of the network you might not be the same high speeds. We can with our devices have 509 10 meg or 100 meg devices connected to a one gig device and then 64 today and 2,000 in December connected to a 10 gig device. So you actually scale it because the network will be set up to deliver throughput at a certain speed but at certain parts of the network the take-up might only be much lower speed networks. So by having an understanding of that upfront it means that you can effectively reduce the number of units you have because you can have interoperability between the smallest and the largest units.

CHAIR—Okay. I guess we all grapple with this mother of a thing in the absence of a cost-benefit analysis, but what if security is not done at all, or not done properly? There are clear benefits of the NBN. However, without a cost-benefit analysis there is no weighing up. Is it your view that the benefits of the NBN could be outweighed purely by the security compromises in the event that the security is not done properly? Is it potentially that dire?

Mr Weston—Were it not to be as secure, and this leads back to a question that was not quite resolved earlier, on the difference between levels of assurance with different devices. Our layer 2 device within the core of the network gives us assurance that the device has not been tampered with or modified in any way. That leads to a certain level of confidence, and that is why we have the common criteria we have the EAL4-plus, the FIPS accreditations, and those boxes are not modified in any way in the field. When we lead on to what is the difference between doing that security and securing from the bank from your desktop PC, which is out of the control of the NBN in the sense that you can have your own viruses on the PC, it could be compromised in other ways, key-loggers on that PC, in addition to any third-party home user/SME securing the backbone at least gives high assurance of that section of the network being secure, outside the scope of any users or end users of the NBN.

Mr Du Bois—And the benefit of providing secure links is that it not only secures sensitive information going across those links but it stops information being dispersed into the links. So there are ways to add information to these links to get things to behave differently. We do to Queensland Rail, so we secure the railway links across Queensland simply because there might be a day when someone decides they want to change the directions of the train. If those links are encrypted it is very hard to get in, because while you are putting that stuff in you are going across encrypted links. You do not see anything.

CHAIR—In highlighting security risks in the proposed NBN build, are you saying that they are much different from the risks inherent in the existing network and what we have at the moment?

Mr Du Bois—I think your risks go up.

CHAIR—How so, and why?

Mr Du Bois—Because you have high-speed networks now across the whole country and the perpetrators who do this—it is not pushing our own company—are organised crime and you did not have to be living in the country. There is a young New Zealander who is in jail for 10 years who got caught last year as part of a group of 20. The last transaction they took was \$20 million but they had taken several hundred millions. He was sitting back in New Zealand hacking into the systems going through. The truth is that it is going to be fantastic opportunity for all of us to have as much information as we choose, not just video downloads—

CHAIR—Including the bad guys.

Mr Du Bois—But including the bad guys. The people who work on the defence will tell you that the bad guys have got all the stuff already. The London bombing was done on encrypted phones.

CHAIR—The bad guys are already there but you are saying they have got increased opportunity with the increased capacity.

Mr Du Bois—Much higher opportunity for this, because we all believe that it is inherently safe. And it is a much easier path to get access to a broader network.

CHAIR—You have just said it is not that simple, though.

Mr Du Bois—If it is encrypted. It needs to be secure. The word ‘encrypted’ might be the incorrect word in every facet. Sensitive information needs to be made secure, absolutely.

CHAIR—So in many senses we know not where we go. How do you prove that you are not trying to push what is clearly a vested interest? How do you prove that you are not trying to push security through scaring—the spectre of that which we do not yet know?

Mr Du Bois—We can only refer you to the customers who work with us. So while with SWIFT’s Secure it is Global Swift Networks.

CHAIR—That is still based on what exists.

Senator IAN MACDONALD—Mr Finch would not be doing it, though.

Mr Du Bois—I have a military background and, with respect, the truth is that people in defence, as Senator Macdonald rightly says, clearly understand the benefits of securing sensitive information. I am not trying to be impolite and presuming everyone else does not, but they have been doing it since Julius Caesar's time. The reality is that there are different levels of documents that you have across the Senate and certain of them require certain security and others do not. What we have seen is not just defence; we have now seen commercial organisations beginning to understand the benefits. We have eight private banks in Switzerland and the reason they do it is that cyber criminals today will take stuff off their high-speed links, as John spoke of earlier on, and at high speed you do not have to be able to read it. You can park it somewhere else and then in your own time frame you can sift through the information and look for it. And that effectively is what is really going on. It is not us trying to push our own FUD, because as I said the Europeans are very, very conscious of trying to secure sensitive information. It is not that we are not but we tend to be—

CHAIR—She'll be right, mate.

Mr Du Bois—a little bit more blase about it.

Senator IAN MACDONALD—When you said before to Senator Ludlam that you could get your secretary to buy it online, did I misunderstand you?

Mr Du Bois—No. I would say just go to Google, look up fibre tap and buy it online.

Senator IAN MACDONALD—And that is a device that can hack in to—

Mr Du Bois—Absolutely. It is not designed originally for fibre tap devices. It is actually designed to help with the optics they use. But we could give you the name of the company. This is common knowledge.

Senator IAN MACDONALD—You say you are the only ones doing it. I am sure we had evidence from someone associated with the University of Queensland who were—

Mr Du Bois—Tapping fibre-optic cable?

Senator IAN MACDONALD—No, who were doing security for the government.

Senator LUNDY—It is the Queensland University of Technology and they have a security section in their IT school there. It might be under their faculty of law.

Mr Du Bois—Maybe it is the quantum group? We do quantum cryptography as well. We have two sites running in Switzerland. We do the Swiss elections.

Senator IAN MACDONALD—But are you are associated with them?

Mr Du Bois—No, we are not. We are totally independent.

Senator IAN MACDONALD—But as I recall it I am sure they were telling us the same thing as you.

Mr Du Bois—I think if you checked with DSD, with respect Senator Macdonald, we know that in this country if you go to the government's EPL, which is the evaluated products list, for layer 2 encryption there is only one vendor on the list.

Senator IAN MACDONALD—The other thing is that whenever we use these silly laptops, every 15 seconds we have to type in a code. Is that encryption?

Mr Du Bois—No.

Senator IAN MACDONALD—Okay, so it has nothing to do with it. Finally, there was a very celebrated incident in the last couple of months involving a public servant who is not well. Although he confessed to doctoring some emails he maintained his belief all along that he had seen an email. Given the sort of fiddling you are talking about, is it possible that someone else could completely remove from my laptop an email I have sent?

Mr Weston—Yes. We touched on this earlier. When we talk about the endpoint of your laptop and the applications that run on your laptop, that is one particular form of attack. So that is at the applications base and higher. Someone could put a keylogger on your laptop, log everything and then get your passwords and transmit that to themselves in a secure fashion. You would be unaware at the time that that had happened. Where we come in really is on the backbone to secure sniffing of that traffic. So there are two different cases.

Senator IAN MACDONALD—Senator Fisher is saying you are scaring people; you are certainly scaring me. What I understand you are saying is that an email I send talking about giving favours to a car dealer—because we are not encrypted in Parliament House and in government, except in defence—could actually be removed and nobody could tell that it had been removed. Could you tell it was removed?

Mr Weston—Not at the level we play in—not at the layer 2 space but certainly at the layer 3 space. If you were to transmit that email across a network and the security on your local system had been compromised by a virus or a trojan horse of some sort, and if that were to be sent in the clear on the backbone and that backbone was not encrypted, then that could be observed by anybody with the likes of this fibre tap. So there are levels here about compromises in security.

Senator IAN MACDONALD—Are you telling me that a clever criminal can add emails to my computer and make like they are from me when I have never seen them?

Mr Weston—Absolutely.

Senator IAN MACDONALD—Or remove an email I have sent to someone—I am sure I have sent it but suddenly I cannot find it?

Mr Weston—In the simplest of terms, yes. There are levels of complexity there about what the latest virus protections are and what the latest security holes are.

Senator IAN MACDONALD—Defence are obviously worried, so they have got you doing it, but surely governments—

Senator LUNDY—They do.

Senator IAN MACDONALD—If mine is not encrypted?

Senator LUNDY—Yes, DPS does it.

Senator IAN MACDONALD—But mine is not.

Senator LUNDY—But your security locks it down.

Mr Du Bois—You might be running a thing called PGP, which is encrypted. When you send stuff it goes in PGP, so everything that goes across from your PC onwards would be encrypted. You could do that.

CHAIR—Whilst Senators Macdonald and Lundy sort that out—

Senator LUNDY—It might be useful to get a security briefing from the Department of Parliamentary Services.

CHAIR—The committee can consider that.

Senator LUDLAM—I have one last question, and it again goes back to the issue of costs. For the largest network that you have worked on, either overseas or in Australia, of a non-military nature—something intermediate—what overall proportion of network cost increase would occur if you were to properly encrypt the network?

Mr Du Bois—Can I throw the question back to you?

Senator LUDLAM—Yes.

Mr Du Bois—Are you asking about the cost of the devices going in?

Senator LUDLAM—The cost of your services. I am still trying to get a sense, because it is very difficult. I understand also why you are not willing to say, 'It'll cost this much to encrypt the NBN,' but does it add five per cent to your network costs, 50 per cent or 500 per cent? I am just trying to get a sense of that.

Mr Weston—That is a very difficult question to answer, in the sense of what the rest of the network comprises. Even with our encryption devices, one-gigabit encryption devices are becoming more and more in daily use, so the cost of both the encryption device and the switchgear that would sit behind that—Cisco or some other product—is reasonably low. If we

are saying that the NBN has aggregated 10-gigabit links, where there might be a 40-gig trunk aggregated over four different links, all of a sudden both the switchgear and the encryption devices are far more expensive. So I think it is very difficult to give that answer without appreciating—

Senator LUDLAM—What shape the network is.

Mr Weston—what the shape of the network is.

Senator LUDLAM—Are you getting a better sense in Tasmania, where you are putting together a bid? Is that giving you a bit of an idea?

Mr Du Bois—What we see are the links. We are looking at the trunks, so we are saying that, if there were 10-gig trunks between the mainland and Tasmania, you just put two devices in. So for \$260,000 you secure the whole link.

Senator LUDLAM—So nobody in a submarine is going to be able to tap that cable, but then you have a whole island to consider.

Mr Du Bois—If you do tap it, you are not going to get any information off it. So the question is: what is the cost disclosure? As John rightly says, the most common device being deployed is really a one gigabit. There are a lot of them. So for \$100,000 less in price, can you afford to have sensitive information in the field?

Senator LUDLAM—I agree with your point. I still have not the faintest idea of whether it would double network costs, for example, in Tasmania.

Mr Du Bois—No. With respect, if you want me to hazard a guess, I am going to give you the best guess I can possibly give.

Senator LUDLAM—I am not going to consider it as a formal quote.

Mr Du Bois—But I will tell you that, if it were one per cent, it would be high.

Senator LUDLAM—You would be surprised if it was more than one per cent?

Mr Du Bois—Of the whole network.

Senator LUDLAM—That is more or less what I was after—just an order of magnitude.

Senator BARNETT—I have a follow-up question. Can you just tell us a bit more about your Tasmanian bid and the timing of that?

Mr Du Bois—It is not a bid. Do not get it out of proportion. We have been included in a consortium, along with Macquarie Bank, Aurora Energy and a network company, to bid for the work that is going on. We will do monitoring. That is where it is at this stage.

Senator BARNETT—What is the timing?

Mr Du Bois—We have a meeting on the 28th to go through the next stage. I do not honestly know the timing of the end point. Our commitment to it is that we want to give them two devices to install once the cable is in and then let the rest of the stuff happen. At least they can test the network with the devices. In terms of Senator Ludlam's question and performance, you can get all that stuff out of the way. We are very confident in what we do. Then at the end of it you can do the business case behind it. We see that works strongly in our favour because we do run at LAN speed.

CHAIR—On behalf of senators, thank you very much, gentlemen, for your evidence.

Proceedings suspended from 12.31 pm to 1.26 pm

MORGAN, Mr Kevin Leonard, Private capacity

CHAIR—The committee welcomes Mr Kevin Morgan. Mr Morgan, as you are aware, the evidence you are about to give is public and subject to parliamentary privilege. It is potentially unlawful for a third party to attempt to interfere with evidence to be given. If at any stage you wish to provide your evidence in camera, please request that of the committee and we will consider your request. It is very good to have you back before us again. Do you wish to make an opening statement?

Mr Morgan—If I may, thank you, because an awful lot has happened, obviously, since I made the submission and since the last hearings. What we have seen is the costs for this policy of high-speed broadband blowing out from what now seems a quite modest \$4.7 billion to one that now could land taxpayers with a liability of \$43 billion. That is by the government's own somewhat imprecise estimates. We have had our first milestone. We have spent \$100 million so far, following a \$50 million equity injection into NBN company. You add that up with the payments to the lead adviser on the implementation study, the earlier tender, and various consultancies on the Tasmanian and rural black spots program and you get over \$100 million. What have we got for that? A lot of rhetoric. If you Google 'Senator Conroy' and 'nation building' you get over 6,000 returns. That is after an advanced search. Truthfully, what have we got? There are few trenches being dug in Tasmania. After two years of this policy there is not one new broadband service or one megabit added to the speed of existing services. Fair enough, a project like this, nation building, takes a long time, but at the moment, as an observer, this policy still lies in the realm of fantasy—and, unfortunately, it is one that is shrouded by complete secrecy. I might say something about that later, if you wish, given I did try an FOI request for some materials and the outcome is amusing.

Other than the curiously formed observations of the expert panel—and they went massively beyond their terms of reference to offer what I understand was unsolicited advice on the way forward—we do not know anything about how this policy was framed. Given that lack of understanding or any evidence, we can only conclude that it has been formed in a fact-free environment, other than the evidence which has lain largely self-serving from Telstra's competitors and may now form the basis both for the NBN structure and for the regulatory reforms that will underpin it. It is somewhat curious, given that the Prime Minister last year stressed the need for evidence based policy. It is a leap of faith to believe that a \$43 billion wholesale-only network can be rolled out in eight years and generate commercial returns when there are not really any facts on the table.

Despite that leap of faith, the facts remain that there is no precedent for a large-scale wholesale-only network anywhere in the world. True, there are subsidised small-scale municipal networks in Europe and the USA which have had mixed fortunes, but we do not know much about the economics of them, because they are typically cross subsidised from other municipal earnings or rates or whatever. The reality is that throughout the world no-one is building a wholesale-only large-scale network. I will stand aside the Singapore one for the time being. It is not really a precedent, given the size and population densities in Singapore. It is interesting but not a precedent. The reality remains that wherever the leaders in fibre and broadband deployment, countries which are leading on the OECD tables—Japan, Korea, USA, even the UK

now, Germany—in each of those markets the rollout of fibre and high-speed broadband is really built around the incumbent, the vertically integrated telephone company. There has been no need to dismantle the incumbent company to achieve good outcomes.

The government promised us initially a competitive, wholesale-only, fibre-to-the-home network. We know that that ‘build it and they will come’ model was a complete fantasy. Why? Because it is basically acknowledged in the reform package of legislation that is now before parliament—the consumer safeguards bill and so on and so forth; the legislation that will split Telstra. I appreciate that that legislation is the subject of a separate inquiry, but you cannot really broach the issue of the NBN now without referring to that package of so-called reform.

In reality, that package of reform, which is going to allow the government to turn its fantasy into reality, possibly, will drive Telstra out of the fixed-line market and coerce it not so much to divest its network but to divest its traffic onto the NBN. I would stress that in this package, although the terms ‘structural separation’ and ‘functional separation’ are repeatedly used, the underlying intent is divestiture—the sale of the network and/or the transfer of the traffic that is on the current Telstra network.

That legislation confirms one thing: the NBN demands a monopoly. It will need probably every cent of existing public switch network revenue if it is to achieve a commercial return—and bear in mind that the government has stated this is going to achieve a commercial return. That return is not the government’s cost of borrowing—it is not five or six per cent; it is a blended cost of capital, a blended cost of the public and private sector equity and debt that would go into the project plus the return that a commercial investor would expect. What it might be ultimately I do not know, but it is probably closer to 15 per cent and five per cent.

But at least with this legislation we have a clearer picture of how the NBN might work. We have a policy to invest \$43 billion that is utterly contingent on destroying the existing investment in infrastructure in the fixed network. It is an exciting policy to some. Former Prime Minister Paul Keating said it made his heart beat faster. I suppose it does in a sort of *Clockwork Orange* way, if you delight in destroying things. The government explains that this policy of structural separation, coupled with the wholesale-only NBN, will correct the mistakes of the past and unlock a new competitive future—benefits for consumers and so on and so forth. Well, despite the rewriting of history—saying this will ‘correct the mistakes of the past’—in my view there were not mistakes made in the past. No-one separated their incumbent on privatisation or with the introduction of competition. There was no cause to do so in the United Kingdom, France, Germany, Sweden—run through the whole OECD list.

There was little reason to do it here. There was no mistake by either the Labor government, with the introduction of competition initially, or the Howard government, with privatisation—and that is not about the merits of privatisation per se. It was not a step that anyone took. What I would say is that this policy, even if you believe there were mistakes and errors in the past, threatens to create mistakes that will dwarf them and deem them to be almost insignificant. It really attacks the fundamental structures that deliver and that are essential to the delivery of affordable nationwide telecommunications services in this country and in any developed country. It unwinds 30 years of genuine reform which started with the royal commission into the Australian Post Office back in 1974 and saw the creation of Telecom Australia, its corporatisation and commercialisation and then the introduction of competition et cetera. That is

a package that contained a lot of very productive reform. Worse still, it calls into question how we will observe some of the long-standing tenets of telecommunications policy in the NBN era.

I will leave you with one question. I have not got the answer and I cannot see that the government has yet volunteered it. How do you deliver universal service in the age of a structurally separated wholesale-only NBN? I think it is an interesting question. It is a critical one. It may well go to the question of whether or not the idea of a wholesale-only network is realistic in a country like Australia. Thank you very much for the opportunity.

CHAIR—Thank you, Mr Morgan. Indeed, as you said as part of your statement, you have acknowledged that the legislation relating to Telstra is properly the subject of a separate inquiry by a separate committee, which in fact is convening hearings next week. I presume you will be making your views on that issue known directly to that committee, which is where they would most appropriately belong. That said, they are clearly a part of the fabric of this inquiry as well. Senator Lundy has some questions for you first.

Senator LUNDY—Mr Morgan, I thought I would start with the issue of availability of bandwidth generally. Given you do obviously have a background in public policy in this area, I am wondering if you have a view about what sort of bandwidth Australians ought to be able to access right now to serve their needs. I know it is a bit like asking, 'How long is a piece of string?' I want to get a feel for this and see whether you think 100 megabits per second is too much or not enough and whether you think 10 megabits is a more appropriate goal.

Mr Morgan—Each user's demands will vary enormously. I am quite happy with 1.5, because I was offered 25 and I thought, 'Whoops, my allowance goes in a couple of hours.' That said, I think the test should be that it is bandwidth which is affordable. By that I do not mean just by the consumer. It should be so by society at large. If you look at the other priorities that might lie before a government or before a society and at the opportunity cost of \$43 billion to deliver 100 megabits, you might think it might be more realistic to perhaps go back to the 12 megabits as the baseline. That would be adequate for most applications that any domestic user would want. Certainly ADSL2 would satisfy practically any application that is commonly available or even foreseeable. I think there was a report by Ovum for the fibre-to-the-home council in Europe at the end of last year which did note that there were no applications currently available that really demanded fibre to the home and that kind of bandwidth. I think 12 to 25 megabits would be quite competent. It is interesting to note that the UK have set two megabits as a national goal, which seems a bit modest. Obviously, they have made a decision that they are not going to spend that much money on broadband and that what they do need to deliver, that two megabits universally, will be raised through a telephone tax.

So 100 megabits is definitely gold plating and perhaps not necessary. Obviously, for specialised users it is, but there is already a lot of fibre for those people. I was intrigued to see that one of the things that fell out of the first round of the computers for schools funding—and I think it is a good statistic as it is heartening—is that 50 per cent of schools in that first round of funding, which you would think were probably the less advantaged schools because they were first up, had fibre. But when you go further into the statistics you find that only 0.5 or one per cent of them are actually using speeds of more than 15 megabits, because the applications are not there. You might say it is because there is not enough widespread high-speed fibre, but I think in the short term it should be 12 to 25 ADSL2. If you had gone to VDSL that would

certainly have been as much as you would have wanted. Sorry for that very long answer to a simple question, Senator.

Senator LUNDY—But I think it is relevant to your point of view. Exploring it a little bit further, certainly one of the challenges for the government, if you are going to make a significant investment, is deciding the best way to make that significant investment future proofed. One of the facts that inform the need to build a new network of some description—and we know what the current description of that is; it is a fibre-to-the-premises network—is the poor state of the copper network. I have done a lot of work on the constraints on ADSL. My concern is that there is finite capacity within the copper network for ADSL. As you say, if everyone were able to get ADSL2+ then that is a prospective argument for some universality of higher bandwidth. But for all intents and purposes all of the evidence we have had is that the existing network was never going to provide even anything close to universal higher bandwidth speeds using ADSL or ADSL2+ because of those constraints. So I want to see whether in your view, given what is an obvious criticism of the government's policy, you think it is plausible that a policy solution would in fact be to rely on the existing copper network and ADSL-style services.

Mr Morgan—It is true that copper is in very poor shape particularly in inner city areas through age. Then, as you have rightly pointed out on numerous occasions, in suburban and outer urban areas its ability to offer DSL-type services is severely limited by RIMS, pair gains and whatever else was the optimal technology when it was built. But of course when you overlaid copper with what was essentially an opportunistic technology, which was DSL, you were going to run into those problems.

I suppose the unfortunate thing for the government was that it inherited an impasse as to Telstra, which was obviously intent upon addressing some of those problems. Perhaps at that time the Telstra management's view of Canberra, irrespective of what government was in power, was so coloured and so bad and the relationship was so bad that you could not get anywhere with that. But I think somehow someone has got to step back when you have got a quite competent incumbent which already has a lot of fibre in the local network and which could, at a far lower cost than \$43 billion, upgrade much of that to initially FTTN and apply subsidies to those areas where it itself cannot build a business case but that business case would probably, as has been said earlier, extend to 60 to 70 per cent of the country. But that requires the two sides to step back a little bit. Is it past that point? Is it not wise to go back to that? Should we gold-plate? Should we future proof? I got pilloried for saying, when I last came here and I was asked about fibre to the home, 'Oh, it would be \$40 billion plus.' Everyone ridiculed me in the trade and asked, 'How did you get that crazy figure?' So I was delighted when the government came up with \$43 billion. We do not know whether that is the final figure or not, but it is an awful lot of money.

I understand—and I trust no-one will press me on this, otherwise I will be up against privilege—that the \$43 billion was derived by the expert panel, although there have been suggestions that it was not. It was derived from the estimates contained in the Broadband Stakeholder Group report in the UK, which I am sure you would be familiar with. It is an excellent report and is very thorough on the comparative costs of fibre to the home, fibre to the node and so on. I make that point because it is curious that, if the expert panel took their costings for fibre to the home from that report, they did not take a major point. In fact, they made quite the opposite point in their observations. They said, 'We should go fibre to the home because it

future proofs, and fibre to the node would be a wasted investment.' You would basically put fibre to the node in and, if you wanted to go further with fibre to the home, you would strand that investment.

Senator LUNDY—We heard a lot of evidence to that effect in previous hearings, before the policy changed.

Mr Morgan—Go back to the Broadband Stakeholder Group and you will find that they say that installing fibre to the node is not an obstacle to subsequent upgrade to fibre to the home unless—there is a caveat—there has been significant subloop on the bundling. Obviously, if competitors have installed large amounts of equipment in nodes, that presents a problem because that investment has been stranded once back at the exchange, they have moved down the network and their investment gets stranded again. That would create a significant problem. Given the reality that no country has found subloop on bundling to be a really economic prospect, it is a non-issue. What they said was, No, if you go fibre to the node, much of that investment can be rolled in subsequently.' Obviously, the nodes themselves are stranded, but I think that what is more important than perhaps the progression in laying out the capital is the progression in how you build a business case and the income streams to go to that ultimate, which is fibre to the home. You would be incrementing your revenues, certainly, because you would be offering faster service and a wider range of service, but you would not be pushing your cost structure up massively in the way that you would with fibre to the home.

That is a long-winded answer, but the WIK report, which I think was tabled by the Competitive Carriers Coalition to this inquiry, is very informative. Their observation was that there is no business case in the six leading European markets for fibre to the home. It is just not a commercially viable thing. The business case for fibre to the node was limited—surprisingly limited actually—in those major markets of Germany, France, Spain and so on. I suppose what they were getting at is that you can do that and then move up further, later, if you want to. Correct me if this has not gone anywhere, but in the United States, where it is part of the package, they have been talking about tax incentives, accelerated depreciation and those kinds of incentives set against a target. If you are building broadband infrastructure, be it wireless or fixed, that delivers certain speeds, then you will enjoy accelerated depreciation. If you accept that broadband generates economic growth and more revenues for the government through economic activity, taxation returns and so on, that seems like a quite good neutral way to provide a stimulus that does not hit your budget bottom line immediately. You might forego a little bit of corporate tax revenue in the short term, but you would be gaining it back from the supposed benefits of broadband in the longer term.

Senator LUNDY—Following that through, I take you to the issue of the access regime. You mentioned unbundled local loop and the installation of assets to deliver services in that local loop, could you make some observations about the success or otherwise of the 1997 regulatory reforms in the telco industry—specifically the access regime aspects of the Trade Practices Act and how that informs your view about the market pressures that ought to mean an affordable broadband service would be improved over time in the market under the current structures. I ask that in the context of what is a very succinct submission about thinking that the current structures serve Australia reasonably well.

Mr Morgan—I suppose the proof is in the pudding. Although, unfortunately, perhaps to build a case, the government has been decrying broadband performance in Australia, we are only a couple of percentage points behind markets which we want to emulate, like the one in the United Kingdom, both in terms of penetration and speed. Costs vary, of course. But I think that at some point in this debate there has to be some reality about the unique nature of the market. That has always been totally excluded from the debate about telecommunications performance in Australia because that does imply higher costs and difficulties. Even if you take suburban population densities, our urban population densities typically in Melbourne—once you move outside of St Kilda where you might have 5,000 per square kilometre—are 1,500 to 2,000 per square kilometre. Greater London as a whole has 7,000 to 8,000 per square kilometre. It has a profound impact upon the cost of serving people. I think you have to take that into account.

Obviously, this regime has been marked by disagreement, litigation and people feeling that Telstra is not meeting the obligations it has under the act and so on and so forth. To an extent, that is inevitable.

Senator LUNDY—Why is it inevitable?

Mr Morgan—Just the sheer logistics of opening up a network of eight million or nine million services to potentially 20 million different people asking for access means there will be accusations that there are queues, that you have let Primus in and not AAPT and so on and so forth. There are logistical problems and real problems in there. It has been long time since I was around network people directly, but I still think the evidence given by Mr Malone from iiNet was very telling. He said they have difficulties but they are all network people and they like to get an answer. That is not to say there will not be instances as there may have been in the recent case with Telstra—which they have accepted and behaved properly—where things have not worked properly. But, by and large, if you look at the rates on bundling in Australia compared to, say, the rates on bundling in the UK, taking into account the very different geographic characteristics in the markets, Australian rates on bundling are not dissimilar to and not that much below those in the UK, where you have functional separation that was supposed to accelerate it. They have to be qualified by the fact that, by and large, because of the structure of pricing, it has not been terribly attractive for competitors to go into about a third of the market. So, if we are talking about bundling in a limited part of the market, I think it has been reasonably successful.

Senator LUNDY—I have a final question. The next big step in regulatory reform in telcos is the accounting separation for Telstra and the rules that the former government put in place to require some accounting separation. Are you able to comment on the relative success or failure of that effort to further regulate the telecommunications industry?

Mr Morgan—Perhaps—

Senator LUNDY—I am happy for you to take that on notice.

Mr Morgan—No. I am just thinking back to the minority report on the sale of Telstra bill in 2005. I think you and Senator Conroy signed off on that.

Senator LUNDY—Yes.

Mr Morgan—You may have been circumscribed in what you could raise after the discussion you would have had in the party about structural separation with Lindsay Tanner. But I do note that those comments from the then shadow minister and you were really about refining the operation of the separation regime.

If you look at what is happening in the debate about separation internationally, you will see that they have had a huge debate in Europe. It started off with Viviane Reding, European Commission Commissioner for Information Society and Media, coming out all guns firing about structural separation the European way. She got a bit confused. That kind of got wound back to functional separation. What falls out of it eventually is a new law which says that regulators can use functional separation as a measure of last resort provided all these tests are met.

And what do you actually see then on the ground? You see the Italian government endorse operational separation, which is absolutely modelled on the Telstra example. They think it works quite well. Bear in mind that, unlike Telstra, something might fall out of this recent court case but it is not going to be a multimillion-dollar case. Telecom Italia, back in 2001-02, were fined about €50 million or €60 million. There have been clear breaches of conduct in the European Union. Telefonica was fined €300 million in 2005 by the EU competition commissioner Neelie Kroes. But no-one then said, ‘You need something more.’ They said, ‘We need to refine some of the tools we’ve got.’

By and large, there is not even a great deal of enthusiasm for functional separation within the European Union now. The UK is winding it back because it was an obstacle to fibre deployment. The French have never been interested. The Germans certainly are not. The Swedes have a curious situation where Telenor pre-empted the regulator by creating a ‘kind of, sort of’ functionally separated network division—but it is not functional separation as it would commonly be understood. The Italians have chosen operational separation. The Poles—which is the only other example you can find of going down this path—have sort of ended up halfway between operational separation and functional separation. So that model has still got some value in it.

Perhaps the government found itself in a position where—unlike in the UK, where the regulator clearly had the power to address this problem of anti-competitive or observed anti-competitive conduct by going down the structural separation path, because Ofcom had that power under the Enterprise Act or could refer a matter under the Enterprise Act—it felt it had to create a big stick. But I think it is a bit too big of a stick to address a problem that is being dealt with in a much more balanced and rational way in other markets.

Senator LUNDY—Thank you. Before we move on, I just have a quick statement to make. Because the witness mentioned the Competitive Carriers Coalition I just want to place on the record again, as I did at the start of this inquiry, that my husband is David Foreman and he is the Executive Director of the Competitive Carriers Coalition. Because you mentioned them directly I thought it was important to make that declaration now.

Senator LUDLAM—It seems to me that you have two broad areas of concern: one around the market structure and one around the scale of government spending. Is it your view, reading between the lines, that the market should be just left to get on with it—that we do not need government intervention in infrastructure of this kind?

Mr Morgan—If this policy had been couched in terms of ‘the government is going to build, as best it can, in cooperation with the private sector, a national broadband network’ and it had not added the conditions or the goal that it was going to be a commercial network then one might have said, ‘That is visionary. That is really worth considering.’ But the scale of this network and the promise that it will generate a commercial return really distorts the policy.

Is there a need for government intervention in this sector? There are many sectors of the economy that demand government intervention. I suppose this is not an answer to do with telecommunications policy so much, but when you are in a society where—as my children do—as you get a university education you get a letter every quarter telling you how much money you owe, I think there are other priorities. There is obviously a case for a level of intervention in the market in those areas where you do need subsidy—in rural areas and remote areas, certainly. But let us bear in mind that we are talking about an industry which in total has revenues, though this is including mobiles, in excess of \$30 billion a year. Profits are in excess of probably \$5 billion a year. It seems bizarre that you cannot frame a policy that channels those revenues and some of those profits into investment. So that is one answer.

Senator LUDLAM—Your submission and your opening statement were quite strongly worded in terms of ‘destroying’ things. I have not checked in the last couple of days but my understanding was that the markets treated Telstra pretty gently after the minister’s announcement and their share price has not gone off a cliff since then. Some analysts are recommending Telstra as a buy. Is it your view that, as to their share price, as soon as a decision is made one way or another we are going to see that destruction?

Mr Morgan—Well—with forbearance from the committee, in the light of the chair’s comments about that legislation being the province of another inquiry—as I say, you cannot uncouple these two things.

Senator LUDLAM—Right. I would agree.

Mr Morgan—Telstra is being asked to agree to a voluntary path which is called structural separation. If it does not agree to go down that path then it will be functionally separated out. I will come back to the functional separation bit, but for now let us stay with the structural separation bit. As I stressed, it is still a bit of a surprise to me that commentators are referring to this as structural separation. It is divestiture. It requires them to sell down their stake in their fixed network—any fixed network they offer retail service over—to 15 per cent. The government says, ‘Oh, well, you can satisfy that by transferring the traffic to the NBN.’ If you start to do back-of-the-envelope calculations about this, you see that really that means that any access revenues that Telstra would then gather from customers would be passed over to the NBN. That would mean that the line rental that Telstra gets at the moment would be gone. That would be off the bottom line—net of running the copper network which, of course, would no longer exist. That would probably take \$2 billion off the bottom line. In a strictly technical sense it is not call origination and call termination, as we understand it, on the PSTN. But for Telstra, at the moment, obviously, traffic is generated on its network and terminates on its network. It retains, essentially, that revenue for origination and termination of calls—another couple of billion dollars. If the network were to transfer the traffic to the NBN, it would have to pay NBN Co. for a like service. Of course, we are talking about VOIP in this instance, so it is not quite the

PSTN-type termination. But another large chunk of revenue would go off. What happens to the mobiles?

Senator LUDLAM—I guess my question, rather than being on the specifics, is: if it is such a destruction of the value of Telstra, why haven't the markets responded that way?

Mr Morgan—I suppose you cannot believe it would happen!

Senator LUDLAM—My understanding, on reading some of the stuff over the weekend, was that the market had priced in some form of separation down the line; it was seen as inevitable. So that is why it was not such a great shock to the system. Would you disagree with that?

Mr Morgan—I think the functional separation can be priced in quite readily. If you start to run through it, functional separation is an irritant; it costs between a couple of hundred million and a billion dollars, depending upon the new information systems and platforms you need and the new buildings and so on. Structural separation, as we commonly understood it—picking up half the company and dropping it in a new legal entity but one that is still owned by an overall Telstra company—obviously costs much more, into the billions, but still you have got a share in this and a share in that. But I do not think anyone seriously has understood or has started to think through—and I am not saying that I have, because it is a vast issue—or has yet seriously factored in what would happen if Telstra did divest its network. If it did divest its network, by selling it, who would buy it? The government is building a Rolls Royce fibre network here, so if Telstra were to say, 'Who would like to buy my 40-year-old copper network?' I do not think they would get a rush, frankly.

So Telstra, irrespective of the revenues that are transferred over, has to write off billions of dollars in assets. And it could expand all the way back up the network the way this legislation is couched. We have been talking about the copper network, but it could embrace the backhaul, the trunks or whatever. Every element of the network could be caught in this. When Telstra transfers revenue and writes off billions of dollars in assets, it ends up with a balance sheet that is hit by a big plunge in revenues, heavy levels of debt—which would not change substantially; why would they change?—and no or few assets underneath it. The company would be fundamentally different from what it is today.

Senator LUDLAM—How different is this, though, to what happened to the horse-and-cart manufacturers when automobiles came in? Aren't we just overbuilding a network that has been made obsolete in places like Japan and Singapore? I do not understand what the difference is if it is time to move on. You are leaving Telstra's value intact in the retail sense, and they run a very large operation, and perhaps that is the reason the market has not punished them so severely in the last couple of weeks.

Mr Morgan—So you are leaving Telstra intact?

Senator LUDLAM—No, not leaving it intact, but Telstra retail is obviously still a very professional outfit and very large. I guess I am trying to tease out, from your comments about the destruction of things, whether you mean physical assets of a very old and degraded copper network or the market position of Telstra. I am wondering why that has not been seen thus far.

Mr Morgan—As I said, I do not think people have really stopped to weigh up the full consequences if it goes that way. I think the price does reflect concerns about functional separation, certainly, but, because it came out of left field, I do not think anyone has really thought about the implications of it.

Senator LUDLAM—Okay. My last question relates to the comment you made right at the beginning of your opening statement about a wholesale-only network being a bit of a dangerous thing in regional areas. Are you concerned that by preventing that wholesale supplier from offering retail services you might see fibre taken to the regions and no retailer bothering to pick up service in that area?

Mr Morgan—It is an open question. At the moment, delivering universal service is, despite the arguments about the size of the USO, pretty simple. Telstra has a national network. It has always been the national universal service provider. It is basically funded by cross-subsidy topped up with some other subsidies. But once you have a situation where you have a wholesale-only network, and you have a number of retail service providers, how can you put an obligation upon the retail service provider to operate nationally? I do not see how you could do that. Certainly you could put an obligation on the NBN to operate nationally and meet certain service standards in the delivery of what equates to a basic telephone service. But what are we going to end up with then? We are going to end up with something like the Broadband Service Guarantee, a raft of subsidies and lots of service providers to choose from, and you have to pick one and fill out the forms. It would work, but it would be cumbersome and costly. And that is why I say it is unwinding reforms which were done back in the 1970s, when the idea was to take telecommunications off budget, because it was deemed to be an industry that could support itself, and it is going to bang a big slab of it, possibly, back on budget.

Senator LUDLAM—I guess time will tell. Thank you.

Senator BIRMINGHAM—Thank you, Mr Morgan. It is good to see you again and hear your viewpoint again as the world has, as we know, moved on since this committee last met with you. We are now nearly two years into this government's life and we are on the second round of broadband plans from them. What is your impression of the state of investment and the development of services for industry and consumers in Australia in that two-year period?

Mr Morgan—I cannot give you any figures, but there is anecdotal data. However it came about, in 2006 Telstra went on a capital strike as far as the fixed network was concerned, to put it crudely. Whatever caused it is immaterial, but they said, 'We are not going to spend that money now.' They had a \$5 billion business case approved by the board for fibre to the node. That is off the table. They have not spent money on the fixed network. They are not going to, certainly with the threat of fibre to the home. Why would they?

Worse than that, I think this has created phenomenal uncertainty for not just Telstra but for other ISPs. Why would you invest in, for example—as Senator Lundy raised—ADSL2 if in two years time that investment is going to be stranded by the government rolling out fibre-to-the-home. It is true that that would have applied if Telstra had been rolling out fibre-to-the-node, but I think there is even more uncertainty now where Telstra is not investing. I also think that ISPs will be asking whether it is worth their investing in the short term. They are not going to. So it could actually lead to a significant problem over the next couple of years where, rather than our

going up the league table, we may even fall back relatively. It could be argued of course that you are going to get a huge spurt in eight years time but that presupposes that that network can and will be built within the budget and time frame that the government has announced.

Senator BIRMINGHAM—Here in Melbourne, though, Telstra has decided to proceed with some proposals during this time line. Yet, I imagine there may be some misgivings or second thoughts in the company in regard to that decision to roll out high-speed fibre in the Melbourne area, which is a decision that was taken prior to the separation announcement.

Mr Morgan—It goes back to the question Senator Ludlam asked. This announcement was made on 14 September, if I recall correctly—mid September. I wonder whether people have really digested the implications of it. If you are half way through an upgrade of the hybrid fibre coax in Melbourne and it was now on the table that you might have to divest that network I think you would say, ‘Put the tools away.’ So I think it is going to stop investment, certainly, by ISPs as well as by Telstra over the next few years.

Senator BIRMINGHAM—In relation to that risk of forced divestment, what level of assets do you think NBN Co is going to be wanting? Do you see a scenario where Telstra can say, ‘Here, you can have the whole lot in return for this,’ or do you think that there is no way known that NBN Co is going to have any interest in acquiring a whole lot of copper along the way?

Mr Morgan—Telstra chooses the voluntary path because it wants spectrum—it wants to grow in the radio market. So it makes an offer—I am presuming that this is how it would work—and says: ‘We will structurally separate. We want to keep Foxtel but we will give you the local access network. We will structurally separate that; we will sell it off or we will agree to transfer our traffic to the NBN and then just close the copper network.’ The minister might go to NBN Co and say, and I am being cynical here: ‘They have offered the copper. What else would you like?’ Because it is of course not restricted to the access network; it is any network that carries a retail service. And they might say, ‘Well, backhaul is nice and some of those trunk links and some international capacity would be handy.’ That goes into the pot. It then becomes a fire sale because, I again presume, once Telstra makes a voluntary offer of separation it has to set a date on it. So it is saying, ‘We will divest or get rid of certain network assets via date X.’

Senator BIRMINGHAM—Conveniently, I think it is basically that the arrangements have to be in place within—Oh!—eight years.

Mr Morgan—There are assets in there—backhaul, trunk fibre, transmission centres and there are state-of-the-art pieces of network—and, having said that, not all of the copper is rotting or useless. Much of it has got a good life in it if it is properly maintained. So it is not being too cynical to suggest that the whole network could be caught in it. NBN Co might be very interested and of course they would really be the only buyer, in a sense. Who else would want to go in against a government with a big open cheque book?

Senator BIRMINGHAM—And yet in those circumstances there would be other players still left with some infrastructure potentially, still left with fixed-line capacity. Obviously nobody has the capacity that Telstra has, but it is not the only one; Optus has certain capacity as well. Does this create a strange two-world system where one company has no capacity for vertical integration and yet others could have some?

Mr Morgan—I think is quite bizarre that Telstra is precluded from enjoying the benefits of vertical integration and offering retail service directly over its own network, yet quite large companies like Optus could. I have to say that I am a bit gobsmacked by the fact that Optus put in what I would view as an ambit claim and it has got up. After working for trade unions for a long time, I have seen a few ambit claims: you write them right over the top, you claim \$1,000 an hour and you want everything. I never had one get up. Optus have. It has gone straight through. They have got everything they asked for and a bit more, unfortunately, because this is going to destabilise them, I believe, and other ISPs as much as Telstra—not merely because of the stranding of assets if the copper is wound up, but the pricing issue has migrated to the NBN.

Rightly or wrongly at the moment they have built a business case and have now been very successful in offering good, competitive service in large parts of Australia predicated on the \$15, \$16 unbundled local loop. On that copper loop, they can offer—in parts of the country but not in all parts, as Senator Lundy rightly points out—up to 25-megabit ADSL2. It is inconceivable, unless the government wants to write subsidies of several billion dollars a year till the cows come home, that NBN Co. could approach access pricing for a benchmark product like ADSL2, 25 megabits, for \$15. I do not know what it would be. No-one knows what it might be. It might be \$40 or \$50. So, suddenly, if that copper is rolled up, all of those competitive suppliers are also in a very difficult position and being forced onto a network potentially with much higher prices.

Senator BIRMINGHAM—How do you respond to the oft-put utilities argument that the type of separation that some talk about is critical to the electricity and gas sectors in terms of ensuring a fair, competitive retail market place and surely fixed-line communications is a similar entity?

Mr Morgan—At the basic level the utilities industry is water, gas and electricity single-product reticulation networks. They are not interactive networks. You do send water back, but down a separate lot of pipes, the sewerage pipes.

Senator BIRMINGHAM—We hope they are separate!

Mr Morgan—We hope they are separate. Electricity is electricity. It comes in different voltages but essentially they are simple reticulation networks. In the European Union, Neelie Kroes, who is viewed as perhaps the most powerful and proactive competition regulator in the world, has always maintained that, whilst structural separation was fitting and necessary in the utility industries, it should not be applied to telecommunications. That has been her position. The closest that anyone has come to splitting an incumbent network in recent times—I am not on about the AT&T split—was the attempt by Babcock & Brown Capital Management to split Eircom, the Irish national telephone company, of which they owned 65 per cent. The other 35 per cent was owned by the employees' share trust. That fell out of the privatisation. The employees got a substantial stake of the company and built on it.

The employee share trust and the unions were obviously a little concerned about the impacts of separation in terms of jobs. And that is an issue in this debate, by the by, if I could just put it on the record. No one has yet talked about what happens to 35,000 Telstra employees. They are just chattels. Is the network sold and they come along with it, or as part of it? I do not know. But to come back to the Irish scene, that deal, as you may be aware, was pushed very hard by Babcock & Brown Capital Management as offering regulatory benefits. It was a utility and I heard numerous presentations from Rob Topfer of BCM about the utility nature of the telecoms

network and how they could then have lower cost capital et cetera. It broke down when ESOP, the employee share trust, hired very respectable financial advisers—Rothschild together with Merrion Capital, an Irish financial advisory company—who ran through the potential numbers on this utility model of a network. They said: ‘The markets will not buy it. This is not a utility industry. The risks in the telecommunications industry are huge compared to gas, electricity and water. You will not get cheap capital in the way that you envisage. Investors will always demand a substantial risk premium in the telecoms industry.’ It was as much that opinion from the markets, that telecoms was a distinct industry and that the model was not appropriate, rather than the shortage of capital or the deterioration in capital markets which was occurring at the time, that sank that proposal.

CHAIR—Mr Morgan, you have previously done some work for the trade union movement. Are you aware of any concerns the trade union movement might have about the proposed divestiture, as you refer to it, of Telstra’s assets as opposed to the separation legislation?

Mr Morgan—This is just my take on it but depending upon the extent of that divestiture, how far back into the network it reached, it could impact upon not just perhaps the 10,000 or so in the access network but people in the trunks, Accor, switching and so on. So you are talking about everyone who is basically not in a call centre or retail.

CHAIR—In what ways will it impact?

Mr Morgan—At the moment they have certain conditions. Rightly or wrongly, they have a very good redundancy agreement—80 weeks capped plus four, which is four weeks for each year of service up to a maximum of 80 weeks. I think many of them are still working a 36¼ hour week.

CHAIR—Laying aside the nitty-gritty of the terms and conditions, are you aware of what the trade union movement considers ought to be done in the event that the legislation proceeds and Telstra divests?

Mr Morgan—I do not think there is any answer to that. If the network is sold to a third party, a private company, Telstra could offer them as a job lot where you buy the network with 10,000 employees.

CHAIR—A very good job lot, no doubt.

Mr Morgan—Yes, but the government itself cannot impose that condition on Telstra. It cannot say that there must be a guarantee that these workers are transferred to another entity. The only way I can see that the government could guarantee that there is no impact on employees in Telstra is if NBN Co. themselves mandate, either through legislation or through the articles of the company, that NBN Co. take, on the same conditions, any Telstra staff that wish to transfer to them. Obviously if they stay with Telstra and they take their current redundancy entitlements that would be a matter for them. But the only way you could guarantee employment would be if those people were transferred to NBN Co.

CHAIR—So essentially you have outlined a few ways in which Telstra employees could be worse off: they may not be transferred at all—that is, they may lose their jobs; they might get

different jobs; or they might get new jobs with different terms and conditions—that is, inferior ones, attached. Of course, they might get new jobs with better terms and conditions as well. But those are essentially the ways in which you have identified workers could be worse off, aren't they?

Mr Morgan—Yes.

CHAIR—Do you have a view as to the ACTU's publicly voiced view that in the event that Telstra's workers are transferred across to this new thing then the government should take on the existing terms and conditions of Telstra workers—that is, they should be folded into the new enterprise as is so that workers are not worse off?

Mr Morgan—I think it is the only way you can protect them. I think otherwise—it is the only way they can protect it. But of course NBN Co. envisages itself as a fairly lean and hungry sort of outfit largely using contractors. So it would require, I think, a little quiet word from the shareholder to make sure that it did that. You are spilling potentially thousands and thousands of jobs, and the only way you could secure them is to transfer those people into NBN Co. It would be Postmaster-General mark 2, of course.

CHAIR—One publicly funded entity to compete with another. Thank you, Mr Morgan.

Senator IAN MACDONALD—Could you just comment about the constitutional aspects of this divestiture, whether it is really taking someone's property without compensation, or would you assume that Telstra will be paid current value for whatever they get out of?

Mr Morgan—The phrase has been used that this 'offers Telstra choice', so in exercising that choice it is doing something voluntarily, so nothing would be confiscated in that sense. But I think the reality of it is that Telstra has a choice here: structurally separate, divest its network, or accept functional separation. We do not know how difficult and damaging functional separation could be made. With the ACCC getting new powers to set access prices and conditions, it could be quite punitive indeed and far beyond anything that happened in the UK or New Zealand—plus the fact that you do not get spectrum. So that is not looking like a good bet.

You come back to the other leg of it and say, 'Voluntary structural separation'—that is, divestiture. I think a situation has been created where they will be pushed into a fire sale and, in reality, there is no choice being exercised, so it may be arguable in law that this is not a choice. I am not a lawyer, so I am just saying this. It may be arguable in law that this is not a choice, and then the issue of compensation will re-emerge. I got pilloried, again, when I wrote in the *Age* a couple of years ago that the original tender was going to flounder, was going to sink, on what I said was the \$20 billion compensation issue. Again I was attacked: 'Where did that figure come from? That was nonsense.' So it is a live issue.

Senator IAN MACDONALD—You were very prescient—perhaps a bit light! Finally, you are talking about the Telstra employees going over to NBN Co., but of course NBN Co. is going to be—what?—49 per cent privately financed, and the financiers of that will want a return on capital. One would think that if they are taking on an extra 25,000 people rather than contracting out their work it is going to make it less than attractive for an investor. Would you agree with that?

Mr Morgan—Yes. The first thing that would come across with the employees is, by standards in the industry at large, a very generous—it is not generous; it is excellent; it is worthwhile—redundancy package. That comes across and, at minimum—you could do the back of the envelope—you are probably talking about between 80 and 100 grand for each person who comes across, because a lot of these people have 20 or 30 years of service. They are not old; they joined in their early 20s and they might only be in their mid-40s.

Senator IAN MACDONALD—But that is not \$25 billion.

Mr Morgan—You could end up with a couple of billion dollars worth of redundancies—anything between a billion and a couple of billion dollars liability in the area of redundancy—depending upon how many come across, obviously. And that is a hefty liability on top. We do not know what the business case is for NBN Co., but put another \$2 billion on top.

Senator IAN MACDONALD—Thank you for that.

CHAIR—Thank you very much, Mr Morgan.

Mr Morgan—Thank you very much for your time.

[2.29 pm]

GANS, Professor Joshua Samuel, Private capacity

CHAIR—The committee looks forward to hearing from Professor Gans. Professor, as you are aware, the proceedings today are public. The evidence you are about to give is protected by parliamentary privilege. It is potentially unlawful and in contempt of the Senate process for anybody to attempt to interfere with evidence that would otherwise be given, as indeed it is to give potentially false or misleading evidence. Can you state your name, rank and serial number for the record, please.

Prof. Gans—I am a professor of management information economics at Melbourne Business School—serial number whatever!

CHAIR—007, perhaps! Do you wish to amend your submission?

Prof. Gans—No.

CHAIR—In that case, would you like to make a short opening statement?

Prof. Gans—Yes, I would like to say a couple of things. I was here last year as well, prior to the most recent policy announced by the government. My view on that policy is that we at long last have telecommunications policy moving on track. A lot has to be done in order for this to be realised. I want to raise one concern that I have in terms of how the media discussion has played out, although I do not necessarily know if this is the government's intention. There is a lot of discussion regarding the new broadband network and whether it can earn a commercial return. As an economist, I regard that as a largely irrelevant consideration for what is essentially government infrastructure policy. In fact, the returns in terms of benefits of high-speed broadband are perhaps only one part of what you get from this investment. In particular, you get two other things. First of all you get the ability to get structurally based competition in telecommunications for the first time ever in this country—there is that potential. That yield is not commercial return but social surplus, in terms of lower prices to consumers and the ability to consume more telecommunications services at lower costs. That is basically what we call consumer surplus. You get those as long as you set up the new broadband network in a way that allows that competition to flourish and does not give too much or any ownership to existing incumbents in the industry and comes up with a regulatory regime that allows for competitive investment.

The second thing you could also potentially get from this sort of investment, if you are willing to set aside commercial returns, is another social dividend. I advocate, in particular, basic broadband services—that is, not the high-speed ones that this policy is about but just a basic level of internet access—and, with this sort of investment, there is no reason why you cannot make that freely available. You end up earning a return over that since the vast majority of households will want something more than the free service, but if you have a free basic internet service, just like we have free access to roads at the moment, it allows you to really consider putting government services online. We know that one of the impediments to putting those

services online is that it is hard to get rid of a bricks and mortar infrastructure or a paper trail simply because there is a section of the population that cannot afford broadband access. Provide a free service and that entire debate changes.

I would suggest that, while initially you can earn money selling basic broadband services, in the long term you would not expect it to be so. So, part of future proofing is being not just technologically future proofed but economically future proofed as well. Those services ought to cost zero in the near future. It should be brought forward right now to yield the social dividend. Do those two sets of things and we can get away from the discussion about whether broadband services will cost \$40, \$50 or \$200 a month to pay for whatever cost there is of this network and we can start thinking in social terms. I see it as not broadband policy but infrastructure policy, and that is how we have to think about it.

CHAIR—Thank you, Professor.

Senator LUNDY—It is a pleasure to hear you speak, Professor Gans. I note the significant change in your view towards federal Labor's policy with the adoption of a fibre-to-the-premises—

Prof. Gans—I admit that I was not in favour of the previous policy—that is true.

Senator LUNDY—I thought I would make that point because the tone was definitely different. I also want to pursue the point you just made, that the federal government certainly talks about economic infrastructure but also social infrastructure. What is your view on the sorts of things the government ought to do in order to progress what will be on the network? Can I fly a few flags in anticipation of your answer, including the digital economy report currently being discussed by Senator Conroy's department but also the Government 2.0 Taskforce under the auspices of Minister Tanner. Over to you now, but I would just like you to extrapolate on your point about government online and the sorts of things that will populate a high bandwidth network for this country.

Prof. Gans—This cuts across federal and other levels of government as well. An obvious starting point is thinking about educational access and use of internet services for that. I have seen this occur and it affects how we are teaching our children and so I am going to put this by way of example: I live in a very technologically savvy household. A child comes home, says they are going to do a project on something. This month it is the project of the newspapers and their benefits. I said, 'Great. You know we don't get a newspaper anymore.' They said, 'Yes, that seems to be a problem.' I said, 'Well, you can use the online ones.' No can do. Basically because it is not certain that everybody has internet access at home, the teachers have put a restriction that no internet access can be used to do this project on the newspapers, for goodness sake. My daughter and every one of her classmates are not going to read a paper newspaper by the time they care about reading the newspaper. I think that is fairly certain. Yet it is impacting on the whole curriculum. Once you can as an educator presume that people have basic internet access to some degree, which you would be able to do if it was basically freely available, you can now think about curriculum design to teach the children for the future they are going to be inheriting. That is one example. I can think of others as well.

My favourite one is in terms of health provision. Every time I have ever seen some of these very glitzy presentations about the future for e-health, it always envisages a surgeon situated I guess here in Melbourne remotely operating on somebody with some rare disorder somewhere in regional Australia. That may happen, but that is not why you spend \$43 billion. Why you spend \$43 billion is because you want to get not the exceptional health events covered, you want to get the routine stuff. My favourite example, and again my parenting comes in, is if you have a child with an ear infection. You have to take the child down to a GP, usually not a scheduled appointment. You have to wait for whatever length of time. The GP checks the child's ear, works out if it is an infection or not and sends you home. The only activity there medically performed was somebody having a look inside the ear. You did not need to go to a doctor for that; you could take a photo, probably with a very simple \$15 device, and send it through. At the moment when we do not have universality in terms of broadband access, there is no imperative on the departments of health and on other organisations to think about the legal ramifications of being able to allow that sort of service rather than the traditional form of medical care.

Senator LUNDY—So why not? Is that because to do so would create further inequity?

Prof. Gans—I think there is a concern about inequity, there is a concern about what it might do to services in the area. People start to worry about the common costs of operating a medical practice and things like that. It is just very hard to think bigger and more revolutionary.

Senator LUNDY—I want to nail you down on that point because I think is a critical one. Are you saying that there has been a reticence to invest in the sorts of high bandwidth applications in, for example, e-health because we have not had an environment of universal access?

Prof. Gans—I actually say there is a reticence to invest in the low bandwidth ones.

Senator LUNDY—Because there isn't universal access.

Prof. Gans—That is right.

Senator LUNDY—So what changes when you have a policy in place that says, 'We will achieve universal access?'

Prof. Gans—There are two things, to my mind. One is the very nature of the government having it. We have already seen this as part of the discussion over whether the ABC's digital content should be under caps or outside of caps. It has become fairly clear that it is unsustainable for the government to have a broadcaster and then to also charge by the megabyte for that broadcast. There is a political imperative that comes from the government doing it that allows you to push on these things.

The second is that I have been in many of these conversations where you suggest in terms of online access, 'Why don't you do this?' The usual thing that comes up is, 'You do understand there are still in these areas a certain proportion of the population who do not have that access.' What I am suggesting is that, if it was part of the plank of the NBN to provide that free, basic service and then even to think about what it is going to cost lower income households for actual computers that could access the internet—it is \$200 to \$300 and falling—and making the whole gamut available, it would cut through that. That says, 'Now, we expect you to have these

devices, and this is no longer an objection to us thinking about putting stuff online.' In my experience, that looks like the biggest objection. But the economics always pans out. The economics are always blindingly obvious about how you deal with segments of the population that are not currently enfranchised in terms of technology.

Senator LUNDY—Thank you for that. Can I go a step further on the issue of lower socioeconomic areas. We know statistically now that the lower you are on the socioeconomic scale the less likely you are to have an internet connection and computer literacy. Do you think within the gamut of the NBN policy there ought to be a specific program that ensures people at the lower end of the socioeconomic scale are provided with perhaps a low-cost option or an equipment subsidy, knowing that there have been several philanthropic and government sponsored programs of that nature in the past?

Prof. Gans—I think we can do it. Moreover, because of the nature of these services, really basic internet access and stuff for low bandwidth where you just want a reliable connection is something that is a very distinct product from even the ADSL 2+ cable and fibre products that are clearly going to be part of this as well. There is a natural market differentiation between the two. So you could actually offer a basic service, including an income tested provision for computer equipment or a subsidy if necessary without destroying the rest of the market, because there are still going to be the people, such as those who have bought broadband now, who have bought it for higher speeds and what they can do. You are not going to jeopardise that too much by doing this. In other areas where you offer the free service you completely crowd out any other possibility of revenue. I just do not think that is the case here.

Senator LUNDY—We have read in other evidence of the growing popularity of netbooks, the style of laptop computer that functions in large part through the cloud and has its applications through the cloud. So it has much cheaper hardware but requires more bandwidth to be a meaningful technological tool. Can you perhaps share your insights into that trend and how that interrelates with the prospect of national broadband network.

Prof. Gans—One of the fortunate things that some of these technology companies have been doing in anticipation of internet access over mobile devices is that, despite the wide availability of lots of bandwidth, they have been very economical in trying to design their tools. Google is the primary example of this. It hardly uses any bandwidth at all to do a lot of googling. It is the same with a lot of other resources, such as Wikipedia. They have all been designed so that you can get them from a mobile device. From the point of view of netbooks, the amount of additional text that it takes to write documents online and save them in the cloud versus not is just minuscule. It is just nothing compared to what we are talking about. The stuff that really takes up high bandwidth right now, as I understand it, are video downloads.

There are a couple of different parts to the issue. The technology has run away from the copyright laws, it seems to me, in this regard. Australia has always lived in a bit of a television and movie backwater. It has improved over the years, but things come here late. Now, with internet connectivity, that is harder to sustain. So, instead of having repositories such as YouTube, iTunes or any of those things located in Australia, sensibly located on the network, to give people video services, what you have instead is a whole lot of people downloading off peer-to-peer networks located anywhere in the world. It offers no hope in optimising bandwidth in that regard. That is just the result of technology getting away from the legal framework. When I

suggest that we should have a free basic internet service and so on, it would have to be very selective in how it allows the high-bandwidth stuff to be maintained. Having simple caps on usage is something that would allow that product to come into the market. There are ways to do this, but I am not an expert on the minutia of it.

Senator LUNDY—That is a shame, because you have opened up a complete Pandora's box. The issue of copyright law in the digital realm is directly relevant to content and usage—what will appeal to people in terms of using a high-bandwidth network. It is not the whole issue but it is certainly part of it. What do you think needs to happen in general terms to copyright laws surrounding the sort of content that requires high bandwidth to resolve the problem you described—the desire for that type of content is pushing bandwidth use up perhaps beyond where it ought to be? Perhaps if we had a more reasonable copyright regime in the digital realm—

Prof. Gans—I do not think it is impossible to do these things. There is not a huge amount of evidence on what tweaking the system would do. My impression of it, and you have seen a few studies on this, is that Australians are maybe No. 1 in illegal downloading of videos. Previously, all the copyright owners used to worry a lot about music—that is what was occurring in the US—but for Australians it is video downloads. My impression is that the networks were interested in the idea that they got downloaded because programs came here three months later. In other words, people did not want to wait. So they started to put those programs on a different schedule very quickly so that it did not happen. It would be very interesting to find out what the impact of it was. In other words, is this just—

Senator LUNDY—Just to get this clear: the television networks' scheduling of new release programs—that is, the delayed release in Australia—has triggered the demand for the new release series shown in the US?

Prof. Gans—Exactly. That would be the contention. There have been some experiments to try and close that gap, but I do not know how they have gone. It is not that networks have been releasing that information, in terms of what that might have done to this illegal traffic. The other thing is that in the US there has been more content available online—just in general. So, rather than having to worry about watching it on TV, it is being provided on sites by the copyright holders themselves that are able to use online material. My point is that, with respect to books, there is a 30-day publication requirement. You publish in 30 days, you lose the right and you can import the stuff. If we had a similar sort of thing with relation to movies and television, I suspect that would clear a lot of things up. People would be far more serious about Australian rights much earlier and they would want to negotiate it and find the appropriate way of distributing, and that would go some way towards stopping the externality that is going on in terms of the management of the broadband network caused by the illegal downloads. It is not that they do not have an incentive to stop illegal downloads per se, but it is the extra cost coming in that I am trying to focus on. That is why the copyright laws may need to be aggressively sped up to recognise that this is a kind of world economy now and Australians should not have different copyright restrictions imposed on them maybe because somebody in the US or Europe thinks that Australia is the afterthought.

Senator LUNDY—Very interesting. I do not suppose that you know anything about the impact of the Australia-US Free Trade Agreement IP provisions on this issue.

Prof. Gans—As I understood that, and I do not know a huge amount, it moved us in the wrong way for this particular point.

Senator LUNDY—That is what I thought. What are the implications from that free trade agreement for this particular issue? I am happy for you to take that on notice.

Prof. Gans—I cannot answer that. I have just noted before that it is free trade in goods but not so free trade in ideas.

Senator IAN MACDONALD—Thanks again for your help to the committee. I was re-reading your submission about your back-of-the-envelope, front-of-the-page costings. As I understand it, you are saying that the costs could be around \$1,200 per annum, up from the about \$500 that most Australians pay now. Am I reading that correctly?

Prof. Gans—This was on a particular set of assumptions. I must admit that I re-read this before coming before the committee. The idea of this particular exercise was just to show that there were considerations other than taking for granting the \$43 billion cost of this. To understand whether there will be a social return on this it needs to be understood that it all has to come from broadband revenue.

Senator IAN MACDONALD—Certainly there will be a social return on any improvements to infrastructure. But it comes at a cost. I note that your expertise is in economics and business. Do your figures take into account the fact that the NBN is only a wholesaling networking company? Upon the top of any revenue that they get, you have to have the retailers' revenue as well. Was that taken into account in your \$1,200 figure?

Prof. Gans—It was taken into account. But it is not so transparent from running down the discussion here, mainly because there was some displacement of costs that were occurring already. One of the things that is sometimes not transparent in terms of what an economist does is that this compares one branch of a choice tree, in effect, or a fork in the road with another. Some things that happen on both branches get netted out. Implicitly, it is in there, in terms of the fact that those costs will exist anyway and those services will occur anyway, regardless of whether you have an NBN or not. I do not see this as changing those.

Senator IAN MACDONALD—If Optus or Telstra or anyone else continue to use their own networks, are people going to pay \$1,200 for something that they currently pay \$500 for? For most people, 10 megabits per second is a great speed.

Prof. Gans—I see it as inconceivable that you will be paying more for broadband services once this is put in. Basically, what we are talking about is a new investment, a completely new network. Regardless of what happens to be done with the previous network—whether it is part of a restructure Telstra or owned by someone else—it will still exist. I would be very surprised if it is not over the next eight years still one of the dominant networks. We already have many people still on dialup. It takes a little time for people to switch providers. But the point is that there is going to be competition, and competition will lead to those prices going down. That is why it is such a difficult issue in terms of whether the government will make a commercial profit out of this network.

Senator IAN MACDONALD—They have to. Remember that they are using 49 per cent private money, at least. Senator Conroy has said that it will make a profit. Apart from your figures, I have not seen any commentator or analyst who thinks that there is anyway in the world that with a capital outlay of \$43 billion they can make a profit.

Prof. Gans—My figures were not saying whether or not they were going to make a profit. I have two things to say in response to that. I was concerned about the social dividend, so I am thinking about consumer surplus and other things, not things that are directly monetised by NBN. The second thing is the \$43 billion figure. That was much higher than any commentator thought that the price of putting in a brand new network would be. From my perspective, I do not look at the government's policy announcements in this regard—right from April—as simply, 'This is what we're going to do and you can expect to see in eight years exactly that.' I do not look at it in that way at all. I saw that as an aggressive business decision whereby they credibly committed to providing competition to Telstra in the marketplace. Once that commitment was out there, there would be a renegotiation of how the telecommunications industry is structured in Australia much along the lines of what we are currently seeing.

I imagine that there is going to be some reallocation of the existing assets, both the copper network and the cable network, to optimise the building and rolling out of this new network. My hope is that that will occur in a way that still preserves the structural competition that comes from the broader threat. But basically the broader threat is just a start: 'Here's what we can do.' Now it is time for the telecommunications industry to negotiate on the back of that possibility as opposed to in the situation when the government was a weaker player and was just trying to use regulation to get things going. The good news about that is that it is far more market based and open than anything that we have seen thus far. This is a very positive move.

Senator IAN MACDONALD—I am not sure if you heard the previous witness, who gave some scenarios that could end up with us having the government again running our national telecommunications, like Telecom or the postmaster general used to years ago. Heaven forbid that we go back to that.

Prof. Gans—I heard a lot of—

Senator IAN MACDONALD—This is not a debate on socialism versus private enterprise, but—

Prof. Gans—No. I heard what the previous witness had to say. I have heard it before, because I have dealt a lot in these telecommunications circles. Any time any significant reform is proposed, we hear the same thing: 'Oh, it's going to change this. It's going to lead to estranged revenue here and there.' Let us take the example, which I almost could not believe, regarding job losses. Here we have a government going to invest up to \$43 billion in an industry with capital that is complementary to all of the existing skills in that industry. If you are a worker in that industry, this is a dream. It may not be that you will work for Telstra, but somebody else is going to have to do that job. It is just supply and demand, and basically there will be a whole lot more demand for those services coming out of this. So I do not see any of those things as a worry at all. In fact, it concerns me when people come and say that, because it might be creating undue anxiety when the reality is that the employment prospects in that industry are rosy.

Senator IAN MACDONALD—Again, those are matters of opinion. I thought that the previous witness made a very good case, with respect. The thing that concerns me is that Telstra and Optus have services which are pretty good for most Australians apart from those of us who live in the regions. I cannot understand how you can spend an additional \$43 billion and still compete with what is already there.

Prof. Gans—I shared your concerns. I in fact voiced similar things just a year ago right here. I said: ‘Do we need this? Do we need it now? What are we doing it for?’ There is a sense in which those questions are very important. If we just think about broadband alone, allowing people to have faster video downloads is a private benefit. You want people to pay for that. The way I see this policy as differing is two-fold. First of all, it is about a broader telecommunications reform structure. Everything that we have seen has indicated that that is part of the whole mix that provides other boxes of benefits other than pure private benefits.

The second part is that it is not happening tomorrow. It is in Tasmania, but it is not happening tomorrow anywhere else. This is an eight-year rollout, and so really it is just putting us on the path to that investment. Remember that this is a path to the sort of investment and upgrade that previously—and we could debate the reasons for this—was not occurring internally from the private sector in telecommunications in Australia. There were no similar upgrade plans. Everywhere else around the world—

Senator IAN MACDONALD—The OPEL plan was not Rolls Royce, but it was getting there—

Prof. Gans—That was a government plan.

Senator IAN MACDONALD—and at a much more moderate cost.

Prof. Gans—And I am sure we will end up seeing very similar aspects to this by the time it covers regional Australia. I expect that that will come last, as with all of these things, but we will probably see something along those lines. We may see it being far more wireless than wired in eight years time. We only have to think about eight years previous and what we were talking about then to know that there is a time frame here.

One of the things that I feel are very important that you would want to monitor is that in structuring the NBN, its plans and so on we are not being too prescriptive, saying that what was announced in 2009 is exactly what should occur in 2017, that it should be held to look exactly like that—fibre to the home across 90 per cent of the population. What we want to do is specify the goals. We want people to have a choice of telecommunications carriers. We want them to have technological capabilities to bring certain internet speeds, both up and down. We want those end goals to be part of the NBN’s mandate and how we judge the success of this policy, rather than what the actual bits of infrastructure look like.

Senator IAN MACDONALD—I will leave it there, except to say that your point about eight years time is a valid point. OPEL would have been up and running by now, with all the benefits that we would get but eight years in advance.

CHAIR—Hear, hear.

Senator LUDLAM—I have two quick questions. You are one of the few people who have taken time to scribble out some numbers on the back of an envelope. Have you taken the time to analyse what Professor Ergas put to the committee last week?

Prof. Gans—I do not know if I have seen the particular one but I have seen some of his arguments as well. Unfortunately, all economic models are only as good as their assumptions, including what I have written to you here. He is looking at particular timing issues that I am just not sure are realistic. Here is his model, as I see it. You are sitting there in front of the computer now and you have to wait a certain amount of time for data to come down because of the internet speeds. That has a cost associated with it. What we are doing is bringing that investment forward, because it was going to be done by someone eventually anyway, he argues. We are bringing that forward, and so what is the benefit of being able to wait a little less time over that period and what would people be willing to pay for it? It turns out, when you put it in those terms, not much is the answer, and not much is probably the case.

But his exercise is very limited in that way. He is trying to model how Telstra would have thought about doing this investment and whether it would get a commercial return. That is not the same decision that the government is facing. It should have and hopefully does have a broader agenda in what it is trying to do with this policy. The other thing he puts into that policy is again the \$43 billion that we are talking about. We are talking about moving that forward and I am sceptical about whether that money will be spent.

Senator LUDLAM—I want to bounce one point off you that a previous witness made to us, and I know you were in the room at the time. He asked: in an environment where you have a national wholesale provider, or maybe a couple—you have suggested it might end up being a patchwork, and that is fine—how do you up apply a universal service obligation when retailers are still going to be chasing the biggest dollars and not necessarily going out to the fringe parts of the network?

Prof. Gans—One of the things that have been a terrible inefficiency in universal service obligations is to designate a company and say, ‘You provide universal service obligations and you have to find the money somewhere.’ This is the negotiation that occurs. What I would prefer to see is that, if the government is serious about universal service in broadband and telecommunications, it prices these services and then when different customers are hooked up in the designated areas the retailers get a subsidy. That may be passed back to the wholesale network to some degree as well. It would be far more transparent a means of delivering the services. There have been some examples of this pushed around the world in broadband—that is, pricing subsidies per customer hooked up, as opposed to putting the obligation on one company to deliver all that.

Senator LUDLAM—We are short of time so, without wanting to drop homework on you, I wonder whether you would be able to provide the committee on notice with some examples of where that is done well. Certainly, if it was done badly here in Australia, we could really benefit from that.

Prof. Gans—Yes, I could possibly do that. In fact, Austan Goolsbee, one of Barack Obama’s economic advisers, was responsible for a paper on this topic which would be worth looking at.

Senator LUDLAM—We can chase that. Thanks very much.

Senator BARNETT—I have a question in two parts, Professor. I just want to clarify your response to Senator Macdonald. You indicated that you did not have a view as to whether it would make a profit or not make a profit. Is that right? Can you clarify your response for the record?

Prof. Gans—I do not know for certain. What is true is that I would be sceptical that it would make a profit on the basis that, if it were going to make a profit, someone would have done this investment. That is why I think there is more to this policy than just commercial returns.

Senator BARNETT—You are also aware that the government has announced a commitment that it would be commercially viable?

Prof. Gans—Yes.

Senator BARNETT—That appears inconsistent with your response.

Prof. Gans—Okay.

Senator BARNETT—Secondly, do you think the pricing should be universal—the same pricing across the country?

Prof. Gans—That is a difficult issue. If the government wants my suggestion to have a basic level of service that is free, obviously that would be the same across the country. These other ones are a more difficult matter. What I would prefer to see is that the market is able to determine the ultimate prices but with the government standing behind it if it wants to encourage certain areas to be hooked up that might be underprovided. It should provide these sorts of subsidies for doing so.

CHAIR—Thank you very much.

[3.10 pm]

BOSCHERT, Ms Gayle, Clever Health Project Manager, Grampians Rural Health Alliance

RYAN, Mr David John, Executive Officer and Chief Information Officer, Grampians Rural Health Alliance

TONKIN, Ms Sharon, Employee, East Wimmera Health Service; and Member, Grampians Rural Health Alliance

CHAIR—The committee welcomes the Grampians Rural Health Alliance. The proceedings are public. You are protected by parliamentary privilege in providing your evidence and it is an offence and potentially in contempt of the Senate for a third party to attempt to interfere with the evidence that you might otherwise give, as indeed it is to give false or misleading evidence to the committee. The committee might benefit from a brief opening statement before we go to questions.

Mr Ryan—Thank you for allowing us to talk to you about what the Grampians Rural Health Alliance has achieved and what we believe the National Broadband Network can bring to health, particularly in rural areas. First of all, I would like to talk about a little bit of the history of the alliance—how and why it was formed—and then follow on with a brief discussion about the benefits that an NBN might bring to health.

First of all, the alliance is basically a vision of a few people whereby the provision of ICT to health services was a requirement. If you are a small rural health service with a turnover of, say, \$20 million, you cannot necessarily afford some of the technology, particularly in the health sector. Back in 2002, software prices were extremely high for the health sector. They were dominated largely by American and UK companies and had price tags of anywhere between half a million dollars and \$1.5 million for patient management and electronic health records. With those sort of prices, it was seen that it would be better to go into a purchasing deal whereby you could provide a shared service out of some of the larger public health services.

In the Grampians case, that larger public health service is Ballarat Health Services. Having a major public health service in the region is a great thing. They can afford much more technology because of their size. They are currently a \$300 million organisation, so provision of shared services out of that major centre is now appropriate. Back then it was seen that shared services was a fundamental. As it went on, probably in about 2002, some of the health services decided that it was the right time to invest in telecommunications to provide the ability to have shared services provided out of Ballarat Health to the region. It did not necessarily have to sit in Ballarat Health but the spend had to be broadened out from all of the public health services in that region. Back then the alliance contained all the rural public health services, but it also contained some GPs, allied health providers and community service and local government providers. It was a very large alliance of health across both non-government organisations and government organisations.

Later on, in 2003, a bid was put up to the national communications fund to establish GRAHNet. GRAHNet was basically a company limited by guarantee for the purposes of building a broadband network across the Grampians region. The Grampians region, for those of you who do not know our region very well, covers Bacchus Marsh and Melton in the south all the way up past Horsham and then across to the South Australian border with our site across in Edenhope. It takes up almost one-quarter of the land mass of Victoria, so it is a fairly large distance. We do have terrain on our side though, unlike some other areas across Victoria. It is mostly flat, luckily. Although the Grampians has some major mountain ranges, they do not necessarily interfere with telecommunications.

We were able to establish optic-fibre links and BDSL links out to some of the tail sites. All the major sites have optic fibre and then they all go out to the tails, which are generally BDSL, so the smaller campuses are connected to BDSL. The smallest bandwidth is two megabit—at the BDSL sites—up to 10 megabit for our optic fibre. We have the capacity to go to 100 megabit, or even more, in that network. The network is generally provided by Telstra but it is also provided by Neighbourhood Cable, which is our local presence. Neighbourhood Cable have installations in Ballarat and the surrounds. They also have implementations up in Mildura and in Geelong. It was seen that they could provide a local service at fairly cheap prices at the time and still remain cheap. In fact, all of our contracts got better than government pricing attached to them. That meant that we could do a lot more with our service and we could actually get more connectivity and more bandwidth with those prices.

It was an \$8 million grant from the National Communications Fund, under the previous government. Later, after the network was built, we put in voice over IP telephony. There are roughly 6,000 voice over IP handsets out there, which means every health service in the region is using IP telephony. That is probably unlike any other alliance in Victoria, which means that everything is on net. So all calls between all health services in the region are free.

Later on, in 2006, we applied for a Clever Networks grant to provide high-quality clinical video conferencing. We were successful in gaining a \$3.8 million grant, which then rolled into the Clever Health project, and we are hoping to make a submission to the Digital Regions Initiative shortly. The intent behind Clever Health was to provide remote access to specialist care and also to provide peer support in each of the locations.

I have with me Sharon Tonkin, who is a clinician at Donald, one of the areas as we go further and further out from the major centres. Sharon will be able to give us some testimony about the benefits that, particularly, Clever Health has brought. There have also been administrative benefits from having shared service set-ups. We provide applications, internet services, electronic health records, electronic referral systems and the like from that major centre, that shared service. So it has brought us a lot.

CHAIR—Thank you, Mr Ryan. Before we go to Ms Tonkin, are you unique? Is there anyone else in Australia seeking to provide the same sorts of regionally based services?

Mr Ryan—I think it is fair to say that, with the level of funding we have had, we have been able to grow a very solid foundation. The vision was to link up everyone, to not leave anyone behind.

CHAIR—Countrywide?

Mr Ryan—It was Victoria-wide, as much as we could—particularly our region. We could not do it everywhere. If I were to take the south-west area of Victoria, I guess they were the leaders in this space in the late nineties and early 2000s. In some ways we have overtaken them by providing the next level of connectivity. That is largely because of our video-conferencing installations, because we are now providing benefits. As an example, I started in my role about 14 months ago and I have to say I am the luckiest executive officer in Victoria. I have stepped into a network with the job done. I think the next thing I need to do is not convince the CEOs of each of the health services to invest money; it is to convince them how much more money they need to invest to get more value. I think what they are stating to us at the moment is that the value is going to come from more video conferencing rather than more voice over IP or more applications.

Ms Tonkin—Thank you for the chance to speak. Our involvement at Donald and, in fact, East Wimmera Health Service in the Clever Health project has enabled us to start to give more equity to our community in health service delivery at point of care. By way of background, we are five towns spread over a very large area, servicing five communities. The further away we get the further access we have to things such as allied health specialist services. We have an ageing population with an inability to travel. We might have palliative care clients with an inability to travel but who certainly need specialist opinion. Coupled with that, over the last couple of years we have suffered extreme difficulty in recruitment, particularly in the area of allied health. Unfortunately the average age of our nurses is 49 and our ability to recruit younger people to come through and replace them has not been good at all. We have been looking at ways of getting specialist views and opinions through to our community, and that is where Clever Health came in for us. Although it is only early days, we have seen a potential that can really support us in delivering what we need to do.

One of the examples we have used is that one of the facilities at my campus offers a three-chair dialysis unit. You have a group of people who are strongly dependent on being connected to a hospital but who can have a small things go wrong that could mean for them three to four hours travel for a two-minute opinion and a fix and then three hours of travel back, and of course you have to dialyse when you get there. So the capacity as a Clever Health unit and a media link in our wireless hospital means that we can wheel the unit in, the nephrologist or the dialysis clinician can put the camera to, say, the arterial access and can look at it immediately, do A, B or C and the problem is fixed—we have had the specialist opinion for the nurses and off we go. That can be said for the equipment as well. We are covered by North West Dialysis, which is based at the Royal Melbourne Hospital, which is approximately 300 kilometres from us. We have excellent backup from those people, but there are times when they need to see what is going on.

Another service we have used recently is in the area of palliative care. Certainly the first consultation is done by the specialist physicians in this area and, as disease processes take over, you need to adjust things like pain management and symptom control. These people, who are in really challenging times and do not want to leave their families and their homes, can be seen by the palliative care physician who can discuss with them their options, the medication changes needed, and then we can have orders put through to save those people from travelling, so they are not wasting the last days of their lives on the roads.

We have infrastructure issues as well. We have members of the community who need specialist opinion, but we do not have public transport. We have an ageing population, particularly older women who are now widows who do not drive. We need the services to come to them. We have an increasing number of people in the lower socio-economic group coming to live in our communities because it is deemed cheaper but who complex care issues, like social service issues or mental health issues, and they do not own vehicles, for example, to travel two hours for a mental health review or opinion at a time of crisis. It is not opportune. We have been able to use those types of things.

One of our campuses recently did a speech pathology assessment of one of the aged care residents who would have had to leave the aged care facility and travel several hours to Bendigo to be seen by the speech pathologist. They would be fatigued, so the assessment would be poor, and then they have to travel back. This way the clinicians and the person can attend. We can all get advice from the specialist and take it from there. In the area of emergency transport, we can save dollars in ambulance use by having perhaps, in the state of Victoria, Adult Retrieval looking at the person and directing the appropriate transfer to the appropriate facility first up, not having a cascade of 'first we go to a regional centre and then we go to the major centres'. So there are cost-saving dollars across the board, and so it goes on. We are only in the early days, so we certainly support what we can be offered through the system.

CHAIR—Thank you for those very good visuals.

Senator LUDLAM—Most of the work of this committee has been on competition and market structure, so I am delighted to meet people who are actually using the technology for good. As an aside, do you have any idea what you have saved on phone bills as a result of switching over to VOIP for all your voice calls?

Mr Ryan—No, I do not.

Senator LUDLAM—Presumably, that is on a balance sheet somewhere?

Mr Ryan—It is. I suppose the project ran from 2003 until about 2005. Most of that information was collected over that time and the collection was wound up in about 2006. That is one of the reasons I went out. If anything, now everyone expects call costs to basically stay pretty stable across our network.

Senator LUDLAM—Are you doing much video conferencing as well?

Mr Ryan—Yes, a hell of a lot. It has grown significantly. What is the latest, Gayle?

Ms Boschert—Across the network it has gone up 150 per cent in the last 18 months. It is steadily increasing as people like Sharon and others start to find more uses for, and become more used to, the technology. The usage and the reasons it is being used are expanding dramatically.

Senator LUDLAM—What would the impact on your services be and what would you be able to provide if we went from the bandwidth that you are used to at the moment up to what the NBN is promising?

Mr Ryan—If anything, being able to push a multitude of things through that pipe. We are currently doing high-quality videoconferencing on two megabits and if it goes to 100 megabits or beyond—it is not necessary for pure video but if you are wanting to do video with telemetry from critical care monitors or from monitors in a patient's house, for example—I see a major growth particularly in the delivery of care to the household. Because of that it is a requirement to get out to the premises in the first place so that the health service can provide that service. It could actually be a shared service operated by a government. That is going to require significant levels of bandwidth even to the home because that would be telemetry being pushed through.

At the moment there are remote patient monitoring trials happening throughout Australia. There was one in Loddon Mallee in the Grampians just across the border from us and there is also one in Gippsland happening at the moment. Each of those trials has shown that the limitation was not so much the bandwidth as it was the technology and the ability for people to use the technology. That has matured somewhat now and you are not talking about a patient pressing lots and lots of buttons and relying on a Windows computer. Now it is solid-state devices in people's homes. So the telemetry that is going to come from those will be real time rather than an upload into the systems in the shared service. Being real time it is probably likely to feed information readily but if that information is images then you are talking a requirement beyond two megabits—anything from 10 to 100 would probably be about right for remote patient monitoring. If you are talking about high-quality videoconferencing at full high definition, you are talking about a minimum of six megabits. If you are having telemetry on top of that plus digital imaging from radiology providers, you are probably talking about needing to consume anything between 40 and 60 megabits.

Senator LUDLAM—Looking at the other direction, how much of an impact has been made in your being able to be in touch with the big hospitals in Melbourne or indeed internationally? Is that something that you use a lot as well?

Ms Boschert—We are just starting to get to the point where our interconnects into Melbourne are up and running into the ARV. The potential for that can certainly be seen in our hospitals being able to manage transfers more effectively. It is not necessarily the actual transfer of people but the transferring of them at a perhaps more appropriate time and to make sure that information is transmitted about that patient so that the receiving hospital knows more about them and is more ready for the patient that is arriving.

There is also the potential to manage some patients within their community. This means that you do not get the community dislocation caused by families being left behind in a remote community and someone in Melbourne without any support, which happens quite a lot. It is also the case that we get transfers from remote hospitals because those hospitals are not quite sure whether they need to be transferred or not. They hit the metro hospital and they are sent home again. They have had three or four hours in an ambulance and the family has to drive down to the metro hospital to pick them up and bring them back again. So the technology can intercede in that and the assessments be done remotely, with the associated telemetry and digital photography that goes along with that, meaning people can be maintained within the community.

That supports the staff within those communities as well because it means that, instead of deskilling them by sending off everything that they are not quite sure about, they are trained and supported to deliver a more effective and more complete health service to the community. That is

really important when we are looking at retaining a rural workforce. As you say, it is very difficult to get the workforce. We need to be able to support that workforce in an effective manner. Videoconferencing gives us that ability.

Ms Tonkin—One of the increasing difficulties we are having, of course, is that the nursing workforce are working without a medical staff at least every second weekend. Previously we have had telephone instructions from the major services with the capacity to videoconference. For example, if a farmer is brought in after a tractor crash and is already being looked at by the director of the trauma centre at the Alfred, even if we ask for the chopper it takes an average of two hours to get to us. Certainly once it gets to us it is 50 minutes from Donald to the Alfred, and that depends on dispatch rates. So we have top-level clinical direction from the nursing staff at the scene, often in adjunct with the paramedics, who have an increased skill base and competency levels for administration of medications. I am a member of the state trauma committee and we all talk about the golden hour of first-rate administration of intervention. This will give us that capacity when we do not have a doctor at hand, and you cannot understate the value of that.

Senator LUDLAM—You can cram a lot more into the first hour.

Ms Tonkin—Yes, and with the attrition of the injuries you are looking at less morbidity-mortality. You are looking at returning the person to full function sooner and less risk of infection—all sorts of things. And there is the saving of the health dollar. While you might be spending it in networking materials, what you are saving in health funding, medication staff, rehab costs, loss of income et cetera is just immeasurable.

Senator LUDLAM—Looking down the curve a little, and given that you are probably leaders in this field in Australia at least, can you see any disadvantages in moving to medicine and health care via cyberspace? Are we going to lose contact with the human being at the other end of the screen? Is there anything that you have already confronted that has given you pause?

Ms Boschert—I think there was a lot of fear about that when we started this project—it took a long time and a lot of support to engage the clinicians and for them to believe that technology was reliable, trustworthy and able to be used. But, in fact, what the clinicians are finding is that they are more accessible. Instead of them spending three or four hours on the road, they can see three or four patients in that time. The precious and limited skill and speciality that they bring to it actually is more accessible and more available to a wider community. So, while there are certainly some things that cannot be delivered by remote technology, there is an enormous amount of support that can be delivered. I guess the distinction is where you make that decision. It does not stop clinicians being hands-on and providing that support. What we are finding is that their being more accessible by remote means increases the support for staff that are hands-on at that more remote site. There is give and take in the way it is delivered. It is about a judgment by the clinician as to what is appropriate and when the technology is inappropriate—and obviously transferring a patient always offers that backstop.

Senator LUNDY—Welcome. The history of the Grampians Rural Health Alliance tells a really important story, I think, so I want to thank you in the first instance for outlining that. Ms Tonkin, how has it changed your work and your capacity to provide the professional service that you provide?

Ms Tonkin—It is probably freeing up what limited resources I do have from the perspective of staffing so that I can access the appropriate services for someone perhaps in our accident and emergency department. In previous times we would have had to provide transport escort and backfill that escort to cover the existing inpatients and aged-care residents. Now we can have direct access to the appropriate clinicians and the appropriate team coming to get the person. You get the appropriateness of care. For me, the most significant thing is the freeing up of my limited resources and the ability to deliver the most appropriate care.

Senator LUNDY—What has the feedback from the patients been? You talk about the different challenges, but—

Ms Tonkin—It is probably in two groups. The younger members of the community are computer literate, IT literate, and they love it. The older group, and that is the majority, look at it with some caution at first. But at the same time, there probably has not been a community that has had as much change as a rural community. They acknowledge the give and take required to live in isolation. If we look at the equity of health care, in Melbourne you would expect an ambulance to get you somewhere within 10 minutes. The rural person understands that that is not possible but that it is a question of what is the best practice for me.

Once they have been through it with us—and there is an inherent relationship between their local healthcare person and the person in the town; they know us on a one-to-one basis—if we think it is all right, they trust us. You then get to see the speech pathologist within a few days, as opposed to the average waiting time at the moment of eight to 10 weeks. If you have a swallowing problem and are not eating properly or your cancer is growing, your health is too far behind the eight ball by the time that appointment happens. So, yes, there is a strangeness, but when they have a delivery of service—and we need these people to keep living in our food bowl and generating our food—they grab it with both hands.

Senator LUNDY—In your opening statement you mentioned workforce issues generally within the nursing profession. What sort of response do you get from new recruits? How has your recruiting strategy changed as a result of having this type of modern service?

Ms Tonkin—One of the big stumbling blocks we had was when we explained, especially to the division 1 nurses, that there would be periods of time without medical cover, there was acute anxiety. Frankly, as soon as you said that you lost that candidate. Nowadays when you say to them that we have the capacity to talk to Ballarat and that, if needs be, Ballarat will link us to the trauma unit, the cardiac unit, plastics or whatever—we all hope that it spreads—that gives them a support structure that we did not previously have so that they are not alone in managing what clinically can be a very serious event. We are all aware of the lawyers at our workplace now. They do not want to be facing the coroner. If you have provided them with an expert opinion that can drive the care they are giving with the appropriate legal medication orders et cetera, they are much more relaxed and willing to listen.

Ms Boschert—I have an example that illustrates that really well. I was talking to a nurse yesterday who supports dialysis patients. She lives in a remote community and there is no nephrologist within cooee. The specialist who manages this patient is a respiratory physician and so knows about lungs but not about kidneys. She is often put in a situation where she has to assess the fluid balance for the patient—how much fluid they need to take off and how long they

need to dialyse the patient. She is the one who makes that decision in phone consultation with a nephrologist in Melbourne. If that nephrologist can be linked by vision to that patient, the sort of feedback and information and support that that nephrologist can offer to the nurse is much enhanced compared with what the situation is for her at the moment. She is often put in a situation of acting, as she says, well beyond her training, because she is the only one who is making those decisions. The network can provide that support. It does not provide all of it, but it adds enormously to the comfort and ability of those nurses to provide support. And, frankly, our health system is dependent on it in lots of ways.

Senator LUNDY—Just by the by, have you made a submission to the health reform consultation that is occurring at the moment nationally? Sorry, Chair, I know this is a bit out of left field.

Ms Boschert—No, we have not.

Senator LUNDY—Can I urge you to? Because I think that they would benefit greatly from hearing about your work. I would also like to ask a bit more of a backroom, technical question: How do you go maintaining the technology? Often we hear, and this has certainly come up with respect to the rollout of digital services in schools, that it is all great in theory but you need the technical backup. How does it work for you, and how do you source people with the technical skills to keep your system up and running, particularly in small places like Donald and Edenhope?

Mr Ryan—We provide a managed service, so we have outsourced some of the running of the network, the management of the network and the monitoring of the network. That does not mean that we outsource everything; we are still the customer service side. From our office of the Grampians Rural Health Alliance we provide that customer service out to the region. We are hoping to grow that. Maintaining the currency of technology is always going to be an issue because of the high cost of technology, so we have to make sure that we are constantly building refreshing of technology into budgeting. It is not something that health service CEOs want to do because it is their bottom line, but that is the reality of it. I put to them, ‘Without the technology, what would you do?’ In our case, the answer has come back, particularly from the smaller regional hospitals, that they would not be able to function because they are so reliant on it now. They know that they are up against it in terms of cash but, as long as we are constantly building that in, the currency will be there. The customer service side is paramount because when something is not working you need to ring someone. We are there to help and we are going to be growing that service. A lesson learned from the past few years is that we probably have not paid enough attention to the customer service side. Although that may not be obvious to some of our customers, it is obvious to us that we need to focus on recruitment of the appropriate staff into customer service areas.

Senator LUNDY—That is interesting. From the other perspective—the hierarchy in the Victorian Department of Health—what sort of support, response and leadership is there within the state department about the usefulness of a high bandwidth network to allow you to deliver services in the way that you do?

Mr Ryan—It is growing. I think it is fair to say that there were parallel streams of work happening. They were not necessarily aligned. The state government embarked upon

HealthSMART, which was a strategy to implement new applications. Those new applications, though, were seen as a bit too big in some ways for some of the smaller rural public health services. However, they are currently rolling out in our region, so we have an interconnect with the state government network that allows us to have and the state government to provide shared services to all hospitals and health services in our region. We have recently undertaken some implementations there and we are undertaking a current one in our financial system area as well.

However, that was for applications. It was not necessarily targeted at anything other than hospital administration. As soon as you go outside of that and to enter the clinical areas it starts to drop off in the HealthSMART area and that is where what we have been doing starts to take over. They are starting to become much more intertwined and that line between the state strategy, the Commonwealth strategy and our strategy has pretty much blurred. I am in there regularly trying to argue for interconnectivity between all of our networks. I actually do not think it is far away. In fact, we are partnering with another Clever Networks project in Loddon Mallee at the moment to provide that interconnectivity for some of the metropolitan hospitals. With that underway, the next stage would be to have a Victoria-wide series of interconnects with all appropriate emergency services, community services and health services. That is where we are hoping our vision will get some sort of traction with the state government and they invest as well.

Senator LUNDY—I guess one of the things that has been really important is that it is not just about government policy and where that sits; it is also about the practical engagement of clinicians. Unless clinicians have trust in the system it is not going to be used. So it very much needs to be a managed, reliable and interconnected service that can turn on and that clinicians know will always be there to make the connections.

Ms Boschert—The level of change management, workforce support and just basic handholding to get clinicians engaged in this is a significant investment. I guess in ICT projects that is one thing that gets very much forgotten most of the time. We invest in the technology but we do not invest in the people. For us that has been a measure of change and a measure of success—that without that ongoing investment in the people and working with the people to demonstrate the value of the broadband and video conferencing in fact it would not be anywhere near where we are at. It is a really important point to keep on reiterating. It is probably my catch cry. It is all very well to have a technology infrastructure rollout but, unless the people use it and have reason to use it and value it, it sits unused.

Senator LUNDY—How did you do that? Can you give us a brief summary of your strategy for engagement? I think you are right: I think it is an incredibly important point.

Ms Boschert—It is a constant effort. It is about building relationships. It has taken me 18 months to convince a palliative care physician that the technology could work. He is using it and he is using it three or four times a week now—and he is not driving quite as much. It is about putting long-term effort into a project like this. It is not about the short-term rollout. Technology rollouts are actually, in many ways, quite quick. The change of the workforce actually takes the longest time and effort. Would you agree?

Ms Tonkin—Yes, for us it was availability. In the initial phases of learning of equipment Gayle was always on hand. I could ring her up and say, ‘The screen is doing this.’ ‘Well, Sharon,

have you pressed such and such?’ Things like that. There was an extremely good working relationship established between the health services and the GRHANet people. We put faces to names. Even problem solving could involve being on the phone and video conferencing problem solving. Gayle could ring me on the phone and say, ‘Turn it on. This is the problem.’ So you would work through your problem solving on the equipment that was daunting you at the time. We actually got the hang of it that way. It was the availability. Sceptical old nurses are hard nuts to crack. If we had an answer straight away it deemed it simple and easy to do, so we did it. The doctors turned out to be the hardest, funnily enough, but they are grabbing it with both hands now.

Mr Ryan—Just to clarify, the equipment is not simply an LCD screen on a table; it is basically an LCD screen sitting on a trolley—a bit like an IV pole. There are associated cameras and scopes that hook into that video feed. So it requires a bit of expertise to use them.

Senator LUNDY—We have seen some slides of equipment. I have in my mind an image of something like you are describing. We have seen this sort of equipment. It is not a normal computer with a little camera sitting in it like a laptop, no.

Ms Boschert—It is mobile and can go anywhere in the hospital. Nurses can take it to the bedside—

Senator LUNDY—the patient.

Ms Boschert—and do. On your question before about patients, patients are surprisingly accepting of it. I think the value of it is that they see it short-circuits some of the waiting times that they would normally have and/or they do not have to drive. That is of enormous value to them.

Ms Tonkin—We have talked about the complex issues. One of the pluses of the units is that we can actually show at a distance a doctor little Johnny’s infected eardrum. If you are a mum with a sick toddler, you have a couple of others, Johnny now has a fever and is unwell and you do not have access to a doctor for a couple of days, if we can put the probe into the ear and the doctor at the other end can say, ‘Yes, this is infected. Start little Johnny on such and such,’ you have solved the problem and removed pressures from an already pressured rural family that can be the straw that breaks the camel’s back. So whilst we may deem little Johnny’s infected ear as not a major thing, like the farmer who rolls his tractor, the capacity to problem-solve for community members is huge.

CHAIR—I have one more question. I know that Ballarat Base Hospital has an extraordinary digital capacity. I was there some years ago now and understood that within the hospital itself they had an extremely high bandwidth digital network that allowed things like x-rays to be stored. Can you give me an update on that? In particular, what does that mean for people on GRHANet and what sort of access do you get to Ballarat Base Hospital, given that they were ahead of the game with their internal digital technology quite some time ago? Forgive me, it has been a while since I have visited.

Mr Ryan—Each of the health services in the region that are part of Clever Health have upgraded their own networks inside their four walls. They have wireless installations. So there is

wireless technology everywhere basically in all parts of all hospitals in the region. They link up, obviously. You have the broadband capability through the ground and then within the four walls you have got capacity in each of the health services so we can roll around technology, we can have mobile PDAs available in those areas. We have laptops that are loosely carried around and we are looking at tablet technologies currently as well.

It also means wireless phones—having voice over IP phones wirelessly walking around from ward to ward. That can happen as well and does happen. Ballarat Base Hospital in and of itself has the capacity to grow in its IT environment. The limiting factor is always going to be money and how far you push the technology. There has got to be a reason why you want to do it. For instance, they are now doing electronic patient records. They are actually scanning medical records and then having them available whoever needs them basically. That is only a step towards an electronic health record; it is not the electronic health record.

In terms of the state strategy, each of the agencies are involved in the Health Smart environment. So in the clinical space over the next few years there will be more and more applications available that will target that clinical space. They are some years away. In rural areas we are not holding our breath too much around some of that sort of work. We are looking at providing steps in technology. One of those steps is the operating theatre complex at Ballarat Health.

CHAIR—Thank you. I am going to have to ask you to provide anything further you wish in response to Senator Lundy on notice.

Senator IAN MACDONALD—My questions have really been answered. I was going to be smart and say, ‘But you can’t use this to ask “Say ah” and look down your throat,’ but you are actually telling me you can with the ear. Thank you.

CHAIR—Thank you one and all from Grampians Rural Health.

Senator LUNDY—Please do provide us with additional information on notice, if you have further information.

CHAIR—Yes, the illustrations have been, as you can see, really graphic and positively so. Thank you.

[3.53 pm]

WYNTER, Mr Brad, Manager Organisation Development, City of Whittlesea

CHAIR—Welcome, Mr Wynter. Thank you for your time today. The proceedings are public. Your evidence is protected by parliamentary privilege. It is potentially unlawful and in contempt of the Senate for a third party to attempt to interfere with witness evidence that would otherwise be given. If at any stage you want to give evidence in private, please request that of the committee and we will consider your request.

Mr Wynter—I am the manager of organisation development. It is not generally the HR function within councils; it is actually an innovation area within council that was set up at the Whittlesea council 11 years ago. I represent the City of Whittlesea. It is a northern urban-fringe council. We are a growth council. When I joined the council 11 years ago there were about 110,000 people in the municipality. With the recent changes to state planning—five million in Melbourne—at capacity we will reach 500,000 people in the future. One of the key things that council was concerned about was: how do we build communities that are ready for the future? One of the first tasks that we undertook in the innovation area was to look at how we might use some of the new technologies in infrastructure to assist build a place that would be effectively future-proof. We developed a strategy in 1999—basically a multimedia strategy—looking at how council might improve its services to its community and assist the community to take up some of the technologies and capabilities that were emerging at the time. In 2000 we identified that broadband was going to be an infrastructure that was going to be required for communities in the future, especially for communities that were outside the central business district of a major city. They needed to be well connected in order to support a whole range of new services that were being promised for the new information age. As I mentioned, we started with 110,000 and we are going to move to 500,000 people.

Many of the areas are what we call greenfield developments. These are old farmlands that have been rezoned as residential. It was about how council might position itself to improve that broadband connectivity at the time. We looked at the telecommunications space and identified that it was not providing what our communities were looking for. At the time, we had many residents coming to us saying that they had moved from older parts of Melbourne, they had moved from areas where they might have had ADSL or cable infrastructure, they had paid a premium for a new home and land package and they found that all they were getting dial-up services, with no ability to upgrade to broadband services.

Council decided that it wanted to play a proactive role in getting a better outcome for local residents. We identified that one of the issues for greenfield estates was that all infrastructure was underground and that would make retrofitting of those estates very difficult in the future. We looked overseas and identified that one of the key things that council could do in its planning capacity would be to mandate, as part of the subdivision process, that an additional conduit would be put into greenfield estates—that is, residential, commercial and industrial estates—for the purposes of providing fibre to the premise in the future. We had some work done in getting a commercial provider to develop some standards so that that conduit would be suitable for any type of fibre technology, because there is a range of fibre technology, some of which require

more space than others, and we built some standards around that conduit network to ensure that it could be future-proof and could cater for any type of technology. We made the changes to the planning scheme in 2001. We could not make them retrospective. Many of the estates already had subdivision permits provided, even though, with the planning process, once the subdivision permits are provided, there are planning permits provided for each individual lot that will be developed. That can be a gap of up to many years, depending on the market. We started to get properties trickling through with the conduit installed, from day one.

The next process that we undertook was a fair bit of lobbying at the state and federal levels. One of the difficulties is that planning is a shared responsibility between the state and the local governments. If we were challenged in terms of the conduit requirement that we put in place, we wanted to ensure that it would not be overturned at the state level. We were successful in advocating that state planning be changed to accommodate the conduit requirement in planning, and that is in the Melbourne 2030 planning document that was released in 2002. We basically then did a whole range of work, which will probably take a fair period of time.

Just briefly, we were not going to put fibre in from day one, because we would require a carrier's licence to do that. We put out an expression of interest in 2003 to see whether we could get a carrier to provide a fibre-to-the-home solution in the conduit the council was going to provide—basically for free, or on a peppercorn basis. We also gathered together the other urban fringe councils—growth councils—to form a consortium, to offer to do the same approach for all of those growth councils around Melbourne, on the basis that a carrier would come in and put in fibre.

They very clearly indicated to us out of that expression of interest process that an additional subsidy would be required in order for them to come in and put fibre into that conduit provided by council. Council did not have the capacity to provide that subsidy, so we then started working very heavily with the developers, mainly through the UDIA—the peak body in Victoria—and worked with them to see whether we could get some support at that level. It was difficult for them to support us. We did then identify some individual developers that were prepared to provide that subsidy. Subsequently, we now have two major estates, in the City of Whittlesea, that have fibre to the home on the basis that we wanted them to provide the infrastructure. The three policy objectives we had were: firstly, that they would provide a scalable infrastructure into the new estates; secondly, that it would be capable of 30 megabits per second synchronous; and, thirdly, that there be a rich mix of services provided, on an open access basis.

Generally, we found that the biggest obstacle was the open access basis. Most carriers wanted to provide it as their own services to the residents. But despite that, we had two developers that were prepared to provide that subsidy to carriers and they delivered those solutions, which are open access. Both the estates that are wired-up are running 100 megabits per second. One is a point-to-point solution and one is a passive optical network, but I will not go into technical details. All I need to say there is that they are scalable infrastructures—they can scale up from that to much higher levels of connectivity in the future—and we have done a fair bit of lobbying work to suggest that this is a good approach.

There is a range of difficulties that we are currently facing. This is one of the reasons why we were very encouraged when the NBN announcement came because it was obvious that there needed to be some form of subsidy provided, in order to lift the infrastructure from the current

copper infrastructure that is provided as a matter of course to a new generation of infrastructure that would be scalable for the future. Secondly, we were very heartened by the open access requirement because we have seen, within our municipality, that we do have one developer that has provided what we call a proprietary fibre-to-the-home solution and we are getting a lot of negative feedback from the residents about being locked into an expensive set of services and not having the choice of service provider in terms of those services.

Senator LUDLAM—I probably only have a couple of questions, which are just around whether it is possible to extrapolate what it is costing to provide that level of service to the homes, where you are building the network into the new subdivisions, with what these services might be able to be offered commercially on a larger scale. Is there anything we can learn from your experience in that regard?

Mr Wynter—Generally, the subsidy is in the vicinity of \$1,000 to \$1,500 per lot. So that is probably the difference between providing a copper infrastructure and a fibre infrastructure. Some of the reason for that is that, at the moment, fibre is very small scale whereas copper is very large scale. We would expect that subsidy to drop over a period of time. The actual cost of fibre is quite similar now to copper infrastructure.

Senator LUDLAM—You said also that you had found two developers who were willing to do that for you. Are there still lots being put in with developers who did not or is everything that you are building henceforth with fibre?

Mr Wynter—No, currently we have about 4,000 lots with conduit past them and of that only about 650 actually have the fibre-to-the-home solution. That is another reason why we are very happy with the NBN announcement, and especially the mandating of fibre to the home in greenfield sites; because unless there is a party prepared to pay the subsidy then the fibre is not put through. Having said that, we also see that there is an advantage in having the conduit in place because then there is a ready pathway to actually get fibre to the premise in the future. We know that the cost of putting the conduits in at the time of subdivision is about half the cost of doing it retrospectively—the main reason being that they open up the trenches to put in all the other services, but to retrofit they have to bore under roads and footpaths and they have to dig up someone's garden in order to get to the home. So that is the issue in retro-fitting.

Senator LUDLAM—Just to be clear, did you go back and lobby for amendments to the Victorian local government act to make sure that what you were doing could not later be challenged by developers?

Mr Wynter—No. We basically lobbied the state government in terms of their planning policy for the future. So it is not in legislation; it is actually in the state planning policy.

Senator LUDLAM—Does that mean that all other subdivisions are at least being trenched at the moment similar to the standards that you are putting in?

Mr Wynter—No, the only amendments we made were with the local planning scheme. We have had changes made at the policy level with the state government but not at the planning scheme level.

Senator LUDLAM—So they are not making it mandatory everywhere?

Mr Wynter—We have approached the state government about doing that and their response in the past has been, ‘We’ll see how it goes,’ rather than making a leap of faith. Interestingly enough, we recently approached them and they are a little more interested in it now. In fact later this week, on Friday, I have a meeting with the state planning area as well as another group—a state authority called the National Growth Areas Alliance—to see whether we actually do this more formally as an approach within Victoria.

Senator LUDLAM—It would seem to make sense so that we are not putting in subdivisions that we know we are going to need to retrofit or cable a few years down the track. In your submission to the department you stated that fibre to the premises should be a ‘utility service that should be provided to all premises on a standard open access basis with regulated pricing’. How closely do you think that recommendation is met by the government announcement?

Mr Wynter—I think it is probably too early to tell at this stage. One of the key things that we are looking forward to is the results of the implementation work that is going to be done—I think it is going to be delivered in February next year. At the moment we are very happy with the commitment and the intent. At this stage we are not sure yet what the details will be. I know there is a working group that has been established by the department to start to work through some of those issues.

Senator LUDLAM—We took evidence in Canberra last week from a group that was advocating for all future utilities to be buried—and fibre to be buried—rather than being hung on overhead cables. I think your local government area, partly because you were hit by the fires earlier this year, would be a bit of a case study. Is it policy in Whittlesea that henceforth everything is to be laid underground?

Mr Wynter—Yes. But that is not retrospectively applied over some of the brownfield areas. That is for all new areas.

Senator LUDLAM—What is the thinking around brownfield areas where you have already got overhead cabling?

Mr Wynter—I think there could be a case made for eventually retrospectively installing that infrastructure underground. Again it is a matter of when that is done and how that is done. It is more expensive to put it underground.

Senator LUDLAM—Do you have a rough idea of how much more expensive it is?

Mr Wynter—It is probably between \$400 and \$1,000 per lot frontage in terms of underground. I do not have the costs for above ground, but it is a lot less than that.

Senator LUDLAM—And of the areas that were hit by the bushfires earlier this year, do you have enough information to say whether the areas that had overhead cabling did any better or worse than those where the services were underground?

Mr Wynter—Without a doubt, the underground infrastructure was preserved. At Strathewen, which is the neighbouring municipality, the only infrastructure that was damaged was the exchange, the above-ground infrastructure. In that case, Telstra brought in a portable exchange on the back of a truck and basically connected that up and had those services operating within one day.

Senator IAN MACDONALD—Mr Wynter, you are certainly at the forefront. Congratulations on what you have done at the council. Did I miss who owns the network into these greenfield estates? Is the council running that, or is it Telstra, Optus or someone else?

Mr Wynter—No. The conduit belongs to council, and it is our mechanism of ensuring that we get our three policy objectives met. Basically we enter into a lease agreement with the carrier for them to provide their services on the basis of those three policy objectives: that they provide open access, scalable infrastructure and a rich mix of services on a competitive basis. We only charge them a peppercorn rent. Currently, because there is no regulation at the federal level, we are the ones that have to regulate the open access, and this is our mechanism for doing so. You are shaking your head, Senator, and I agree—it is crazy. But it is what we have to do to get the outcome that we are looking for. It is another reason we are very happy with the NBN announcement. The responsibility for telecommunications is at the federal level. We believe that the regulation of that open access will need to go back to the federal government. Council do not want to do it; we are only facilitating to get an outcome. We do not want ownership of the conduit long term. It is actually a liability to us, because we do not earn any income out of it and it will eventually need to be replaced.

Senator IAN MACDONALD—Do you use a particular carrier?

Mr Wynter—No, it is a competitive process. The developer goes out to the marketplace and chooses the carrier. The only caveat is that they have to meet our three policy objectives. In fact, the two estates we have have different carriers providing the services. Obviously, those carriers have competed against others to win the work, to deliver those services.

Senator IAN MACDONALD—So will you fold your ‘network’ into the NBN? Would you expect to be paid for it?

Mr Wynter—That is one of the things we are looking at at the moment—gifting all of our assets across to the NBN Company.

Senator IAN MACDONALD—You are looking at it?

Mr Wynter—We are looking at it at the moment. There has not been a council resolution on it but it is something that we will be approaching council with. In terms of the conduit that has been provided by the other two carriers, we would be likely to gift those carriers that asset, because they have basically put their infrastructure in place and they are delivering according to the principles that we have outlined. They will be overtaken by the federal requirements for open access and all those aspects, which meet all our requirements anyway. Basically, we see council’s long-term role as being to continue to use its planning powers to ensure that, as part of the planning requirements, it is provided as a utility service. After that, we will deal with it in the same way we deal with electricity, gas and all our other services. As long as it is in place and it is

being regulated and managed at another level of government or by another authority, we do not need to be involved any further.

Senator IAN MACDONALD—That is great; well done.

Senator LUNDY—Thank you very much for coming today, Mr Wynter. With all of the focus by the council on what broadband has to offer, what has that meant the council has been able to do in the provision of services in an online environment and what is the relationship between the innovations you have made in the use of high-bandwidth networks and the delivery of local government services?

Mr Wynter—There are a number of things; I will give a few examples. One that you may have heard of is the EasyBiz project. Have you heard of that?

Senator LUNDY—Yes, but please describe it for the committee.

Mr Wynter—It was part of reducing the regulation burden on businesses. We applied for the federal government's Regulation Reduction Incentive Fund, the RRIF. We headed up a consortium of 32 councils across Victoria to deliver a common solution around reducing the regulation burden on different businesses. Basically, local government administers a lot of state government legislation. Generally at the moment the legislation is provided by state government and local government then goes out and works out how it is going to administer and run that. A planning permit would be a good example, where there is common legislation but each council will go out and invent its own form, invent the information it wants to collect on that form and provide its own set of information around that form. If you are a business working in the community and you cover a number of municipalities, you may have to do different things for different councils, depending on where you are.

Our approach was to provide a common form that would be available on a common platform. We built a platform on the state government infrastructure and used them as a managed service provider. That form was then designed with the involvement of the 32 councils and the state government department responsible for that form, and it was then loaded up on this platform. When business went in to access information about that planning permit, they would get some common information that was developed across the councils. They would be served up an electronic form, a smart form, that would be automatically modified depending on which council it came from. The modifications would include, for example, the logo, the contact numbers and all of those things that are particular to different councils, but the regulation itself was common to the rest of the form. That smart form would be able to be filled in by the applicant and even sent to their accountant or other professional people that they dealt with and then submitted. It would strip the information out using a particular type of technology and then it would be able to submit that to the individual councils, either integrated into the back ends or, if they chose, as a structured email which could then be integrated or utilised by the council. Or, if they choose to do so, they could print it off and provide it in hard-copy format, as they always had.

That EasyBiz project built that platform to cover 21 different regulatory processes including planning, building, land based information, health and local laws—animals and those sorts of things—with the aim of simplifying for local businesses their dealings with local government. While that technology strictly does not require huge amounts of bandwidth, those smart forms

did require a reasonable level of bandwidth—they were of a size in the megabytes—and they did require a certain amount of infrastructure to use them effectively. Interestingly, the state government is now funding the extension of that project to cover all 80 councils in Victoria, so the other 48 councils are now being included in the program. That was something we did in 2006-07.

We have done something similar in the food space, a project called FoodSmart, where legislation was made around food safety programs in Victoria and a compliance timetable was set. Basically, that required any food handling business to establish a food safety program as part of their normal annual compliance requirements. That was quite broad scoped and included services like child-care services, where they serve morning tea—they cut up oranges and all the rest and give it to the children. They also had to comply and provide a food safety program. Many of these businesses had no idea of what they were doing, so a series of courses was provided—several days of courses that you had to undertake. There was also a fair bit of material provided.

Generally, when we sampled the food businesses, they told us that, even after doing the courses, they would still have to go to the library with a wheelbarrow, fill it full of books, come home, read through them all and do the best they could, because there were really no templates. We built an online template system in conjunction with the ANZFA standards and made it available to all Victorian councils. Again, that is an internet type set of services for those businesses. That is still going. We did that in 2004—I think that is when we finished that—and that is still being utilised. The state government runs that. Once we built the system, we handed it over to the state government to run on an ongoing basis. Since then, both New Zealand and Western Australia have looked at that system and have been interested in utilising it. I think the state government is in talks with those jurisdictions to see whether they can provide that more broadly.

Senator LUNDY—Thank you very much for that description. It is really important to get some examples of the level and depth of innovation that occurs when you have a council as motivated as Whittlesea. I am conscious of time, but I think it is important to stress the point about how strong the leadership from Whittlesea council has been. I am happy for you to take this on notice, but I would like you to tell the committee how the council has been recognised through awards or acknowledgements, with respect to the innovation that has occurred. I am certainly familiar with it, going back quite some time, but I really think it is valuable for this committee to get an insight from a local council perspective about what difference bandwidth makes and how one local council—albeit a fairly well resourced one, given you are subdividing and are well placed financially compared to a lot of Australian local councils—has been able to achieve that.

Mr Wynter—There is just one thing I would like to say. In terms of being well resourced, that is probably a bit of a misnomer around growth councils. Growth councils very much find it very difficult to resource the growth, especially when they are developing greenfield sites. We have to establish new sports facilities, ovals, maternal and child health centres, community centres and all those sorts of things well in advance of full population.

Senator LUNDY—You are absolutely right, and thank you for making that point.

Mr Wynter—In terms of recognition, I think we have won 13 national innovation awards in the last nine years and one international award. We were named in the top 21 intelligent cities in the world. There is an independent group in New York that makes those awards. We were the only city in the southern hemisphere that was named on that list, mainly for the work that we have been doing around advocating for broadband, our broadband programs and a lot of the work that we have been doing in electronic service delivery. Some of the awards have been in the mobile computing area. I think it was in 2000 that we established a mobile computing unit as part of my department, because there really was nothing in the marketplace that could do what we were looking for. We developed about 30 mobile applications in that space.

Senator LUNDY—What sorts of mobile applications? Could you give a brief description.

Mr Wynter—Talking on the fire theme, one of the things that we do during the fire season is send patrols out to look at the grass verges in paddocks near fences. We ask everyone to cut the grass around their fences with certain setbacks to make sure that fires cannot move rapidly from farmland to farmland. The old process was that the inspectors would go out in a ute and would fill up their ute tray with maps. When you are driving down some country lane you have no idea whose farm is whose and which fence belongs to which farm, so we developed a mobile application using GPS technology where inspectors had a map on the screen and as they were driving they would follow the bouncing dot. They could then point at a particular lot and it would have the ownership details and all the rest and they could then establish notices very easily by just pointing and clicking on a few areas, which would automatically generate the notice when they got back to the office. They would print them off and send them out annually. We tried email but it was too difficult. We just did not have enough email addresses. But in the long term that is the way we want to apply those. We found then that we were not requiring contractors to do that work. We could do that within our staff because it was that efficient. That is one example.

Another one which actually won one of the awards was a process we have around valuations. One of the processes in valuations is what is called a 'frontal inspection'. Again, a valuer would drive out in a car with a notebook and have a look at your property to see what level of improvements you have made to it, how your garden looks and all those sorts of things. We developed a fully statistical model around valuations, and the only manual process was that particular process. We mounted a video camera on a street sweeper with a GPS unit. As it sweeps the streets it films the front of all the properties. Every 54 days it does all the urban areas of council. It stores all that footage on a computer mounted in the truck. When it comes back to base it downloads that on to our map based GIS and then the valuers go to their desktops, type in an address and get about 13 seconds of video across the front of the property. They can do their frontal inspections from the desktop rather than having to go out into the field. That is another example.

In terms of innovation, two months ago we actually sold that whole function to the private sector because when we had a commercial assessment done on it they said it was as good as anything in the marketplace and was of commercial readiness. We certainly have been looking for gaps where local government cannot provide particular functions and we have been looking to fill those gaps where it is necessary. Where we have created a marketplace we have been on-selling that to the private sector because, at the end of the day, they will do a better job of it. Those are the sorts of things we have done.

Senator LUNDY—Fantastic. I have one final question.

CHAIR—Senator Lundy, you have misbehaved most of the day, so why change in the closing stages?

Senator LUNDY—I will not be selfish. Can you take on notice: how important is it for accurate geospatial information to be available to you as a council to enable you to innovate in the way that you have described? I am happy for you to take that on notice.

Mr Wynter—Yes, okay. I will take that on notice.

CHAIR—Thank you very much, Mr Wynter.

Committee adjourned at 4.28 pm