



# Cables Downunder

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**Department of the Senate**  
**Select Committee on the National Broadband Network**  
**SF61.1 Parliament House**  
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## **Reply to Questions on Notice.**

1.

In response to the second question I believe that I have answered this when I said “Yes” before I went on in further detail and described in brief the process.

2.

The second question is a lot more difficult as there are a number of factors which affect the outcome.

A. Where the poles already exist, it is necessary to erect a catenary cable which supports the Fibre Optic cable and the various fittings that attaches it to the pole. Finally a second wire which lashes the Fibre optic cable to the catenary cable.

B. With respect to the installation, of underground cable by way of horizontal directional drilling (HDD) the cost of boring the hole and installing the conduit varies due to a number of factors such as the soil type ie: rock, clay, soil, sand etc:

C. With respect to the installed cable:

- If it is underground its life is essentially infinite as it is in a controlled environment. It lies virtually undisturbed and is easily maintained at ground level. It is also easier and faster to install being at ground level
- If it is overhead it is at the mercy of the environment and some of these factors vary with the location for example:
  - A. The effect of ultraviolet light which degrades the plastic sheath etc. As an example, overhead an electricity cable has a life of about 40 years, underground the same cable has a life of about 60 years.

- B. Physical damage by high loads on trucks and Motor vehicle collisions with power poles.
- C. Tree branches falling on it and flying debris in high winds.
- D. Bush Fires burning the cable or supporting structures.
- E. Fatigue and breaking of the glass fibre due to flexing caused by winds etc.

From searches I have done with a friend the vast majority of fibre optic cable in the world has been buried. I would suggest that this has occurred due to reliability and lower maintenance costs. The two major exceptions being Siberia due to the permafrost and Bangladesh due to the floods.

With respect to cost it is our belief that reliability is more important than cost. It could be a matter of life or death or as demonstrated by W C Wentworth in an exercise during WW II, a matter of National Security. It is my understanding that it was essentially the cost of Maintenance and security which caused the PMG to begin burying its overhead phone lines after WW II.

**On a separate issue.**

In response to a statement by Senator Nash as to the location of the NBN cable running where the electricity cables currently exist I should say that I have done some research which indicates that this does not appear to be practical.

The idea that the Fibre Optic cable could be erected along side the electricity cables is predicated on the fact that that the cable is non conductive. While this may be true there are other factors which must be taken into account:

- i. There are standards which stipulate the separation of wires and cables which have been carefully drawn up to take into consideration physical and electrical interference between them and the ability for linesmen to safely work within their vicinity especially when they are live. I believe that to put the Fibre Optic cable in the area of the existing cables would require a re-drawing of the standard.
- ii. The general configuration of cables in Sydney generally takes two forms.
  - a. A single switched wire at the top of the pole for street lighting. And four wires consisting of one neutral wire and three active wires on the cross arm.
  - b. Where there is insufficient height of the pole to allow the Switched street lighting wire to be placed above the cross arm it is attached to the pole immediately above the cross arm with two conductors either side.
- iii. The Cross arm is attached to the pole by one bolt and is either let into the pole to keep it horizontal or has two short metal stays attached to the pole to prevent it swiveling or moving from the horizontal.  
It must be considered that this cross arm and its method of attachment to the pole is of insufficient strength to carry the forces that the NBN cable and its supporting elements would impart to it.
- iv. While it is true that the fibre optic cable is non conductive, it must also be realized that it can not be stretched or have sharp bends. The glass fibre is

brittle and will break It must therefore be supported by a catenary which is conductive. Both the catenary cable and fibre optic cable are held together by a tie wire which is wrapped around both cables by a lashing machine. This can only be done after the cables have been hung. To put the NBN cable on or near the cross arm would bring the lashing machine into contact with one or more of the electricity cables as there is insufficient clearance. Also as a precautionary note It has been noticed that as the lashing wire ages on the pay TV cables, it is tending to break and unravel. The pay TV cable being more robust can withstand the extra forces imparted to it by this unraveling but there must be a doubt as to the fibre optic cable being as forgiving.

- v. Many poles are already leaning as a result of the strain of the current pay TV cables and have had to be replaced. Of particular concern is the situation where the pole leans towards and on occasions even over the road. This situation is exacerbated by the road camber causing trucks with even moderately high loads to lean towards and on occasions impacting the pole. In the case of the NBN's glass fibre cable this is even more critical as the glass is relatively brittle and the impact would have a deleterious effect on the Fibre.
- vi. Due to economic constraints many poles are in poor condition and the life is only being extended by the fitting of steel splints at their base and many poles are splitting and flaking. From memory the average age of an Energy Australia pole is 23 years according to a NSW IPART report. Most of the poles I see seem to be twice that age. In fact the subdivision I live in is at least 45 years old. I have lived here for forty years and have never seen a pole replaced.

There needs to be an engineering investigation into the carrying capacity of the poles to establish the ability of the average pole to carry the extra load. In fact this study should have been done prior to the erection of the pay TV Cables. Without such a study we are all in the dark myself included as it is difficult to know what to address or how to address it without a road map.

In conclusion with your indulgence and that of Mr Wonder of the Productivity Commission who preceded me on the day of my presentation I would like to address a question put to him and for which there was I believe no answer.

Mr Wonder was asked a question about a "Killer App" or Killer application which could make the NBN Redundant.

From my own knowledge and from checking with friends in the industry there is nothing on the horizon which could better a properly constructed fibre optic network for speed. Any threats to the NBN's fibre optic network would be in the form of an evolutionary change rather than revolutionary where by the fibre becomes less expensive and more refined and the same would apply to amplifiers and photonic switches, etc which are part of its makeup. In any case these would be phased into the existing network when it became practical and/or during regular maintenance. In some cases Wireless technology may come close but is hampered by a range of factors such as availability to a base station or satellite and the availability of radio spectrum, which is already becoming crowded, not to mention security issues.

Finally.

**I would strongly recommend that Mr Peter Brown of "Trenchless Advisor" be invited to give a presentation to the Committee. Peter is an expert on HDD and**

other forms of trenchless technology and is well known in the excavation industry. He does work for many of the electricity utilities. He could impart a greater understanding than I could on cost comparisons and trenchless techniques.

Given sufficient notice he could arrange a demonstration of HDD and associated equipment for the Committee in Canberra or Sydney.

Yours faithfully.

*Peter Downey*

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