



Charles Todd Oration

Kathrine Dyer, Chief Network Deployment Officer

Good afternoon,

It's such an honour to be delivering the Charles Todd Oration.

Events like these have always encouraged me to pause and think about our industry, why we are all here, and why we do what we do.

I think the opening video about what telecommunications is doing for families like Zarah's gives a sense of that. It gives a great sense of the transformation that it's having on Australia.

The construction of the Overland Telegraph back in the 1870s was — as we know — one of the most important telecommunications initiatives of the nineteenth century, and an incredible feat of engineering.

It remains one of the key signposts in our industry's history and Charles Todd one of its most early, passionate pioneers.

The telegraph line Charles Todd and his team built connected Adelaide to Darwin, and Darwin to the rest of the world.

It changed the country from one that had to rely on month-old newspapers delivered from England, and letters that took eight months to arrive, into a connected continent that could deliver messages between cities and people in a matter of hours.

Fast-forward to today, and we are less than two short years away from the completion of the National Broadband Network – an upgrade to Australia’s telecommunications and a transformational project improving the lives of people like Zarah and her family.

For me, it’s such a privilege to be part of the team leading its deployment.

We have this saying on the **nbn**[™] network build – ‘clean boots’ and ‘muddy boots’.

The ‘clean’ ones being the work that happens once the network is built and it’s time to flick the switch and light up the home.

The ‘muddy’ ones being everything that happens during construction. The mapping of the streets, the hauling of cables, the work in the pits and the pipes, the drilling, the digging.

I’ve always been interested in the ‘muddy boots’ work.

It might have been growing up with my three brothers on a farm that attracted me to building and creating things. To me, there’s something really satisfying about developing something new. The challenge of creating something that wasn’t there before.

It led me to a wonderful career of almost 17 years at Telstra working in many different areas of telecommunications, but most significantly in urban development of Greenfield fibre in residential estates and business parks.

And it's led me to **nbn** for the best part of a decade – one of the biggest infrastructure deployments in our country's history.

As the company's Chief Network Deployment Officer, I can't help but empathise with Charles Todd a little. I feel I have some understanding of his challenge constructing something as important as communications infrastructure across a continent like Australia.

For him, it meant exploring new terrain and engineering through our rough landscape for the first time. For my team and I, it means following an existing path, but with new detours, challenges and barriers to get the network built.

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The role of my team and I is to plan, design and deliver network construction – at pace, of high quality and always safely.

By 'high quality', I mean ensuring the network my team hands over to the 'clean boots' side of the business provides a good connection experience and provides a great level of customer satisfaction.

We have done this with very little blueprint. No real guide on how to deploy new technology like this. We have trialled and tested new technologies and new ways to design and construct telecommunications infrastructure that has been both innovative and pioneering.

I'll admit this now, in my very first weeks at **nbn** in 2010 I said to my husband – 'what have I done?'

I'd come from building up a new business within a very safe, well established and known environment at Telstra, an achievement I am very proud of. I had now walked into an infrastructure deployment for which we didn't have any blueprint, with uncertainty, ambiguity and challenges around every corner.

But it turned out to be the most exciting career challenge – requiring huge amounts of innovation, in the early days working in constant ambiguity, and great personal resilience.

Today, the result is the construction of more than 185,000 kilometres of fibre into our streets and neighbourhoods.

It's nearly 100,000 kilometres of fibre in our transit network. 25,000 nodes. More than 2,000 fixed wireless towers and two large satellites serving our rural and remote areas.

It's infrastructure on a massive scale.

And by June 2020, we'll be at the finish line.

99 per cent of Australian homes and businesses are now in either design, construction, or with network ready to connect to.

75 per cent of network construction is finished.

More than seven and a half million homes and business are ready to connect, and nearly four and a half million homes are connected to services over the network.

Right now, we're connecting tens of thousands of new homes per week.

Having spent my life in telco, I love data like this. But I know what's behind those headline figures.

What many don't see behind the scenes is the construction of the network – an amazing tale of scale. Of huge amounts of planning. Of continual process improvement. Of the close partnerships we have formed with our suppliers and delivery partners. Of innovative design and construction.

This is truly an inspiration.

As this room would appreciate, it's more than laying cable in the ducts and lighting up homes.

While Charles Todd had the rough Australian landscape and the elements to contend with, we now have fully-formed cities as well. We have large road infrastructure networks and underground utility assets to avoid, apartment buildings at scale, complex public premises with bespoke requirements, heritage listed parks and buildings, regional and remote locations and very dense neighbourhoods.

One of the most curious elements about being in charge of the **nbn**[™] network deployment is that perhaps our biggest engineering and construction challenge receives almost no coverage in the media at all.

Whether we are drilling under rivers or connecting some of the busiest and densest cities in Australia, we are facing unique construction challenges all over the country, every day.

One example of that is the **nbn**[™] Transit Network, which serves as the backbone of our network. It's an incredible piece of infrastructure that links together all of our 121 Points of Interconnection to our Local Distribution Networks right across the country.

Via the construction of the Transit Network we are taking fibre into places that it has never been before.

This includes places like Mount Tamborine in the Gold Coast Hinterland where we are currently in construction.

On Mount Tamborine we are building around and on top of the plateau of a mountain. It is steep, rocky, has many narrow roads and is an area where we must protect wildlife and vegetation.

Also in Queensland, we had to run nearly three kilometres of new fibre across the Houghton Highway Bridge. This was to deliver services to 12,000 premises on the Redcliffe Peninsula.

Laying fibre across the three-lane Houghton Bridge was fraught with challenges. The bridge – which is almost 50 years-old – had sections of damaged conduit along its underside that was in urgent need of repair. This work involved painstakingly replacing sections of the suspended conduit by hand.

We had to use boats and barges to conduct repairs under the bridge and to help winch the fibre across. This also meant dealing with tidal issues out on Moreton Bay.

In other areas, sometimes we have to go right back to basics and run new fibre through paddocks.

In the Gippsland region of Victoria, we needed to plough a 13-kilometre stretch of farmland to bury fibre. That allowed us to connect the towns of Leongatha and Korumburra, about 135 kilometres south-east of Melbourne.

A special plough machine was used to dig the long trench that crossed multiple properties. These ranged from farms to vineyards. Sometimes on this section of the build, our people would come across rocks that were so big they needed rock saws to cut them and break them apart.

There are times where we've had to literally bore under waterways. Like in Scots Head in Northern New South Wales where we drilled two half-a-kilometre bore shots, - one under Warrell Creek and the other to bypass protected wetlands. All so we could connect the town to the **nbn™** network.

And in Sydney's North, we built 55km of fibre backhaul from Mona Vale to French's Forest, then Willoughby to Mosman.

For 593 days, we deployed aerial and submarine cables while working in the intense work zone that is the NSW Government's upgrade of roads in the area for the new Northern Beaches Hospital.

Working with our delivery partner Visionstream, we had complex utility relocations, submarine hauls, aerial crossings over national parks, and heavy traffic near the construction zones. These presented huge challenges in getting access to sites.

Most Australians would not be aware of these examples, which are not just construction feats in their own right, but they demonstrate the time, resources, skill and innovation required to connect Australia to the **nbn™** network.

But sometimes, it's the seemingly mundane premises that are often the most complex to complete.

Sydney Markets in Homebush is a great example.

On the outside it doesn't look like much more than a big concrete pavilion. But in reality it's an enormous, labyrinth structure with underground passageways, market stalls, butchers, fish markets, flower stands – the works. This is a site which operates 24/7 with constant forklift and vendor traffic.

Access to the premises is near-impossible. Produce arrives from 1am and trading starts from the early morning and runs all day. In the evening, everything is removed and the whole market floor is hosed down and stays wet for hours.

It's not just a huge market site with more than two-hundred-and-seventy businesses operating from dawn till dusk. It's also a nest of existing telecommunications infrastructure with layers of cables and legacy equipment that no one seemed to possess an accurate map for.

We had to compare records with Telstra, had to pull on our Land Access and Location Management teams. Most importantly, Telstra and **nbn** had to make sure we were aligned so we didn't disconnect anyone during the process.

A lot of these businesses have large fridges for produce that are running on integrated operating systems and any telecommunications disconnection during construction would switch the fridges off.

We worked closely with centre management and deployed the network in three stages, often working overnight, with a high focus on the health and safety of our people.

By being methodical but flexible, and using a hybrid network technology approach, we completed construction and connected all the businesses within the markets in six months.

It speaks to the real complexity in rolling this network out in everyday places.

But it's not just engineering or construction challenges that adds to the complexity of the build.

At the heart of the **nbn**[™] network rollout are the communities we are connecting, the people whose local areas are impacted by the network.

And that's not just every home in the country we're talking about, there's also Local Governments, there's regulatory bodies, landlords, and other parties with interests in the way we're constructing the network.

Our land access and stakeholder engagement teams are the ones that help pave the way for the successful delivery of this network.

We know that the earlier we engage with stakeholders, the greater the likelihood of a good outcome for all.

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Our approach in deploying the **nbn** in the lands of our First Peoples is something I'm particularly proud of.

In Central Australia, the town of Alice Springs looms large in the history of telecommunications. It's there that Charles Todd's team found the clearest path through the MacDonnell Ranges and the mid-point of the Overland Telegraph construction.

In fact, the town is named after his wife, Alice.

This was, and still is, a sacred place. Aboriginal groups from across Central Australia practised ceremonies to ensure travellers safe passage through the gap from north to south.

For **nbn**, connecting 9,000 homes here meant deploying the network over a big slice of history.

Our planning and construction managers worked with the Aboriginal Area Protection Authority to map all the sacred sites in the area. There were approximately 600.

This process armed our designers with the ability to find the best ways to lay a backbone of fibre cable across the whole town without damaging or disturbing sacred sites within the town boundaries.

It was an extraordinary task and helped define our approach for other areas across Australia.

In Yawuru country, our Delivery Partner WBHO employed a local elder as a cultural liaison officer for the entire Broome rollout. His role was to educate and support our construction team and ensure alignment between cultural and heritage issues raised by the Yawuru People and solutions proposed by **nbn** and our delivery partner.

This is the reality of deploying the network in some of the most culturally sensitive parts of our country.

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Looking back, I've thought about what some of the features of our success are. And I believe our collaboration with industry is absolutely key.

At **nbn**, we have had to do a lot of growing up in public. We have had to establish new relationships and processes, so we learnt from issues we may have had in the past.

What we are doing has not been done on this scale. We need to draw on the expertise of others.

Helping us improve our relationships and efficiency often requires co-locating with delivery partners.

In the design and construction process, there are so many interactions and artefacts that move back and forth between us, Telstra and our delivery partners that it can really make much more sense for these people to all be in the same room to plan and problem solve together. We are working closely with our partners as we have done with our other network technology rollouts, to scale the deployment of the FTTC network.

This year we launched FTTC – our new access technology.

We are now the first country to roll out this technology at scale and we expect to have the largest FTTC footprint in the world with some 1.4 million homes and businesses expected to be connected to FTTC in the final footprint.

Since March this year, we have made more than one-hundred-and-sixty-thousand FTTC premises ready to connect.

Launching the FTTC network is something of a book-end for me after my work at Telstra where I scaled up the Greenfields program. I would say the scaling of this technology is one of our biggest challenges in these next two years.

FTTC is basically about taking fibre much deeper into the network.

If you think about it, the average copper length on ADSL is 2.5 kilometres. With our FTTN network we have reduced that down to around 500 metres.

But with FTTC we are taking fibre even closer – to within around 30 metres of most premises.

This means we are not only running fibre a lot deeper but we are running it down residential streets. There, we often have to remediate pits and install new conduits and that adds time and complexity to the build.

We are working with our Delivery Partners to make sure we are rapidly adjusting our design and construction processes to support the scaling of the FTTC network.

We have a great record in accelerating the deployment of all of our technologies by working closely with our Delivery Partners and equipment suppliers. We are well on the way to achieving this with FTTC as well.

Importantly, we are very proud of the work we have done on FTTC in helping achieve very high levels of customer satisfaction from early connected homes and businesses.

One of the reasons that end-users like connecting to the FTTC network is that we are delivering a light -touch connection experience. Most customers can select a self-install option. Once they receive the equipment and instructions via post, they can activate their own service themselves.

This is really only possible because we are pre-connecting most premises during construction. We are integrating the existing copper lead in to the FTTC distribution point to support this easy-connection experience.

Pre-connecting each distribution unit to the existing copper lead-in is time-consuming, and we need to take great care to make sure we get it right. But the reward of allowing the easiest possible connection to the network makes it worth the extra effort.

So, although we are ramping up the speed of the FTTC build, we don't want to do so at the expense of end user experience. We will continue to work with our retail service providers and construction delivery partners to get that right balance.

As we enter the final years of the rollout, we are also managing workforce resourcing.

Workforce contention is very different to what we have previously experienced with the network build.

In the early days of the FTTP rollout there were not enough experienced fibre technicians; with the FTTN rollout there was a shortage of skilled copper resources. With the deployment at scale of FTTC we are seeing civil resource contention in certain states.

In both Victoria and NSW where a large portion of our final footprint is under construction, the industry contention for civil resources is at some of the highest levels I've ever seen in my career.

This is mainly a function of there being a vast number of infrastructure projects in construction which is giving civil resourcing sub-contractors multiple opportunities.

As an example, when we are trying to attract civil resources we may be able to give a contractor two weeks' worth of drilling. That location would most likely be in an urbanised area with high traffic and parking constraints.

Contrast this with that same team being offered a three-month contract on a major road construction project without the same level of traffic and safety considerations.

This is an example of a constraint we are managing closely as we move into the final years of the rollout to ensure we maintain the workforce we need.

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Telecommunications in our country has changed so much in a short amount of time.

Charles Todd knew what a telegraph line could do for a country like Australia. But I wonder if he could have truly predicted its evolution and the impact that it would have on our country today.

Like the opening video we saw, the **nbn**[™] network is having such a significant influence in connected areas.

We commissioned and released a study from AlphaBeta – an economics firm that helped us understand the real world impact the network is having on Australians. Their experts were able to compare areas with and without **nbn** access.

The results were really quite stunning.

It showed that the **nbn**[™] network is helping to change the way people access educational opportunities online, health services, and how they stay entertained through online streaming.

We know it has helped change how people stay connected to family and friends.

And it is helping to drive business growth. In **nbn**-regions, the number of businesses is growing at twice the rate of the national average. If this rate of growth continues from now, by the end of the rollout there could be up to almost 80,000 additional new businesses as a result of the **nbn**[™] network.

We can now see that it is encouraging self-employment, helping people become their own bosses in greater numbers. In 2017, up to 6,400 additional people were self-employed in **nbn**-areas and that could increase up to 92,000 by 2021.

And in a significant win for those with poor access to connectivity, the AlphaBeta economists predicted that, when complete, the **nbn** rollout will help move Australia into the top 10 OECD countries for internet equity. This is a huge shift from being in the bottom 10 in 2012.

Two short years from completion, the **nbn**[™] network we're building is delivering on its original policy aims.

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Very close to my heart though, is the impact the **nbn**[™] network is having on women and their participation in the economy.

Interestingly, these results showed that the rate of growth in female self-employment was 20 times higher in **nbn** regions than non-**nbn** regions.

If this trend continues, up to 52,000 additional Australian women will be self-employed by the end of the rollout due to the impact of the **nbn**.

To me, that is such an incredible impact.

In telecommunications, I think one of the most powerful things that will drive us and our industry forward is diversity.

By that, I mean diversity of thought and perspectives.

I'm told that I'm the first Australian female leader in our industry to deliver this high-profile memorial address. I can't help but pause and reflect on that.

In 2005 at Telstra, I had just taken on a leadership role to support the deployment of fibre into Greenfields estates.

I was initially told by people around me at the time that a woman would never be appointed to that type of leadership role.

This was a defining moment for me.

I don't think people were being unkind, just matter of fact. And, unfortunately, the facts still speak too far in that direction.

Thankfully, I ignored what was being said and I persisted and I am so thankful for the opportunities that have arisen and the achievements that I have made.

Data from the Workplace Gender Equality Agency shows that just over 30 per cent of employees in telecommunications in Australia today are women.

As we climb through the ranks of these organisations, this reduces even further.

In middle management, around 25 per cent are women. At the level of key management personnel we see that at just over 18 per cent. And by the time we look at CEOs and heads of business, it's as low as just 4.8 per cent.

I think back to that time in my career and I know other women may have had similar experiences.

I don't want to walk into a room and view myself differently because I'm a female leader. As I mentioned earlier, I grew up with three brothers and as an only daughter, there was never a moment in my upbringing I didn't feel I belonged or I was not equal in a male-dominated group of people.

What I'm interested in, for our industry, is the opportunity for innovation that diversity brings.

We touch the entire Australian population. We devise products and services for diverse groups and communities of people and, naturally, to do this well our employees need to reflect the communities that we serve.

Without it, we can't solve the complex problems and develop solutions appropriate to everyone.

What I've learned is, having a range of views from people with diverse experience can produce more creative results – this is often more powerful than a room full of technical experts. That includes gender diversity, cultural diversity, age, and different identities.

At **nbn**, we're still very much on our journey.

At June 30, 32 per cent of our employees were women with 30 per cent representation in senior management.

I look out in the room and I see some of them here today.

By 2020, we want that representation in our senior management ranks to be 33 per cent and by 2022 we are aiming for 40 per cent. Bold targets, but we're on our way to achieving them.

We are hiring more women. We are working with industry groups such as Engineers Australia and specialist recruiters to highlight the job opportunities that exist for women at **nbn**.

We are creating opportunities within the company for women to move into more senior roles.

We are providing development opportunities for our female talent through targeted programs.

We are mentoring.

And we are working with our leaders to create the most inclusive culture we can in order to leverage the value of the diversity we have in the organisation.

There's more work to do and we're learning every day.

Outside the walls of corporate Australia, there's a huge amount of work to do to address the lack of female representation in STEM – our pipeline for future talent.

Earlier this year I was the executive sponsor of our STEM-Plus X initiative that we launched in schools across the country with the aim of getting students motivated and interested in the sciences, technology, engineering and mathematics.

The program requires students to come up with innovative ideas to solve a range of challenges. And we saw some amazing ideas.

We saw disaster relief applications; applications to manage emotions in the school environment; fundraising for equipment for underprivileged peers; and plastic reduction initiatives on-campus.

There's a real energy and excitement when you're young. The talent is there to be developed. No boundaries have been created in their thinking. They need to be inspired, to see role models. To see the possibilities.

My invitation is for our industry to collectively shift the dial on these percentages of representation.

Charles Todd led a team of men to deliver one of the foundational elements of telecommunications infrastructure in our country.

It humbles me that – 140 years later - I'm a woman leading and overseeing network deployment of a project that's also ambitious within its own context.

And my hope is that for every group of men in line to deliver the next piece of critical infrastructure for our industry, there are the same amount of women and diverse groups of people standing there ready and invited to do the same.

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There is an exciting two years of 'muddy boots' work for my team and I still to do.

We are on track to complete the build by June 2020.

We will continue to deliver at pace, of high quality and safely.

We will continue to navigate the engineering and stakeholder challenges as we complete construction on the last four million homes and businesses.

And, we will apply the same energy and drive to the **nbn™** network after that last home is connected to help drive the clear social and economic benefits for Australians.

Thank you.