



QUEENSLAND
FUTURES INSTITUTE



BETTER IDEAS

QUEENSLAND'S
ENERGY TRANSITION

Better Ideas

Queensland's Energy Transition

Wednesday 14 June 2023

7:30am – 9:00am

Customs House,
399 Queen St, Brisbane

PANELISTS:



KHOA DAO
Chief Executive Officer
Australia Pacific LNG



**PROFESSOR
ANDREW GARNETT**
Director
Centre for Natural Gas
The University of Queensland



TOM METCALFE
Chief Executive Officer
Cleanco Queensland



STEPHANIE MOROZ
Innovation Manager
EDL



**MODERATOR
CARA GRAHAM**
Partner
Energy, Strategy, and Transactions
EY

QFI thanks its Sponsor



Snapshot

The key theme from the 2023 Queensland Futures Institute's Queensland's Energy Transition forum was the continued need to attract private investment to drive the energy transition. Given several challenges, including supply chain risks and economic headwinds, it will be important for government-owned corporations, such as CleanCo, and incumbent gas industry players to focus on balancing the need for energy affordability and security, alongside the decarbonisation imperative. The discussion also highlighted the critical need to provide certainty in any future government interventions.

Audience Comments on Ideas Discussed

- Although there are a number of challenges in meeting the pace and scale of the energy transition, Queensland is well positioned to manage the risks and provide certainty needed over this process.
- We can leverage our strength in mining and existing expertise in infrastructure to support the development of renewables. It will also be important to diversify our supply chains, which includes considering our skilled workforce, to manage risks over the transition.
- There will be a role for the Queensland Government to provide certainty and unlock the private investment needed to meet its renewable energy targets. However, the decarbonisation objectives must be considered alongside energy security and affordability, particularly in the face of economic headwinds and increasing energy poverty.

Comments from Panel



Khoa Dao

- Australia Pacific LNG is a joint venture company consisting of shareholders - Origin Energy, ConocoPhillips and Sinopec. The joint venture has invested over \$30 billion to develop the coal seam gas business in Queensland, making it the largest producer of coal seam gas in Australia. We supply gas to our liquefaction plant on Curtis Island to produce LNG, which is sold under long-term contracts to our customers in Asia. We also use this fuel to generate electricity, displacing more carbon intensive fuels such as coal and oil.
- The majority of the gas is supplied into the domestic East Coast gas market, covering roughly 25% of the East Coast demand. Additionally, we supply to generators, industrial customers, commercial customers and large retailers who then sell that gas to households.
- There are opportunities for Queensland and Australia in delivering on the vision to become a renewable energy superpower. For Queensland's energy transition, successfully delivering this vision will support businesses to decarbonise, reducing the emissions our economy and attracting new investments. This will support the growth of our economy and create jobs across Queensland.
- We also face a number of complex challenges in the transition. The first is around attracting the required capital investment. Estimates from the Queensland Government show that we will require \$60 billion to reach 80% renewable penetration by 2035. This spans generation, storage and firming capacity. However, with the current economic conditions we are seeing, including the tightness of the labour market, high inflation and interest rates, we are likely to face continued pressure on the price of reaching the vision.
- This highlights the challenge around meeting the path and the pace of the energy transition required. We will require investment in firming capacity, transmission and grid development before we retire existing carbon intensive coal fire power plants, so attracting and planning for this transition is critical.
- Natural gas and APLNG will have an ongoing role to deliver gas resources required throughout the transition, including in servicing industries that are hard to decarbonise through renewable energy.



Tom Metcalfe

- CleanCo was established in 2018 and is a government-owned energy corporation, owning both generation and retail assets. We inherited assets from Stanwell and CS Energy, including Wivenhoe Dam - the only pumped hydro facility in the state, which is 570MW and Swanbank E - a combined cycle gas facility, that is one of the cleanest in Australia. The portfolio also includes Barron Gorge and Kareeya run-of-river hydro power stations in far north Queensland, which are now considered firming or foundational assets as they are very flexible forms of generation.
- Since being established, CleanCo has signed long-term offtake agreements with some of the largest renewable projects in the state – including Western Downs, a 400MW solar facility, and three wind farms - MacIntyre, Dulacca, and Kaban. Combined, CleanCo owns about 1GW of firming and 1GW of variable energy assets. This allows us to offer firm, renewable energy contracts to large customers like BHP, Wesfarmers and Bunnings.

Comments from Panel

- Despite the scale of this portfolio, it only serves 3-4% of the retail-connected load in the state. CleanCo must keep growing to continue to be able to offer competitive products and aims to service 20% of the retail-connected load in Queensland by 2030. This will include 5GW of variable energy and 5GW of firming.
- While we need to facilitate new development in Queensland, we are competing with New South Wales and Victoria, as well as the rest of the world. Right now, China has the largest installed capacity of renewable generation worldwide - three times larger than the second largest - the US, which has been recently supported by half a trillion dollars being spent on the renewable transition under the Inflation Reduction Act.
- This highlights the clear need to consider how Queensland can stay competitive, attracting the capital, resources, and equipment needed to support development in the state. Although we have high-quality renewable resources, we need strong policies and frameworks to support the transition, such as in electricity transmission access reform and in environmental and bio-regional planning.
- The Queensland Government has announced \$500 million in the budget to support projects, which has been largely funded through the coal and gas royalties. This is a great example of government support which must be continued if we are to further drive the transition in coming years.



Stephanie Moroz

- EDL is a leading global producer of sustainable distributed energy, headquartered in Brisbane. We own and operate 90 power stations and gas processing facilities across three continents, and own 1GW of generation capacity. We are quite a diverse business and sell 10 different products into 16 different markets. This supports the abatement of 4 million tonnes of CO2 per year, largely by processing waste methane gas. For comparison, Queensland's net CO2 emissions were 139 million tonnes in 2021. We have been decarbonising for three decades and are well placed to help Queensland on its journey towards net zero.
- There is a significant opportunity to continue supporting Queensland's decarbonisation. Today, 33% of the state's emissions are produced from electricity generation. This means that moving from the 22% of renewables in the grid today, to the targets that have been set for 50% in 2030, and 80% in 2035, will make a huge contribution to reducing Queensland's emissions.
- This will require enormous investment, which EDL understands well. We traditionally owned fossil fuel power stations in remote off-grid communities and mine sites but have been moving towards renewables. In 2017, we supported Coober Pedy in achieving over 70% renewables across the course of the year. Since then, we have been supporting larger sites achieve 80-90% renewables. These systems are being delivered at a lower cost for electricity customers, with higher reliability than fossil fuel generated systems.
- Additionally, stationary industrial energy and transports constitutes 18% and 15% of Queensland's emissions respectively. Electrification in these areas is another key opportunity. Where these processes are difficult to electrify, there is also real opportunity for renewable fuels, such as biomethane - a renewable source of methane produced when organic matter decomposes and can be captured.
- EDL now owns and operates five biomethane plants in the United States, capturing methane from landfill gas, purifying it, and injecting it into the pipeline as a substitute for natural gas. This is a huge untapped opportunity in Queensland where we could be decarbonising the gas system today.

Comments from Panel

- The key to overcoming the challenges and taking advantage of the opportunities we face is creating a supportive regulatory environment. This is the reason behind EDL's biomethane work in the United States. Overcoming global supply chain challenges is also critical – as other global economies are competing with us as they transition to the same technologies, creating bottlenecks in attracting a skilled workforce for example.
- Regulatory and policy reform will also facilitate the required grid development and transmission buildout needed to build the renewables and deliver clean, affordable energy to customers.



Professor Andrew Garnett

- The Centre for Natural Gas at the University of Queensland is a very broad coalition dealing with matters around the energy transition. We are currently experiencing a tale of two transitions. Firstly, there is the type of transition we are seeing play out in Queensland and across the OECD countries. Then secondly, there is the real transition in the many other areas of the world – including India, China and Africa - which represents the significant area for decarbonisation. Queensland currently consumes about 25% - 1,450PJ of Australia's energy, 92% of which is fossil fuels - 36% from oil, 35% from coal, 21% from gas - and only 8% from renewables.
- However, the transition is currently largely focused on electricity. If our goal is decarbonisation more broadly, we must think broader than just electricity – and not focus on the number of solar panels or batteries we have.
- There are a number of other considerations that must be made when thinking about energy more broadly. For example, when Ukraine was invaded by Russia we saw an immediate fear for energy supplies – manifesting through increased petrol prices when only 2-5% of global oil supply was under threat. This impacted the lower socioeconomic demographics hardest. On a global scale, rich countries soon outbid the poor countries for gas, and over that period of restricted gas supply we saw an increase in emissions as poorer countries reverted to coal for power generation. Over a hundred million people fell into energy poverty. This meant that 75 million people went from using LPG for cooking to wood, charcoal, and dung. Additionally, 300 million people went into food poverty, as urea and fertiliser shortages occurred and energy inputs to agriculture also increased (and less fertiliser use in 2022 can be expected to have knock on effects on productivity in 2023 onwards).
- The lesson from the above impacts of the Ukraine crisis highlights the need to ensure affordability, reliability and security alongside decarbonisation. Risk management around supply is critical as without this, we may see an increase in energy poverty in Queensland due to another price spike and a loss of 'social licence to decarbonise'.

Panel Questions

How can we engage and involve local communities in the energy transition process and ensure their active participation?



Tom Metcalfe

- The concerns being faced by regional communities are real and valid – so it is critical to understand and address them. This requires meaningful and effective engagement with impacted communities, as well as communication around the broader environmental and development plans of projects. The industry must do its best to consider cumulative impacts, rather than those of individual projects.
- We must also further consider other, indirect impacts such as those around road infrastructure, water, fire risk and land impacts, and form a comprehensive plan as an industry to address and communicate these issues.
- CleanCo has recently co-designed a project, working with the Ripley Valley community to reimagine a master plan for Swanbank – which was the first regional coal hub to undergo transition. Our community engagement has involved bringing together 30 individuals to assess the community and First Nations People’s needs, which will inform a redevelopment of the Swanbank power station precinct. This level of engagement is needed in order to understand whether jobs, biodiversity protection or other benefits are most important to local communities.

Are there some examples of innovative technologies or projects you’ve seen that can play a role in supporting the energy transition?



Stephanie Moroz

- Innovation is about finding solutions to complex problems. EDL’s biomethane work is a great example of this. By the end of 2023, we will be producing 7PJ of biomethane into the pipelines in the United States. However, this innovative decarbonisation achievement is not being delivered in Australia. Given there are several sources for biomethane, including landfill, wastewater treatment plants or agricultural waste, there is a lot of opportunity for production, which supports the decarbonisation of the gas system.
- There is a current focus on hydrogen to decarbonise the gas system, however, while this will play an important role, we must ensure there are numerous innovations to achieve this. Biomethane is one such example, and it is technologically possible today and less expensive than hydrogen and doesn’t require the energy and water that hydrogen electrolysis needs. It is also closer to what is currently in the gas system, meaning no need for infrastructure upgrades which hydrogen needs.
- Given this is available today, the next innovation on this will be synthetic biomethane, which additionally uses CO₂ and green hydrogen to produce synthetic biomethane through methanation, which can then be injected into the gas system to be burnt again without needing to upgrade existing infrastructure.
- These areas exemplify the innovations which can be supported in order to drive decarbonisation.

Panel Questions

What lessons can we learn from successful energy transition experiences in other countries or regions?



Khoa Dao

- The Scandinavian countries, which have relatively small populations, are blessed with a lot of hydro and geothermal energy. Some other countries in Europe have also been very successful through the energy transition. In the United States, the transition is market-led, which informs on the technology mix used through the energy transition. While it's important to understand these precedents, the Australian solution to decarbonisation will be unique.
- We must equally prioritise sustainability, alongside affordability and security. As we've heard, even though renewables deliver cheap electricity, they require significant capital expenditures, as well as investment in transmission and storage capacity which is also required. We must consider the system cost of renewable energy.
- We are also starting to see energy security as national security, which has been recently exemplified in Europe. There will be an increased geopolitical lens around Australia net export of energy. We have seen this play out in the gas and coal exports being impacted through market reforms, highlighting the interaction between policy which was targeted at security and affordability, and the relationships with our trade partners. It is critical to manage this risk going forward. This may extend to considering our reliance on any one fuel type, or potential single points of failure in the system. For example, there is a risk in the supply chains for wind turbines or solar panels.
- It is critical that any further policy reforms equally consider sustainability, affordability and security.

Queensland is not immune from global trends around the energy transition. Can you provide some observations on what you think are some Queensland-specific opportunities and challenges we will face through the energy transition?



Professor Andrew Garnett

- A critical opportunity for Queensland is our high- quality resources. Between now and 2040, we need to mine more copper than in the history of mankind, as much aluminum as we have done in the last 150 years, up to 40 times more cobalt than current annual production, and a similar increase in lithium production. This requires investment and mining.
- We must also diversify our minerals supply chain. Currently, 80% of solar panels are manufactured in two provinces in China because labour is cheap and energy inputs, which are mostly generated from coal, are also cheap. So, increasing the production of solar panels and windmills drives emissions.
- Additionally, we have an opportunity in the gas industry. The first International Energy Agency Net Zero report highlighted gas demand declining by around about 5% per annum. But without investment this would be 10% per annum. Their scenario results in Eurasia and OPEC (including jurisdictions with the highest fugitive emissions) dominating global gas supply by 2040, at a level greater than during the 1970s oil crisis.

Panel Questions

- This highlights the geopolitical risk we will face as the global industry shifts. There is opportunity for Queensland as a secure and low emissions gas producer to continue to produce gas as demand falls, and remain as a supplier of choice, which will drive our emissions down.
- Mining is a key opportunity for Queensland, but this will come with the dilemma of driving our emissions up to drive global emissions down.

What do you think will be the biggest game changer for energy in Queensland in the next 5 years?



Khoa Dao

- Over the next five years, the Queensland Government can unlock significant private investment in the renewables sector and transmission. However, it should not be the Government's responsibility to fund this transition – the Government must work with industry to create a supportive policy and regulatory framework, giving investors the certainty needed to underpin their investment in Queensland.
- Queensland is home to many incumbent companies with experience in mining, coal and gas, which have great expertise in developing infrastructure projects. The Government must create that right environment to support reinvestment in Queensland and leverage our experience in managing the risks throughout the delivery of the projects that will be required throughout the transition.



Tom Metcalfe

- It is fortunate that the Queensland Government own the majority of the energy assets in the State, making it more manageable for the Government to support the transition by ensuring the correct policy and regulatory frameworks are in place. The Queensland Government recently published draft legislation which outlines many of these settings which is expected to result in supportive policy to unlock the required investment.



Stephanie Moroz

- All of the technological solutions we need to deliver in the next five years already exist. We must therefore ensure the required systems are in place to overcome near-term challenges and drive the transition. This will see the delivery of transmission, grid development, grid connections, under a supportive regulatory environment. Additionally, these settings to further drive decarbonisation, such as fuel standards in transport, may support biomethane and other low carbon options.



Prof. Andrew Garnett

- Given the slow and sticky investments cycles, five years is very near-term. Unfortunately, the global and local economic headwinds and recessionary pressures we are currently seeing may continue. This may see continued increases in energy poverty and put a significant dampener on the transition. In order for this not to happen, supportive policies need to be in place to ensure energy affordability. A bipartisan policy approach will be necessary for us to continue to decarbonise.

Audience Questions

What sort of regulatory changes do we need at this moment to make it happen for banks and financial institutions and private sector to invest in renewable energy?



Khoa Dao

- Certainty is the key factor to any measure to support investment. This allows investors and operators to understand and manage deliver of projects. For example, the Commonwealth Government introduced an emergency \$12 price cap in December, which was followed by changes to the Australian domestic gas security mechanism – which restricts LNG exports in the event of a domestic shortage – and is now working to introduce a mandatory code of conduct which dictates behaviour between buyers and sellers of gas, and includes a pricing provision. This has created a high level of uncertainty and restricted investment and making it difficult for investors to commit to multi-year capital programs.
- We need to work through these programs with government to give investors the certainty needed to continue to invest – which is required for existing assets.



Tom Metcalfe

- The renewables industry is benefiting from a large amount of capital looking for quality projects. We are seeing funds looking for pipelines of projects – rather than single projects. Additionally, we are seeing investment in projects earlier than at the traditional financial close or after construction risk, during operation.
- Certainty underpins this investment, and this can be delivered through quality offtakes. For example, all of CleanCo's long-term offtakes are with private investors. The Queensland Government is seeking continued state ownership of around 50% of generation assets. This leaves a lot of room for private ownership.

Do we need our own version of the IRA or another mechanism to drive that private investment, such as tax credits?



Stephanie Moroz

- Under the right circumstances, the IRA will be very beneficial for the United States and support the economic viability of projects. However, we must not just copy what other countries have done; Queensland must consider our own environment, location, and economic situation.
- Certainty will be the key factor of any support mechanisms we introduce. This can be provided through long-term offtake or PPA contracts with customers, which would provide long-term certainty.



Prof Andrew Garnett

- We need a similar mechanism to the IRA which must be carefully tailored, not cherry-picked. The IRA together delivers a vast selection of measures which together form a number of optimal mixes. There is a risk that when cherry-picking the most politically attractive options from these measures, this may result in sub-optimal outcomes.

Audience Questions

The Queensland Budget announced yesterday outlined \$14 billion being spent on Pumped Hydro, and \$80 million on supporting Kogan Creek gas facilities. Are we getting the balance right between firming and peaking capacity?



Tom Metcalfe

- The Queensland Energy and Jobs Plan included a role for around 3GW of new gas generation. This likely comprises hydrogen-ready gas turbines. The Kogan Creek project highlights the type of transitional project which will be necessary as we reach high penetrations of renewables. Dispatchable generation will play an important role into the 2030s at which point we may require less of the transitional peaking capacity provided by gas.
- As the owner and operator of Wivenhoe, it is clear that the role of pumped hydro is now as critical as it has ever been. We are currently operating almost constantly, underscoring the importance of long duration storage as more renewables are developed.



Professor Andrew Garnett

- The Queensland Energy and Jobs Plan projects significant buildout of pumped hydro under a very tight timeline, which assumes perfect foresight. This indicates the need for risk management in the case that these projects cannot be delivered to this timeline.



Khoa Dao

- If the transition is not planned well, or projects face delays, we will require more gas during peak periods – this is not unique to Queensland. Gas will therefore play a continued critical role to provide the required security and resilience when demand is high. We need to invest sufficiently to ensure adequate gas capacity and meet the peaking capacity that will be required.
- As we transition, there will be a role for this capacity, which will increasingly be sitting unused as renewables enter the system. That is, modelling shows that we may need a full 600-1,000MW or 600TJ/day capacity just in case. This is not feasible under the current design of the system, so there is a clear need to re-think this. This could involve more gas storage, which may not be economically feasible.

CORPORATE PARTNERS



MEMBERS



MEDIA PARTNER





QUEENSLAND FUTURES INSTITUTE

FOR FURTHER INFORMATION

Steve Greenwood | Chief Executive Officer
steve.greenwood@futuresinstitute.com.au

www.futuresinstitute.com.au
Level 11, 111 Eagle Street Brisbane QLD 4000