

TRANSPORT AND RESOURCES COMMITTEE

Members present:

Mr SR King MP—Chair Mr CE Boyce MP Mr JR Martin MP Mr LL Millar MP Mr LA Walker MP Mr TJ Watts MP

Staff present:

Ms D Jeffrey—Committee Secretary Mr Z Dadic—Assistant Committee Secretary

PUBLIC BRIEFING—CONSIDERATION OF AUDITOR-GENERAL'S REPORT 5: 2021-22, MANAGING QUEENSLAND'S TRANSITION TO RENEWABLE ENERGY

TRANSCRIPT OF PROCEEDINGS

MONDAY, 14 MARCH 2022 Brisbane

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The committee met at 10.02 am

CHAIR: Good morning. I declare open this public briefing for the committee's consideration of Auditor-General's Report No. 5 2021-22, *Managing Queensland's transition to renewable energy*. My name is Shane King, member for Kurwongbah and chair of the committee. I would like to respectfully acknowledge the traditional custodians of the land on which we meet today and pay our respects to elders past and present. We are very fortunate to live in a country with two of the oldest continuing cultures in Aboriginal and Torres Strait Islander people whose lands, winds and waters we all share. With me here today are Lachlan Millar MP, the member for Gregory, who is our deputy chair; Colin Boyce MP, the member for Callide; Les Walker MP, the member for Mundingburra; James Martin MP, the member for Toowoomba North.

This briefing is a proceeding of the Queensland parliament and is subject to the parliament's standing rules and orders. Only the committee and invited witnesses may participate in the proceedings. Witnesses are not required to give evidence under oath or affirmation, but I remind witnesses that intentionally misleading the committee is a serious offence. You have previously been provided with a copy of instructions to witnesses so we will take those as being read.

I remind members of the public they may be excluded from the briefing at the discretion of the committee. I remind committee members that departmental officers are here to provide factual or technical information. Any questions seeking an opinion about policy should be directed to the minister or left to debate on the floor of the House.

These proceedings are being recorded and broadcast live on the parliament's website. Media may be present and are subject to the committee's media rules and chair's direction at all times. You may be filmed or photographed during the proceedings and images may also appear on the parliament's website or social media pages. I ask everyone present to please turn your mobile phones off or to silent mode.

MARTYN, Mr Paul, Director-General, Department of Energy and Public Works

SHANKEY, Mr David, Deputy Director-General, Energy, Department of Energy and Public Works

CHAIR: We now welcome our representatives from the Department of Energy and Public Works who have been invited to brief the committee on the Auditor-General's report. I invite to you make a short opening statement after which I am sure we will have some questions for you.

Mr Martyn: Thank you for your time today. I too will begin by acknowledging the traditional owners of the land on which we meet and their elders past, present and emerging. In your invitation, Chair, you noted the committee would like to discuss the outcomes of the Auditor-General's Report No. 5 of 2021-22, *Managing Queensland's transition to renewable energy*. The Department of Energy and Public Works has received this report and considered its recommendations at length. I provided a response to the Auditor-General and can share some of that information with you now.

The energy division of the department is responsible for policy advice on energy matters to government, regulatory oversight of the electricity industry, advice to shareholding ministers in relation to government owned corporations in the sector and administration of legislation for the sector. The division also represents the Queensland government in a range of national energy policy-making forums. The department provides policy advice in a range of matters, but of course, as the chair indicated, matters of government policy are for the minister.

If I could, I will start today by putting some context around the report that you are to consider. I have two documents that, if I may, Chair, I will distribute to the members of the committee because I think they might help in providing that context. Is that permissible?

CHAIR: When we get a copy we will seek leave to table those documents.

Mr Martyn: What is clear is that the importance of energy transformation is perhaps one of the most pressing policy issues facing not only Queensland but Australia and, indeed, countries around the world. The pace of change is ever increasing and the combination of technology, market forces Brisbane -1 - 14 Mar 2022

Public Briefing—Consideration of Auditor-General's report 5: 2021-22, Managing Queensland's transition to renewable energy

and policy imperatives has created significant opportunities and challenges for Queensland. This is a new area that countries across the world are grappling with. Government, industry and consumers are all having to adapt to this environment. There is no precedent and innovation is required, as well as new approaches. This includes continuous improvements and continuous calibration of data and advice.

In 2017 the Queensland government committed to achieving the Queensland Renewable Energy Target, or QRET, of 50 per cent renewables by 2030. The QRET was adopted following advice from an independent expert panel. At all stages the department seeks to access expert advice and the best data that is available. The QAO report is useful in a number of respects. It certainly highlights the challenges and the opportunities that Queensland faces, it acknowledges the work of the department in managing that uncertainty, and it is also provides additional advice on how best to present information on the rapid evolution of renewable energy.

In terms of the specific recommendations of the QAO report, I want to talk to you about the department's response to those issues. The development of the government's proposed energy plan is progressing and will address recommendation 1 of the Auditor-General's report. In developing the energy plan, consideration will also be given to appropriate review points for progress towards 2030. thereby addressing recommendation 2 of the report. The department now publishes details of the QRET methodology on its website, addressing recommendation 3 of the report.

I have provided to members a copy of our webpage, printed out this morning, that shows you the information that we provide on the site. You have there a month-by-month calculation of renewable energy, you have full details in terms of the formula that is used and the assumptions that are used and, as I say, that is updated. What I would also say is that those figures will be reflected in the department's service delivery statement.

We have taken on board the suggestions for improvements to methodology and treatment of data by the QAO for the calculation of QRET outlined in recommendations 4 and 5. This is a matter on which reasonable people may take different approaches due to the sheer complexity of the task. I have also provided the committee with a map-you have a small map, I have a large one. This map shows the sheer number of renewable projects across Queensland-wind, solar, bio-energy; right across the state and, may I say, particularly in regional Queensland. Calculating the amount of renewable energy that comes from all of these projects, as well as rooftops-many people have solar rooftops et cetera-is a complex task. It is something the department puts considerable energy into. This map illustrates the sheer growth of renewable energy right across the state and the importance of managing the entry of this new fuel source as effectively as we can. I am happy to return to that.

Regardless of the methodology used, Queensland has made remarkable progress towards QRET in the last 12 months, and was at 20.4 per cent as at 31 December 2021 using the QAO's preferred methodology. What is critical is that that is up from seven per cent in 2015-almost a threefold growth in renewable energy. This is a significant achievement in a very few short years. The Queensland energy plan will seek to build upon renewables investment to date and ensure that critical enabling infrastructure is in place to support further transformation and decarbonisation of the energy system.

In further support for QRET, the Department of Energy and Public Works is establishing a new hydrogen division from existing resources that will focus on hydrogen as a clean, flexible pathway for all countries to increase their renewable energy use as they head towards zero net emissions by 2050. Queensland is well placed, in our view, for renewable hydrogen production, with significant renewable energy resources, including available land and ports, ideally located to support potential hydrogen exports. We look forward to this morning's hearing and answering any questions that you might have.

CHAIR: Thank you very much. Member for Callide?

Mr BOYCE: Given the pace of change you have alluded to, what guarantees are there that a 50 per cent renewable energy target will achieve grid reliability and frequency, given that some of the coal-fired fleet will be retired at some point in the future?

Mr Martyn: As you say, the market is moving towards renewable energy sources and storage and certainly that is where investment is going. Coal-fired power stations currently play an important part in Queensland's energy mix to ensure reliable and secure power to Queenslanders around the clock. These stations employ a highly skilled workforce of 860 people in publicly owned power stations and provide jobs for Queenslanders. Brisbane

Public Briefing—Consideration of Auditor-General's report 5: 2021-22, Managing Queensland's transition to renewable energy

As the market moves towards renewable energy, coal-fired power stations will face operational and financial challenges as renewables become cheaper. The Queensland government, however, has made no decisions on this matter. The minister obviously has made a number of remarks. In terms of the particular issues around how we ensure the stability of the system, I might ask Mr Shankey, who has given this matter considerable thought, to say a few words.

Mr Shankey: I think it is a great question because phrases like 'frequency', 'inertia' and 'reliability of the system' were not really part of the renewable energy conversation back in 2015. It is something that has emerged over the past seven years and something that, as the DG mentioned, we are giving a great deal of thought to.

What we do know is that solar and wind, for example, are able to supply energy and do not supply different parts of services that the energy system needs-things like frequency and matters that you referred to before. The impact of that is that we need to have a certain amount of spinning turbines in our energy system. We have put a great deal of thought into exactly how much we need as part of our future energy system. Our energy system currently has about 7,900 megawatts of coal and another 3,000 megawatts of gas, so it has a large amount of these spinning reserves. We have looked at what sort of spinning services we might need in total to support a full renewable energy system and it is probably around, if we could make a comparison, 3,000 megawatts worth of that.

I think what we are seeing now as the system evolves is that there are different services that can be provided by different technologies. That is why we are starting to see the deployment, mostly in other states, of synchronous condensers that are able to supply those system services without being necessarily connected to a coal turbine or a gas turbine; they could run off the rest of the system. It is something that we have put a great deal of work into and we are going to continue to do that as more and more renewable energy is deployed, but we are very confident that at 50 per cent we can safely run the system.

CHAIR: I seek leave for this document to be tabled. Leave is granted.

Mr WALKER: What is your department doing to support the hydrogen sector?

Mr Martyn: It is very timely that you raise that. Queensland has a long history as a proven and reliable energy producer and energy exporter. We have long-term trading partners across the globe that buy our coal and gas, and as the world looks to decarbonise it is looking towards hydrogen. In my previous role I was chief executive of Trade and Investment Queensland and I had extensive engagement with our large trading partners, particularly in Japan and Korea. The level of interest from those partners in our hydrogen is very strong. They are looking to how they can achieve their own energy targets, and they see Queensland as a vital partner. Our long history of trading relationships with them gives them confidence that we can deliver. The growth of the LNG industry also provides them with confidence that we can grow a new industry, deliver it and be a reliable commercial partner.

In terms of the government's approach, in November 2020 Minister de Brenni was appointed as Australia's first hydrogen minister. The Queensland government has invested over \$60 million across multiple initiatives, including the Hydrogen Industry Development Fund, to help stimulate the hydrogen industry and future hydrogen jobs in Queensland. In November 2021 Minister de Brenni appointed the Hydrogen Taskforce to provide strategic advice to government relating to the development of a renewable hydrogen industry in Queensland. The Taskforce is chaired by Professor Peta Ashworth from the University of Queensland. She and the Taskforce have done an excellent job in providing advice to the government.

In my own department, the hydrogen coordination unit was formed. It is responsible for coordinating the implementation of the Queensland government's Hydrogen Industry Development Strategy 2019-24, ensuring Queensland will be at the forefront of Australia's renewable energy production by 2030. The hydrogen coordination unit works across government to facilitate project development and undertake broader policy development in energy planning. The hydrogen coordination unit also collaborates with other jurisdictions and undertakes stakeholder engagement in relation to key issues for hydrogen industry development.

I am, of course, pleased to advise the committee of the appointment of Mr Chris Shaw, a very well-respected resource sector leader, as the deputy director-general of hydrogen. He started today, so with your leave I have not asked him to come to the meeting because I think, being only half an hour into the job, it might be a bit unfair. The appointment of this deputy director-general for hydrogen is a signal of the importance that government and our department place on hydrogen industry development. Brisbane

Members would be aware of the turning of the sod by Andrew Forrest at Fortescue Future Industries' hydrogen electrolyser facility in Gladstone about two weeks ago. That facility will begin to produce electrolysers at the beginning of next year. An electrolyser is essentially a machine that separates the H² and the O of water and makes hydrogen. That is actually a seminal moment in the development of the hydrogen industry in Queensland. It is not actually about the product itself; it is about the manufacturing that supports that product. That plant will be the largest in the Southern Hemisphere, and it is actually about how we start to turn this hydrogen opportunity into reality.

We also have Stanwell, a government owned electricity company, partnering with Iwatani, one of Japan's largest companies, on a major hydrogen project looking to export to Japan. Iwatani's partners in Japan represent some of the largest trading houses there. That project, along with a range of others-some in North Queensland around Townsville, some in southern Queensland, as the member for Toowoomba North will be aware-show that we can use hydrogen both for domestic use but also, critically, as an export industry for the state in the future.

Mr WATTS: My question relates a little bit to Col's first question in terms of the stability and longevity of renewables. One of the questions I am trying to understand going forward is the rehabilitation of sites and reprocessing of panels. I believe there may well be an opportunity to set up an industry around this, particularly on the non-government owned assets that are sometimes being subsidised and built out there. I am concerned that we do not end up, as some other countries have, with a bunch of toxic solar panels sitting in a field somewhere that nobody wants to take responsibility for clearing up. Where does the department sit in that discussion around reliability and clean-up and rehabilitation?

Mr Martyn: I might tackle the issue of rehabilitation and the re-use of solar panels and hand to Mr Shankey for reliability. The issue that you raise has come up repeatedly during consultation on the energy plan. As you have identified, it is actually an opportunity for the state to develop a new industry around resource recovery for solar panels. That is certainly something we are looking at as a key element of the energy plan not only to provide certainty to communities about what will happen to those panels at the end of life but also to see that we can use that resource recovery opportunity to support the broader manufacturing opportunities that come with the energy transformation. It is a very good question and it is something we are doing some policy work on at the moment. I might hand to Mr Shankey on the reliability question.

Mr Shankey: We have had extraordinary growth in the solar industry in Queensland, started off by rooftop solar. We now have around 3,200 megawatts of rooftop solar on homes all around the state. Around 70 per cent, I think, of detached homes probably now have a solar PV on their home, so it is huge penetration. That revolution, if you like, or that change is now moving into the commercial sector. I think you would be aware that there are lots of commercial properties around the place looking at rooftop solar. As well as that-and none of that is displayed on the map-is the deployment of solar farms or commercial farms right across the state.

As far as the reliability of the system is concerned, from the department's point of view we definitely want diversity in terms of renewable supply, so we do want wind to be a substantial part of the system. The next major deployments that we would like to see in the system are large wind projects, and that is what we are seeing in the Southern Downs region as well as up in the central region. Just a couple of weeks ago a new 800-megawatt facility was announced by Twiggy Forrest. I will put that in a little bit of context.

The existing windfarm that we had in 2015 was 20 megawatts. That was a large project back then. That was the Windy Hill project up in the Cairns region. Now we are seeing much bigger wind projects, which is what we want as part of the system. In Queensland, the profile of wind is that it sort of picks up in the late afternoon, which is not quite as soon as we would like it to. It sort of picks up around six o'clock and then into the evening. The ideal, of course, would be if it picked up around five o'clock as the sun went down. The challenge for us as we move to higher and higher levels of renewable energy is to bridge that gap, and we are looking at storage to do that.

As you will be aware, the government is investigating the Borumba pumped hydro storage project at Borumba near Imbil. It is also very keen on battery projects right across the state. We only have one battery project at the moment in commercial operation. It is about 100 megawatts. You are right to point out that solar has been the star, if you like, of the Queensland story for the past seven years. We would like to see that greatly move into wind now for the next period while at the same time seeing storage come along and be a big part of the market as well.

Mr WATTS: On the grid and distribution of that power, it is coming from this one source or a few big sources to multiple distributions everywhere. How is that impacting and how is the department managing that? Brisbane

Public Briefing—Consideration of Auditor-General's report 5: 2021-22, Managing Queensland's transition to renewable energy

Mr Shankey: Queensland is in a very fortunate position to have a lot of capacity in its grid. We have capacity in North Queensland, capacity in South-East Queensland and a certain amount of capacity in Central Queensland. We are trying to respond to what you are addressing, which is the issue of congestion: how can we move power around. That is probably a major reason we have embarked on the process of Queensland renewable energy zones to try and, if you like, target where that new development is going to occur. If you like, moving from a process or situation where renewable projects were deployed wherever a developer saw that it was the most advantageous to themselves to a system where we are trying to get developers or projects to happen where it is advantageous to the system; in other words, where we have room for them and where the system can handle them.

You will be aware that the first instance of that was trying to encourage it in North Queensland, and that was built around the Kaban Windfarm. There is capacity there. We also have a certain amount of capacity in the Southern Downs that we are trying to maximise. I think you are right to suggest that as the deployment decreases we need a more sophisticated way to encourage projects, and we are certainly trying to do that.

Mr MARTIN: You mentioned Borumba Dam. I know we have a significant investment in that design, but why pumped hydro and why not batteries?

Mr Martyn: It is a very good question. The work at Borumba is proceeding and obviously has to go through its normal approvals. I think there was a conversation while the Audit Office was here about the importance of pumped hydro, which we see for the long-term security of the system.

To pick up on your point, energy storage provides a number of services—and Mr Shankey alluded to the market-such as capacity and ancillary services that ensure supply, quality and reliability. Storage can also reduce those constraints in the network, defer network investment and help customers save money ultimately. At high levels of renewable generation, electricity will need to be stored over days, weeks or months. Mr Shankey used the example: as the sun is going down the wind may not have come up yet; how do you bridge that? That is an example of storage. Equally, if you have multiple days of cloud or a lack of wind, how do you build storage that bridges that?

The previous work done by CSIRO suggests the electricity system will need upwards of a full day's storage in order to meet reliability requirements on the system. Without large-scale, long-duration pumped hydro, potential pathways to net zero emissions appear prohibitively expensive, unworkable or rely on a step change in technology improvements that are not yet guaranteed. Long-duration pumped hydro is particularly important for long periods, as I said, of lower than expected renewable availability and seasonal smoothing of energy over weeks or, indeed, months. Characteristics of batteries—which goes to your question—and other short-duration storage make them better suited to other applications such as fast ramping, frequency control, ancillary services and behind-the-meter applications.

The Queensland government's strategy for developing long-duration pumped hydro does not exclude those other forms of storage or those other technologies. For example, through Energy Queensland we are investing in trials of network connected batteries in Hervey Bay, Bundaberg, Townsville, Yeppoon and Toowoomba. Ultimately, there is room and a role for both technologies in the Queensland energy market. Pumped hydro and batteries can provide similar services for the market. Batteries can provide power very quickly when required-indeed, within a subsecond time frame. Therefore, batteries have an advantage in the short term in balancing supply and demand and, in particular, in providing fast response services. Long-duration pumped hydro has a much greater storage potential than batteries and can supply larger amounts of electricity over a longer period of duration. As a result, they are better placed to ensure against periods that require sustained dispatchable generation. They are also better placed to shift energy from days, weeks or seasons with surplus renewable energy generation to periods with less renewable generation.

The capacity of even the biggest battery systems remains relatively small, typically up to four hours, which is perfect to cover that evening period between sun and wind. When you look at pumped hydro, as you say, you are looking at days or weeks or potentially months. For example, preliminary assessment suggests that pumped hydro at Borumba could generate 1.5 to two gigawatts for 24 hours continuously. Given Queensland's average daily use is 10 gigawatts, that is an enormous amount of power. Technically, battery systems can be scaled up to provide greater duration; however, this tends to be far more expensive than pumped hydro. As I say, we are looking at all options at the moment. We need to be conscious of the rapid change of technologies in the system and be open to that. We are also conscious, however, of the duration it takes to build pumped hydro, which can be eight to 10 years. That is something where we need to be prudent in terms of keeping those options open for the future stability of our power system. 14 Mar 2022 Brisbane - 5 -

Public Briefing—Consideration of Auditor-General's report 5: 2021-22, Managing Queensland's transition to renewable energy

Mr Shankey: In other states, for example, they have two interconnectors to either Victoria or New South Wales. Queensland only has the one interconnector, so we have to think carefully through the energy independence, if you like, required in Queensland because we are not going to have multiple states to drop off.

CHAIR: We have been beaten by time, but we can continue this line of questioning in the next session. That does conclude this briefing. Thank you for participating. A transcript of these proceedings will be available on the committee's webpage in due course. I declare this public briefing closed.

The committee adjourned at 10.31 am.