



The National Broadband Network

AUSTRALIA'S INNOVATION OPPORTUNITY

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Agenda

- NBN → Innovation Enabler
- NBN → An Innovative Network
- NBN Co → Innovation in Action

NBN → Innovation Enabler

- Ubiquitous High Speed Broadband Infrastructure
 - 100% coverage → 100+Mbps for 93%
 - New applications driving innovation and productivity
 - Australia at forefront of digital revolution
 - Uniform wholesale price for broadband access
- Restructure of telecommunications industry
 - New age for competition
 - Competition focussed at service layer
 - New applications from new service providers
 - Customer Service will be a differentiator

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Next generation broadband will change the way we work live and play

In Education

- Virtual Classrooms
- Global Learning
- Smart Schools
- Collaboration



In Business

- Commerce
- Manufacturing
- Design
- Transport
- Media



In Entertainment

- Multiscreen
- Seamless Connectivity
- Real 3D TV
- Virtual Apps



In Government

- E-Services
- Simplified Interfaces
- Transparency
- Virtual Voting



In Health

- Tele-diagnosis
- Research & Development
- Secure health records
- Training of health professionals

In Everything We Do



NBN is the enabler of new personal and commercial opportunities

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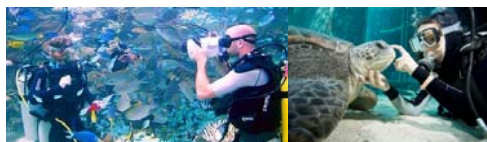


Australian Education – Virtual Excursions

Broadband can deliver the global classroom to my room



ANU School of Music - Streaming Music
Live-streamed Concerts and Video



Reef HQ talk about marine life, coral, climate
change LIVE in the Aquarium tank



Professor David McKinnon (Bathurst) talks to
over 400 students from Ireland and the UK
about Australia's night skies



Videoconferencing: Herodian Room
in the Old City of Jerusalem

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Broadband for Farming

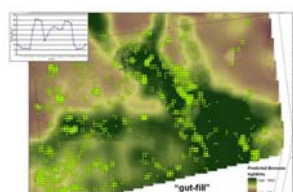
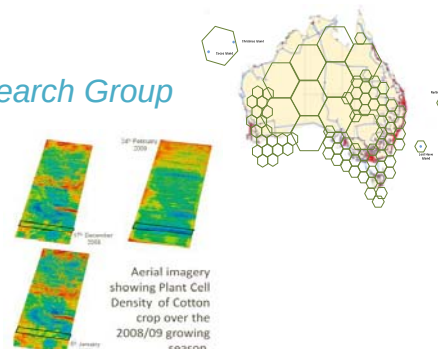
UNE – Precision Agriculture Research Group

Low cost monitoring devices will
generate large data sets.

- Monitoring and imaging
- Collaboration – Australia Wide
- Analysis = Optimisation



Courtesy: UNE – www.une.edu.au/parg



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D'Arenberg Chief Winemaker



- "When we've got the faster broadband it will almost remove the need for me to travel because I'll be able to do everything just as well from here."
- With this technology, instead of just discussing and tasting the wine, I can make it really interactive and show them pressing or fermenting or what's going on in the vineyard."
- Mr. Chester Osborn

High Speed Broadband Use Models.

Improvements:

International Business - Global Webinars
 "Virtual Wine Tastings" – Improved Quality
 Interactive sessions instead of broadcast

Quality of Life - Less travel, more family time.

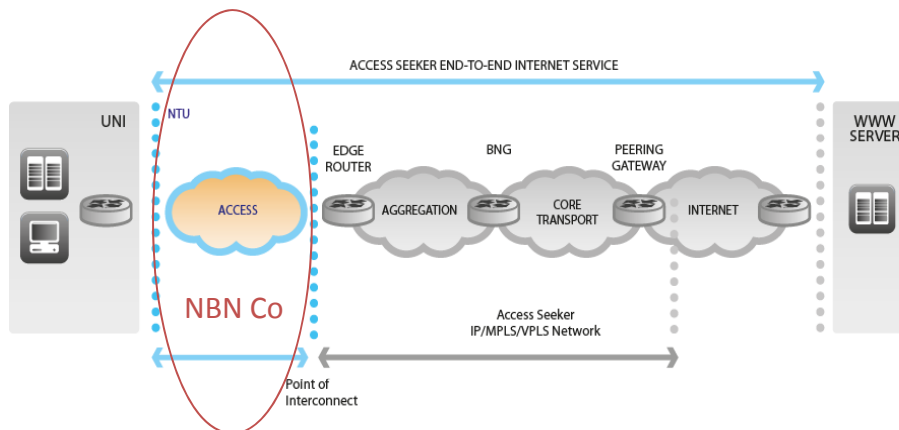
Source: <http://southern-times-messenger.wherelive.com.au/news/story/rollout-the-barrel/>

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NBN's place in the overall network



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NBN → An Innovative Network

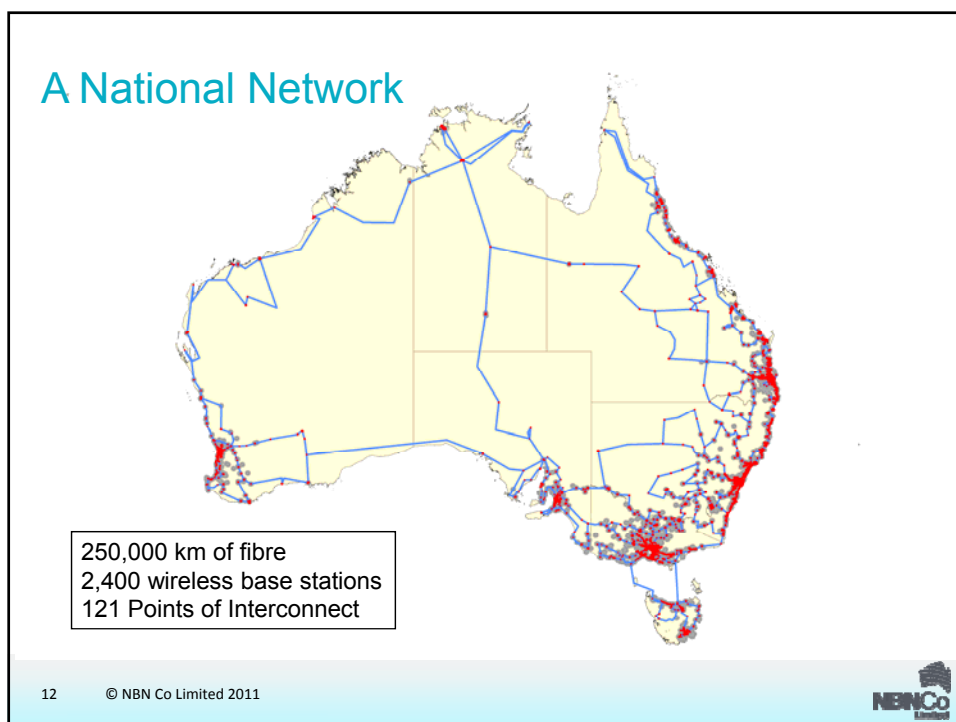


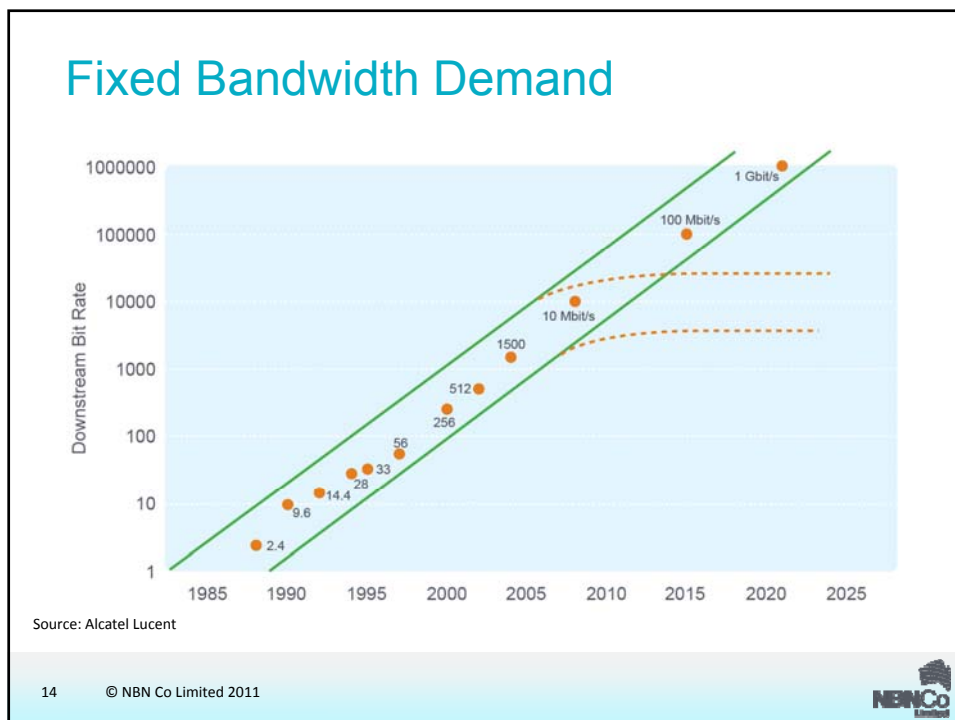
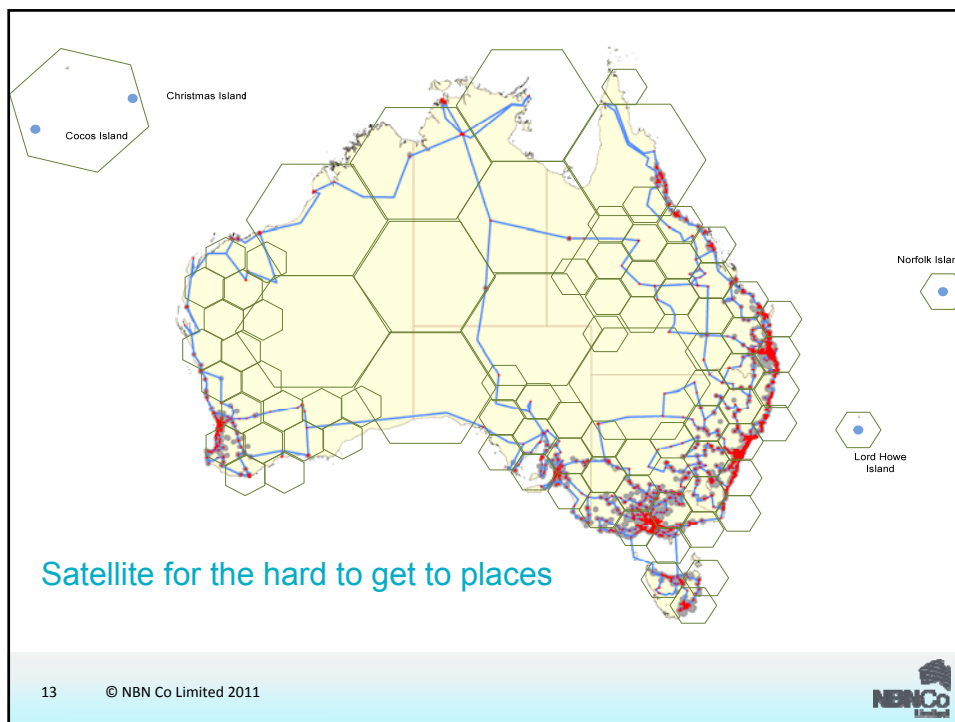
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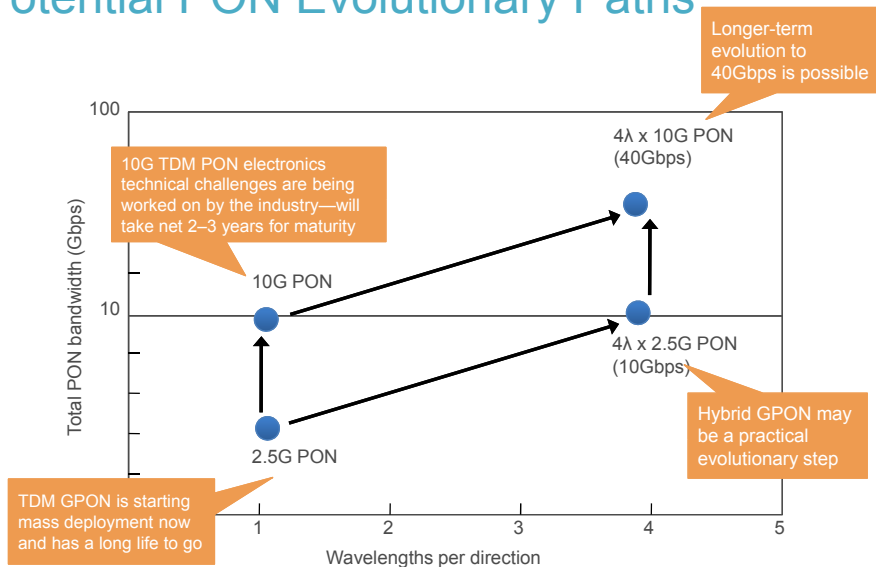
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Potential PON Evolutionary Paths



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NBN Co → Innovation in Action

- Build of Fibre Network
 - 6000 premises per day in steady-state
 - 15,000 to 20,000 FTE staff required
- Wholesale Infrastructure
 - Layer 2 Ethernet product
 - Multi Service, Multi Service Provider
- Broadband for Rural Communities
 - Maximise performance, Minimise Cost



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Innovation – Network Design



- Fibre Network Design Optimisation Software
 - Supplied by Biarri, an Australian Commercial Mathematics Company
 - Optimisation of fibre network design using existing infrastructure
 - Integer programming incorporates algorithms to handle complexity and architecture rules
 - Significant cost savings based on modelling during First Release sites



200,000 km of fibre network to be optimised

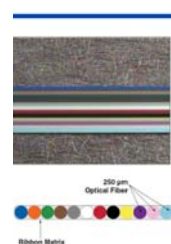
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Innovation – Fibre Cabling

- Ribbon Fibre introduction to Australia
 - Increased productivity with reduction in fibre splicing → 12 splices in 1 job
 - Higher fibre count reduces operational and future upgrade costs
 - Greater network diversity improves service levels
 - Faster repair times after cable cuts



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Innovation – Wholesale Product

- Layer 2 Ethernet
 - Service Provider controls retail products
 - Service Provider controls bandwidth, quality of service and traffic prioritisation
 - NBN is the Service Provider's virtual access network
- Multiple Services from Multiple Service Providers
 - Simultaneous delivery of internet, telephony, video and corporate applications
 - Up to 4 separate service providers to one premise
 - No disturbances between service providers



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Innovation – Broadband for the Bush

- Wireless
 - Long Term Evolution → 4G
 - Maximum bandwidth with clear technology roadmap
 - Layer 2 Ethernet product model
- Satellite
 - Ka band spot beam technology
 - Maximum re-use of available spectrum
 - Approx. 80Gbps per satellite



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An Innovative Workforce

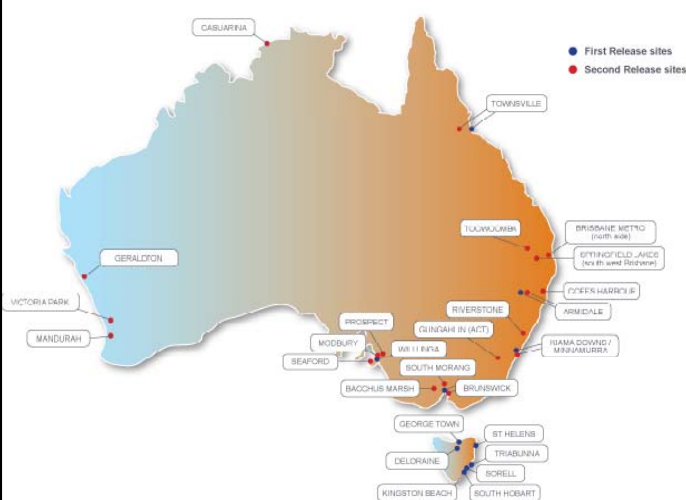
- ❑ April 2009 NBN Co was announced
- ❑ July 2009 Mike Quigley was announced as CEO and later that year the Board was established
- ❑ NBN Co has since reached 848 employees and contractors (as at 31 May 2011)
- ❑ 17% of Workforce at entry level with 11% in Technology and Operations (mostly engineering roles)
- ❑ Led by Technology NBN Co is developing a graduate program → Launch in 2012



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Rollout Progress



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The Truth is in the Physics!

$$\begin{aligned}\nabla \cdot \mathbf{E} &= \frac{\rho}{\varepsilon_0} \\ \nabla \cdot \mathbf{B} &= 0 \\ \nabla \times \mathbf{E} &= -\frac{\partial \mathbf{B}}{\partial t} \\ \nabla \times \mathbf{B} &= \mu_0 \mathbf{J} + \mu_0 \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t}\end{aligned}$$

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