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TRANSCRIPT OF PROCEEDINGS

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INDEPENDENT PLANNING COMMISSION

MEETING WITH BYLONG VALLEY PROTECTION ALLIANCE

RE: BYLONG COAL PROJECT

PANEL: **GORDON KIRKBY**
WENDY LEWIN
STEVE O'CONNOR

ASSISTING PANEL: **DAVID WAY**
MATTHEW TODD-JONES

BYLONG VALLEY
PROTECTION ALLIANCE: **NADJA ZIMMERMAN**
JEREMY FARRELL
DOUG ANDERSON
TIM BUCKLEY
WARWICK PEARSE
ROD CAMPBELL
WILLIAM STEFFEN
GEORGINA WOODS

LOCATION: **IPC OFFICES**
201 ELIZABETH STREET
SYDNEY, NEW SOUTH WALES

DATE: **3.33 PM, MONDAY, 12 NOVEMBER 2018**

MR G. KIRKBY: Okay. We'll start. So good afternoon and welcome. Before we begin, I would like to acknowledge the traditional owners of the land on which we meet and pay my respect to their elders, past and present. Welcome to the meeting today, KEPCO Bylong Australia Proprietary Limited, the applicant, is proposing to
5 develop the Bylong Coal Project, an open cut and underground thermal coal mine near Mudgee in the Mid-Western Regional Council of New South Wales. My name is Gordon Kirkby. I'm the chair of this IPC panel. Joining me are Wendy Lewin and Steve O'Connor. The other attendees of the meeting are David Way and Matthew
10 Todd-Jones from the IPC secretariat and we have Nadia Zimmerman, Jeremy Farrell, Warwick Pearse, Doug Anderson, Tim Buckley, Rod Campbell and William Stefan representing the Bylong Valley Protection Alliance and Georgina Woods from Lock the Gate Alliance.

15 In the interests of openness and transparency and to ensure the full capture of information, today's meeting is being recorded and a full transcript will be produced and made available on the commission's website. This meeting is one part of the commission's decision-making process, it is taking place at the preliminary stage of the process and will form one of several sources of information on which the
20 commission will base its decision. It's important for the commissioners to ask questions of attendees and clarify issues wherever we consider it appropriate. If you're asked a question and not in a position to answer, please feel free to take the question on notice and provide any additional information in writing which we'll then put on our website.

25 Before we begin, I would just like to thank you for taking the time to come here today. Obviously, we heard the first part of the Bylong Valley Protection Alliance's submission with - - -

30 MR: Yes.

MR KIRKBY: - - - Warwick last week at the public meeting up at Mudgee. We just, yeah, do appreciate you coming in in person. It's, kind of, made things a bit easier last week for us to organise everything. So I understand you've got a number of presentations so we might just go straight into it. I think we're starting with you,
35 Jeremy.

MR J. FARRELL: Yes.

40 MR KIRKBY: Okay.

MR FARRELL: Thank you, Gordon.

45 MR KIRKBY: If we – actually, sorry, just one thing before we do it, if we could just go through and identify ourselves just so that when they do the transcript we can align voices back if there's something in there. So might just start with you, Warwick, if you just say who you are and where you're from.

MR W. PEARSE: Warwick Pearse, Bylong Valley Protection Alliance.

MS N. ZIMMERMAN: Nadja Zimmerman, I'm with – solicitor at the EDO, New South Wales.

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MR FARRELL: Jeremy Farrell, I'm a barrister at Martin Place Chambers.

MR D. ANDERSON: Doug Anderson, I'm a principal engineer of groundwater modelling at the Water Research Laboratory; that's a unit inside the Civil Environmental Engineering School at UNSW Sydney.

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MR T. BUCKLEY: Tim Buckley, I'm director of energy finance studies at IEEFA, which is the Institute of Energy, Economics and Financial Analysis, which is a mouthful so we call it IEEFA.

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MR S. O'CONNOR: Steve - - -

MR BUCKLEY: Based here in Sydney.

20 MR: Yes.

MR O'CONNOR: Steve O'Connor, commissioner.

MR KIRKBY: Gordon Kirkby, chair of the panel, commissioner.

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MS W. LEWIN: Wendy Lewin, commissioner.

MR D. WAY: David Way, senior planning officer.

30 MR M. TODD-JONES: Matthew Todd-Jones, IPC secretariat.

MR KIRKBY: And, Georgina, we might get you – although it'll be pretty obvious - - -

35 MS G. WOODS: Yep. Hello, Georgia Woods, Lock the Gate.

MR KIRKBY: Thank you. Okay. We might get into the presentation.

40 MR FARRELL: Okay.

MR KIRKBY: Thanks, Jeremy.

MR FARRELL: Good afternoon. As I stated for the record, my name is Jeremy Farrell, I'm a barrister at Martin Place Chambers, I'm instructed by the Environmental Defenders Office on behalf of the Bylong Valley Protection Alliance. This afternoon I'll be speaking in relation to draft conditions of consent for the project and I propose to deal with four matters: firstly, the context in which the draft

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conditions have been prepared; secondly, what I see as the proper role of the commission in assessing and amending the conditions; thirdly, the general limitation on conditions of consent as it applies to the project and; fourthly, specific comments in relation to the conditions as drafted by the department.

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Could I start briefly with the context of these draft conditions. The commission would be aware that its predecessor – the Planning Assessment Commission – found in 2017 that there was uncertainty and incomplete information in relation to the risks and benefits of the project. It found that for a greenfield proposal in a location recognised for its agricultural capacity, exceptional scenic value and heritage importance, caution and great care will be required in weighing up the benefits and costs of the project in order to arrive at a balanced decision about competing land uses in the Bylong Valley. Now, I won't go any further through the concerns raised by the commission because this commission would be well aware of those.

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And it's clear that since that date, some amendments have been – have been made to the project and these include the open cut itself being removed from Tarwyn Park and overburden being removed from Tarwyn Park as well as a redesign of some of the overburden areas so as to – the proponent says and the department says – better align with the surrounding topography. And in this context, the Department of Planning and Environment has recommended approval for the project, subject to conditions of consent. The draft conditions of consent are an important part of the matrix of relevant consideration and part of, really, what the commission would term as the weighing of the scales in determining whether or not to approve the project.

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The commission would be aware that under 4.15 – section 4.15 of the EP&A Act – the consent authority is required to take into account the likely impacts of the development, including environmental impacts on both the natural and built environments and social and economic impacts in the locality. The conditions, I suggest, are the main protector in reducing and mitigating the impacts referred to in 4.15. So in light of the findings of the Planning Assessment Commission, however, particularly those in relation to agricultural capacity, the exceptional scenic value and heritage importance of the site, I submit that the draft conditions have quite a high bar to clear if it is the case that the commission are to be satisfied that they will protect, reduce and mitigate the impacts as the department would suggest.

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Could I turn secondly to the test for the IPC as the consent authority. The department believes its revised conditions provide a comprehensive, strict and precautionary approach to ensuring that the project can comply with the relevant performance measures and standards and, importantly, that the predicted residual impacts can be effectively minimised, mitigated and/or compensated. I say that the role of the commission is to really examine and interrogate that standard – that statement, correction – and, in particular, if the conditions are inadequate to address the concerns of the commission and those inadequacies cannot be resolved by way of amendments to the draft conditions, it is my submission that the project should be refused.

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One of the key considerations here is this: does the condition ultimately resolve an issue in the mind of the commission and does it do it in a sensible and reasonable way or does the draft condition merely kick the can down the road for determination at a later date by a different party at a different time. Can I turn thirdly to the point I would like to make about the limitation of conditions of consent generally. The first point I'd make here is that it is difficult to condition out scientific uncertainty. The commission would be aware that ecologically sustainable development is an objective of the Act and that incorporates the concept of the precautionary principle.

Now, a lot has been said about the precautionary principle and, without going into the detail in relation to the jurisprudence on the precautionary principle, the easiest way I've found to think about the precautionary principle are the old expressions an ounce of prevention is worth a pound of a cure, better safe than sorry and look before you leap. Applying those concepts to this project, it has been submitted – and there will be – and it will be submitted – that there remains a great deal of scientific uncertainty in relation to the impacts of the proposed development.

And the expression look before you leap would require the commission to have a very close look at the conditions of consent to determine whether they resolve the scientific uncertainty or are simply neutral or silent in relation to the scientific uncertainty or even just, as I say, kick the can down the road for another decision-maker at a later date. Can I use that platform to quickly talk about groundwater. More will be said by persons far more qualified than I in relation to the issue of groundwater but what I would submit is that impacts to surface and groundwater are very difficult to condition away. The bottom line is that in long wall mining, when the coal seam is removed, the substratum of the land collapses and subsidence occurs.

One can provide compensatory water but one cannot reinstate the substratum of the land to how it once was. Similarly, in relation to carbon dioxide, it is very difficult to adequately and totally condition the emission of carbon dioxide. In particular, one cannot condition phase 1, 2 and 3 emissions to prevent or completely offset the emission of carbon into the atmosphere.

It's also almost impossible to condition out the likelihood of accidents, spills and environmental offences. One need look no further than the release of a significant quantity of nitrogen dioxide at the Mount Arthur mine in 2014, and the hospitalisation of a number of people in the Muswellbrook area, to demonstrate that even in well regulated environments, accidents still do occur.

It's also, I would submit, quite difficult to condition the continued operation and potential loss of research opportunities of Tarwyn Park. The advice of the Heritage Council, which the Commission no doubt has before it, is that the concept of natural sequence farming was applied to the property and its landforms as a method of retention of groundwater reserves (a holistic view of water, air, soil and plant and animal interactions) and the Council considered that the project could potentially impact the ability to understand the technology, theory and the application of natural

sequence farming. Despite the project being pulled back from parts of Tarwyn Park, it is still clear that the mining operations are in very close proximity, and indeed part of the mine's infrastructure, rail loading facilities and prep plant, are located on the site. One can predict that agriculture will continue in some form, but one cannot
5 condition what sort of agriculture it will be, or how profitable it will be.

Finally, one cannot condition social impacts. One can direct where the development contributions go and the quantum of those contributions; but one cannot condition consents to avoid social division and the flow-on effects from mining operations in
10 the region of mining activities.

Could I turn to the fourth issue that I wanted to address today, and that is specific issues with the conditions of consent. The Commission would be aware that development consents run with the land; they are not personal. It is therefore
15 appropriate for a project of this nature, with a life of at least 21 years, to condition for the future and to condition for the length of the project. If the mine is sold, or regardless of the ownership of the mine, these conditions really are all we have.

I would like to start with a couple of brief points about the 14 management plans referred to in the conditions of consent, which allow a lot of the detail to be worked
20 out at a later date. There is, I submit, a danger in these management plans, and the ability of proponents to what I call management-plan issues out. If I could to take the Commission to the structure of the conditions. And I have – if the conditions aren't before the Commission – a number of copies here. Let the record note that
25 I've got some conditions just passed over the table.

Could I take the Commission first to schedule 2, condition 2. And I apologise for the font size in that document. But that'll be page 7. Condition 2, schedule 2, provides that the applicant must carry out the development generally in accordance with the
30 EIS; in accordance with the conditions of consent; and then, for the open-cut stage, generally in accordance with the revised mine plan. Now, the take-home message in relation to this condition is that the applicant can carry out – must carry out the development generally in accordance with its own environmental assessment documentation. Importantly, however, it's qualified by the next condition, in
35 particular the last sentence, which states that:

The conditions of this consent shall prevail to the extent of any inconsistency.

And that inconsistency refers to an inconsistency with an incorporated document, or
40 a document in condition 2. And really the take-home message there is, I think, there is a degree of flexibility in the carrying-out of the development that's permitted; and that is permitted through the expression "generally in accordance with". However, the project has to be carried out in accordance with the conditions of consent, which means there is a stricter or a higher bar, and indeed a paramount importance given to
45 the conditions of consent. And that concept on its own is quite unobjectionable. But it's when you combine that concept with the primacy of these management plans that I say that you start to run into some difficulties.

As I've stated earlier, there are at least 14 management plans referred to in the conditions of consent. These relate to noise, blasting, air quality, water, biodiversity, heritage, transport, visual and lighting, bushfire, waste, and a range of other matters. When one actually reviews the terms of the conditions which permit these
5 management plans, what the management plans permit are quite substantial changes to the project over time. And the way I'd explain it is like this.

Let's say, for example, that the proponent decides, for whatever reason, that it would like to amend the project in relation to a matter the subject of a management plan.
10 Or let's say, for example, that the impacts of the proposed development are catastrophically worse than originally assessed and referred to in the environmental assessment documentation. What the management plans do, which expressly can be updated over time, is to quite easily regularise any issues, breaches, or other irregularities in the carrying-out of the development, and allow these issues to be
15 regularised quite easily. And this is because, as I say, the conditions of consent take primacy, and the management plans can be amended over time.

So what actually happens in the industry is that the management plans become a vehicle to amend the proposal over time. The environmental assessment
20 documentation becomes of lesser importance, because that is all subject to conditions of consent. This is a great thing for proponents, because it provides them with flexibility over time; and it's a great thing for the department, from time to time, provided that the management plans are actually updated. But, I say, it's a bad thing for consent authorities, because the consent authority doesn't necessarily know what
25 it's approving and what the project is going to look like without further planning approval. And it's a bad thing for objectors, because the objectors, and the other involved stakeholders, most of the time, are not involved in the updates of management plans.

30 So that's the point I'd like to make about management plans. They seem to be in vogue at the moment; they seem to be in every set of draft conditions that the department are issuing at the moment. But they are a dangerous vehicle if they are left unchecked.

35 The next comment I would make is in relation to some of the ambiguous and unenforceable language in the consent itself. "Reasonable and feasible": the expression "reasonable and feasible" appears throughout the consent, in particular at schedule 2, condition 1, the obligation to minimise harm to the environment. I would submit that in the context of a development consent, which runs with the land and is
40 granted in rem, the concept of what is reasonable and feasible is an entirely subjective set of circumstances. It also doesn't address the circumstances of, well, what happens when reasonable and feasible measures are not enough to prevent catastrophic environmental impacts, which are at odds with the proponent's environmental assessment documentation.

45 And on this point, the Commission would be aware that the Springvale coal mine has involved significant subsidence on the Newnes Plateau, which has caused cracking in

the swamp above the long walls, and has resulted in the swamp draining and drying out. The point I'd like to make about that is that the consent that is in force in relation to the Springvale coal mine is not materially that different from the conditions of consent that are before the Commission. But in any event, those

5 conditions were not enough to prevent serious environmental consequences like what happened at the Newnes Plateau. Staying on the theme of ambiguous and unenforceable and indeed subjective language, schedule 3 condition 1 relates to performance measures for the project. It's at page 9.

10 All through the performance measures on the right-hand side, the expression "negligible environmental consequences" to things like water quality and water flows are used. Just what the expression "negligible" means in these circumstances and how that can be meaningfully enforced is unclear to me. I would submit that the performance measures there are very difficult to quantify or ascertain, and they're

15 entirely subjective. And that has – and that has a real resonance for the Commission, because the Commission would need to be satisfied that these conditions are capable of adequate enforcement.

20 Could I return back to the concept of catastrophic impact and another concern I have with the conditions of the consent as they are currently drafted. I said to my instructing solicitor earlier today that one of the issues with the consent as they're currently drafted is the conditions have no real teeth if the project is not carried out in a way that it has been proposed or if the impacts of the proposal are fundamentally differently to what's assessed. And what I mean by no teeth is that there is no ability

25 for the consent authority or the Department to step in and request that operations in a certain part of the site are temporarily or permanently ceased if catastrophic environmental damage was being caused. And I say this is a particular risk considering the proximity of this proposal to Tarwyn Park. One does not have to really detail the doomsday scenario, but it would be a significant thing for the state of

30 New South Wales and really research in relation to agricultural productivity more generally if the water flows that are the lifeblood of that property started to dry up and started to fundamentally change as a result of mining activity. What is absent at the moment is any ability for the Department to be able to step in and effectively regulate those operations over time.

35 Could I make a couple of other comments. The workforce accommodation facility is at condition 2 – sorry, schedule 2, condition 8 – merely carved out from the consent. It implies that further approval could be obtained for the workforce accommodation facility at any time from Council or the relevant approval authority. I would submit

40 that condition 8 needs to read that the workforce accommodation facility is prohibited on the site to make it clear that the applicant cannot go away and simply obtain further approval for that at a later date.

45 The noise criteria at schedule 4, condition 2 appears to reflect the old industrial noise policy rather than the new industrial noise policy. It also appears to be silent in relation to low frequency noise.

The final point that I'd like to make is an important one, and it's in relation to rehabilitation of land. The consent tries to address the rehabilitation of land at conditions 62 to 67, and they are in schedule 3. And there is – there are a whole lot of aspirational statements in those conditions relating to the final landform,
5 agricultural productivity and the like. If I could say a couple of things about that. The first is that tailings rejects and a final void do not appear to me to be a consistent with a highly productive and strategic agricultural use.

10 The other matter that the conditions are silent upon is the security deposit in relation to rehabilitation, which of course is typically held under the conditions of a mining lease rather than a condition of consent. The concern that I have in relation to this is that the conditions as drafted do not give the state of New South Wales adequate satisfaction that the conditions of consent in relation to rehabilitation would be
15 properly complied with. At the moment, the security deposit held by the Department of Mineral Resources is often in the millions or tens of millions of dollars for the rehabilitation obligations of a mining proponent. I wasn't able to find an updated and accurate costing of the rehabilitation obligations of the proponent in this case, but commonly, those obligations, when properly costed, are in the hundreds of
20 millions of dollars, and given the obligations in conditions 62 to 67, I would not be surprised if that is indeed the case in this case.

The Commission would be aware as well that there are a lot of factors which over time can make extremely difficult the ability of a proponent to comply with its rehabilitation obligations. One can imagine that if the price of coal does not head in
25 the direction that the proponent needs it to over the next 10 to 20 years, the mine may not be profitable for the mining operator to afford the rehabilitation obligations at the end of the carrying out of the operations.

30 The Commission would also be aware of the tens and tens of coal mines in New South Wales that are currently under care and maintenance where the economic conditions are currently not suitable for the completion of mining obligations. In these circumstances, it becomes an issue of not only if rehab will be carried out but when it will be carried out. And so I say that on the material before the Commission, there is some lingering uncertainty in relation to security for the carrying out of
35 rehabilitation obligations.

If I could conclude with this statement – the Department states that the conditions provide a comprehensive, strict and precautionary approach to ensuring that the project can comply with relevant measures and standards and that predicted impacts
40 can be effectively minimised, mitigated and/or compensated. I say that the analysis above suggests that this is not the case, and that the Commission should approach those conditions with great caution. That's all.

45 MR KIRKBY: Thanks, Jeremy. Just one question just on the last aspect about the security – so your concern is basically that there's nothing to prevent this mine just going to care and maintenance at the end and effectively putting on hold all the rehabilitation obligations.

MR FARRELL: That's right. That's right.

MR KIRKBY: Yeah. Okay. That's fine.

5 MR O'CONNOR: Yeah. So - - -

MR KIRKBY: Steve.

10 MR O'CONNOR: - - - just exploring that a bit further, we've yet to be briefed further about the current arrangements under the mining lease for bonds to be held, etcetera.

MR FARRELL: Sure.

15 MR O'CONNOR: But I'm assuming there's some sort of bond that reduces overtime as - as rehabilitation takes place. Do you know if that's the way it operates?

20 MR FARRELL: I think that's the case, Steve, but my understanding is that typically that amount of the bond is a fraction of the real price of rehabilitation.

25 MR O'CONNOR: So it might be costed at what the mine would be able to do the rehabilitation for, given they've got all the equipment and manpower on site, not someone coming in fresh to the site, having to bring all that with them.

30 MR FARRELL: I think that's part of it, but I also think the other part of it is that it's commercially unacceptable for a lot of proponents to put up a bond which is the entire cost of the rehab obligation at the start of the project because the proponent hasn't yet earned the money that it then relies on at the back end of the project to actually carry out the works, and to put such a huge bond as a - is an enormous sort of cash flow imposition on the proponent, and, you know, most of the time it works okay, but there are mining proponents that take advantage of that.

35 MS LEWIN: Is the bond topped up if modifications occur, in your experience, that expand the scope of the mine? Is the bond then recast?

MR BUCKLEY: Would it be appropriate for me to - - -

40 MS LEWIN: Yes.

45 MR BUCKLEY: - - - answer that? I've done quite a bit of work on financial rehabilitation. It's actually - the government - New South Wales Government discourages bonds to be actually paid, and, in fact, only one or two per cent of the total liability is held in bonds, last I checked. Now, that was probably two years ago. They actually ask for financial assurance to avoid exactly what you're saying. They don't want the corporates having huge amounts of capital sitting there tied up for 20 years. So they have to provide financial assurance, and they go to a third party - so

National Australia Bank – and ask National Australia Bank to provide the financial assurance.

5 Now, the reason I mention that is because they actually have no capital involved, which means if they actually do the rehabilitation, they have to fund the capital that they otherwise can defer indefinitely, as you said, by putting a mine on care and maintenance. So 30 years from now, they still haven't provided any of the hundreds of millions of dollars of capital that you estimated, and I'd certainly concur with that estimate. So, in fact, there is a unfortunate – whilst – as you point out, for a good
10 corporate citizen, it's a really sensible strategy.

It's a capital minimisation strategy aligned with a good corporate citizen in Australia who's operating in Australia, but if you're a foreign multinational who might just phoenix the company, you'll end up leaving. There will be no financial assurance
15 actually tied, and – or you just defer for 20, 30, 40 years, and, in fact, one of our future speakers later this afternoon is Rod Campbell, who's written on this extensively. He did a study two years ago which highlighted that there are actually only two coal mines in Australia that have actually completed rehabilitation, in fact, of the hundreds that we actually have.

20 They're far more – there are no government records, actually, or the government doesn't focus on it. So there are only two, I believe, as of a year and a half ago, that have been completed. Most of them are in care and maintenance, which actually means put a padlock on a fence, one security guard, and defer for a decade. So the
25 Queensland Government at the moment is actually working to change that and say, quite rightly, that we – actually, once you finish you finish mining, you actually have two years before you have to start, or, better still, do progressive rehab, which is actually the lowest-cost solution. Sorry for interjecting.

30 MR FARRELL: No. That's all right. That's very useful. Thank you. Okay.

MR KIRKBY: Who's our next - - -

35 MS ZIMMERMAN: I think we'll have Doug Anderson next.

MR KIRKBY: Doug. Okay. Thanks.

MR FARRELL: Folks, I don't mean to disturb. I've got another appointment - - -

40 MR KIRKBY: That's all right.

MR FARRELL: - - - I've got to get to, but thank you very much - - -

45 MR KIRKBY: Thanks for coming.

MR FARRELL: - - - for your time.

MR KIRKBY: Thanks.

MR FARRELL: Thanks again.

5 MR KIRKBY: That was useful.

MR ANDERSON: Good afternoon, Commissioners. My name is Doug Anderson. I'm the principal engineer at Water Research Laboratory, School of Civil and Environmental Engineering at UNSW Sydney. This is my first time presenting to
10 the Independent Planning Commission. I've had previous experience throughout the EIA process, normally responding at the EIS stage or at the beginning of a response to submissions. So my first time, sort of, at the eleventh hour before any determination is made.

15 MR KIRKBY: Okay.

MR ANDERSON: I was pondering this figure quite a bit over the last week and contrasting it with historical experience of how we go about doing projects in New South Wales. My father was an engineer in the Public Works Department Technical
20 Services, and in those days, you would go out and collect data, analyse it, draw a cross-section, pull out your slide rules, think about it really hard and make a decision. These days, we've changed the way we do things towards using complex computer models to try and understand groundwater flow.

25 And I looked at this figure and thought we've spent seven years peering into groundwater models and talk about groundwater models to try and understand the impacts of the development, and that may have some advantages in terms of better outcomes and better management outcomes, but it's also very expensive and it delays development. My brief was from EDO in New South Wales, funded by the Bylong
30 Valley Production Alliance. I was asked to peer down the rabbit hole, so to speak, and look at all the documents and prepare some impartial advice that would help you understand groundwater – groundwater issues so that you could get on with writing your determination report.

35 MR KIRKBY: Right.

MR ANDERSON: I was given about two weeks to do that. In terms of a bit of background about me, I've been training to be an engineer for a very long time, turn over the rocks, peer through the looking glass, question all the assumptions in
40 models, think about the consequences of incorrect assumptions and how to avoid, mitigate and offset the impacts of bad assumptions. I've been trained by specialists in environmental law, groundwater, water, biology, ecology, geology. I've worked all over the world in water resources and groundwater impact assessment in resource development for a whole range of different clients. So I've got a pretty good
45 understanding and appreciation of a broad range of issues and what's important. When I was asked to do this brief, the very first thing I thought was I need to see geological cross-sections, what does this groundwater system look like and how

important is it, and it took me a while to find these geological cross-sections. They were only provided quite recently after the response to submissions, and the first thing I noticed was there's a water table in the alluvial aquifer system.

5 MR KIRKBY: Is this okay for - - -

MR ANDERSON: So the landowners outside of the - - -

MR KIRKBY: hearing

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MR ANDERSON: - - - development site.

MR KIRKBY: Just hold on a second. We just need to get a mike down to you.

15 MR ANDERSON: Okay. I will just repeat what I've said. So the first thing I did was look at the geological cross-sections and work out where the water table was, and this cross-section here is cross-section C. And the first thing I learned here was that the water table was just below the elevation of the Bylong River. So, presently, the water is draining out of the Bylong river and recharging the groundwater system.
20 Previously, before European development, perhaps after about World War II at the end of the dry spell we had, beginning of the 20th century, the water levels might have been higher, but it has been reduced because of agricultural development.

25 The next thing I noticed was that underneath this thin clean sand aquifer here shown in yellow, the sand became much more silty and more – became very clean. And then underneath here was a confined, pressurised clean sand aquifer. This kind of material, this silty sand and the clay, don't store very much water, but can be released very easily. When I looked at this figure and thought what would happen to this system during a drought and what would happen if there was the cumulative
30 impacts of mining as well from the long wall mining tunnels nearby, I realised that once the water table dropped during the drought, the bottom of this clean sand aquifer, it would drop very fast, all the way down to this clean sand aquifer at the base.

35 So I realised this system is very sensitive to climate and very sensitive to the amount of water being used in the local region, and then that made me concerned because I thought our understanding of this system and our predictions of the impact to it will be very sensitive to our understanding of the system or the hydrogeological properties, the climate, the rainfall, the amount of water captured by the mine. All
40 the vagaries that have created this process going on for seven years. Then I looked at the cross-section a bit closer to the development near the open cut mine which is cross-section AA of this figure, and then I noticed that in these cross-sections – so this – in the Bylong River here and near the coal mine here, there's a lot more clay in these cross-sections here. So there's even less water stored in the aquifers here that
45 can be released easily than further down the valley here.

So I thought this part of the aquifer is going to be even more sensitive to dry periods and cumulative impacts of development. Furthermore, because there's so much clay here, as the water tables dropped through, some of these clean sand aquifers – some of these clay layers might – may start to take more load and be subject to a sort of
5 groundwater drawdown induced subsidence, so there could be some subsidence from induced settlement as well. So my outcome of looking at this cross-section was the system is sensitive to assumptions; it is sensitive to drought. The impacts of models will vary significantly based on this model's changes in assumption.

10 And then I looked at some of the differences in the modelling results throughout the environment impact assessment process. The original model was done in a computer program called MODFLOW-SURFACT, and then it was revised after some people went away and collected some field data and the predicted impacts in the alluvial aquifers were less, and that's because they slightly tweaked the hydraulic
15 conductivity values based on some extra field investigation results. But, again, there's still plenty of assumptions and this just goes to show how sensitive the predicted water tables are and the assumptions of the modelling and the information we do and don't know. They also realised the elevations up here in this cross-section figure are higher than your cross-section here.

20 So water levels – sorry, water naturally flows down to this area and with all the drawdown that can be predicted to occur here, if you look at these figures on here, the drawdown here is quite substantial, four to 10 metres. If you look at what a four to 10 metre drawdown looks like in these cross-sections, the water table, in some
25 cases, drop below the bottom of the aquifer. So parts of these aquifers that run through here, may go dry which means the water that used to flow down here will stop. But, of course, in the revised model, this does not necessarily happen because they predict this drawdown, so that's part of the uncertainty that has caused so much debate.

30 And I think it's appropriate to probably consider what the worst-case scenario is and that could be during droughts, these aquifers would go dry. That would be the precautionary approach, and then if the values for this project and the state's economy is that imperative, what can we do in terms of a management context to
35 manage that problem. What's that mean? Stopping the mine for some period of time? Does it mean engineering solutions? That's a challenge in issue. Moving on from cross-section, as in geology, I went into a bit of environmental law. I started looking at the New South Wales Aquifer Interference Policy 2012. So there are two instruments in New South Wales: there's the Water Management Act and there's the
40 Aquifer Interference Policy. The Water Management Act is legally binding. It manages water through water sharing plans at the catchment scale. That's to stop us from taking too much water at the catchment scale. So it's like a macro-economic tool in some respects. It stops us taking too much water overall, but it doesn't prevent local-scale impacts.

45 So we created the aquifer interference policy to manage and avoid local-scale impacts. The aquifer interference policy says that you have to inform the New South

Wales Government of all the water takes from every water source – groundwater, surface water, because they're all connected – and you need to do it both during the project period and during the post-project period, after mining, because groundwater impacts continue for a long time after mining.

5

The mine plan's been updated; the groundwater model's been updated. But I haven't found yet, in all the assessment documentation, where the predictions of water takes captured by the mine, reductions in base flow, are after 29 years of mining. So that's a requirement; the mining company needs to provide that information for the New South Wales Government to assess it. Local landowners and stakeholders need to know that information so they can plan for the future.

10

And it is quite important. If you look at the figure on the right-hand side of the page here. This is from a hypothetical aquifer from a modelling exercise, published in the peer-reviewed literature, from the United States. It shows the discharge at a spring in a groundwater system downstream of a development. In this example, the pumping stops at 50 years, but reduction in flow to the spring continues for a further 25. And that's just because the mine void is still filling up with water, in the context of our long wall mine, and then it takes a long period of time to recover.

15

So these predictions of water take from the development after 29 years are important; they are required for the updated mine plan; and we should really be seeing what the impacts to groundwater draw-down look like through time, just not on a few plan-view maps showing contour maps. We should be seeing cross-sections of geology, and how the water levels vary through time.

20

So if I go back to my cross-section figure here – sorry; I should have said cross-section figure. I looked at this figure and thought, this has been really helpful; I've really understood something about the groundwater system by looking at this. But how does this vary through time as a historical range in water levels in this aquifer? I haven't been able to find that yet. It's written in text, but it's not easy to interpret, and I thought, what would the predictions for groundwater level look like drawn on this cross-section? That would be really useful for making a decision about how to manage this system.

25

As has already been mentioned, there's subsidence in these areas. There are concerns from the community about roads and impacts on agricultural land use. I adopted quite a pragmatic opinion about mining development. If we are going to approve it, there will be impacts, and the impacts of subsidence will be substantial, and they will cost money. I had experience working in the Southern Highlands, and also in the southern coalfields more generally. I've looked very closely at assessment documentation and management reports for Springvale and other mines in drinking water catchments. I've investigated issues with management plan failure. If we approve the mine, there will be impacts; there will be uncertainty in our understanding of those impacts; and management plans require information to be well designed to work. I'm a strong advocate in trying to minimise uncertainty so that we can build good management plans.

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I do have some concerns about management plans being deferred, and kicked down the road. In some respects, it's a fact of life; but the way we currently do things, in terms of defining these management plans, and then performance measures, and then trigger levels, scientifically aren't robust. They do not work, and we need to find a better way of working to achieve more – better outcomes, and to cost in the true impacts of these developments. In engineering practice, it's quite normal to factor in factors of safety to account for uncertainty, and it's quite usual to account – or put a dollar value cost on water, to work out what the costs are and how to manage those costs.

10 Because I was concerned about the assumptions being made – and the consequences of those, because the groundwater aquifer was so sensitive to water levels, because of the specific geology – I went and started looking at the structural geology maps, because subsidence is controlled significantly by our understanding of geological structures. Most of the models we employ to date in environmental impact assessment are based on this concept of conventional subsidence, and that's basically a database of experiences at other sites all around the world, related to the similar geological conditions. These conventional models don't consider sudden changes in relief or topography, and they don't work well near geological structures.

20 I looked at this map, and I thought, here's a national park: Goulburn River. Here's a national park; it's a World Heritage area: Wollemi National Park. The long wall mine gets pretty close to these. I thought, are these structures just not mapped? Has someone even looked at the geological maps here? Have they been included in the models? These are the kind of questions I ask when I want to understand what the impacts, all the unenvisioned impacts, might be, and how they might be managed.

30 In my experience, all the problematic issues I've seen in southern coalfields have occurred because of using conventional subsidence models, and because the structures weren't mapped initially – we didn't know they were there. And so then, the impacts that were always going to occur were much larger than what we thought. And as a society – as New South Wales – we've spent an awful lot of money investigating these issues, and costing them – investigating these issues and trying to rectify them, in that they were always going to happen. We've spent a lot of money on poorly designed management plans, that really affect the bottom line of the mining operation, the economics of New South Wales, in terms of approving these. And it would have been a lot simpler if these structures were just mapped to start with.

40 Moving on from that, I started questioning all aspects of the conceptual model. So the gateway panel cited technical reports early on in the process, stating that there was seam – coal seam – to surface subsidence fracturing; and that would have significant impacts. That's not drawn on the cross-section figure here. I kind of wondered what changed to allow this conception model. Is this diagram an accurate representation of what was actually built into the model?

Then I looked at these elevated areas here: the Bylong State Forest, which is a New South Wales State Government resource. Presumably this has some kind of economic value to the state. I don't know what that value is, but there will be perched groundwater systems up in here that aren't simulated in the model, because, presumably, no one put very many boreholes up here and modelled this, because it's quite hard to do. But if there is fracturing, like in the southern coalfields, there will be shallow subsidence cracks all through this area, and water will drain more easily off the top of the mountain here. These inflow-dependent ecosystems, or groundwater-dependent ecosystems, if they do exist here, will be impacted. Subsidence movements might result in tree falls; subsidence movements may result in lower water table, so that many of these trees can't access groundwater during a drought, so there could be more mortality for trees during drought. And that could have a direct economic impact.

And so I immediately thought, what is the value of the state forest? What is the economic impact of a subsidence to the state forest? How did they represent subsidence in the model? Is it adequate? Could the impacts to this area actually be larger than what has been stated? What's the cost of that, basically? I try and boil everything down to economics: what is the cost of that? Does it matter?

I noticed, on the figure, they hadn't drawn water-balance values on here. They're in tables – different tables – in the report. What is the difference in all these fluxes? You need contextual understanding, so people understand it for the baseline, the mining and post-mining conditions. These are really hard things to find in these large documents, if they do exist at all. Was there a separate conceptual model drawn for the perched aquifer system up here, to understand how it might be impacted? It hasn't been done at Springvale; it hasn't been done for most of the sites in the southern coalfields. And it's a great waster of time, money and human capital if they're not really working on things.

The open-cut coal mine is about two and a half kilometres away from Wollemi National Park, a World Heritage area. I'm still looking for the equivalent conceptual model demonstrating their understanding of the geology and the hydrology between the open-cut coal mine and the World Heritage area to understand whether the groundwater impacts are reliable.

We saw cross-sections across the valley, showing – before – showing the alluvial aquifer system. I'm still looking for cross-sections along the valley through the – first I want to understand how it changes down the valley. So more uncertainty which goes to understanding management.

Management plans have been – how can we make effective management plans that work which we haven't fully understood for the environmental processes that are occurring. I've been doing a bit more digging in terms of the groundwater model and I've actually found a potentially critical flaw in the groundwater model that hasn't been identified to date and that is these values for the specific storage in the model are incorrect, and I have another presentation on that if you would like to hear

that later or I can just leave it to my report. These problems of specific storage values, which basically how much water is stored in the aquifer and gets released when the aquifer water levels drop can have a significant influence on how groundwater impacts change with time, how fast the water table falls and how far the impacts extend out through distance or how quickly.

My finding in specific storage reduces my confidence that any of the models do predict the likely impacts everywhere as they will occur. I think the drawdown impacts may be larger and more extensive in the short term but I don't think they will last as long after the mine is finished. There's a couple of suggestions in the modelling reports that suggest mining impacts will be negligible after 100 years. It may be that this finding stands that the groundwater level might recover a bit quicker if, of course, we're not in a long drought period like at the beginning of the 20th Century. My request to the Commission would be can we please check – carefully check the basis for specific storage and recharge in data and data analysis in the modelling work to make sure that has been done right.

Now, I understand that modelling has been looked at for the better part of three or four years now. I haven't had a chance to read all those documents yet but this is my finding and I'm fairly sure this hasn't – issue hasn't been detected before. I would ask the Commission request historical water level fluctuations and model predictions for the water table, baseline mining and post-mining to be shown in the geological cross-sections including longitudinal cross-sections so there is understanding to inform good management. There's certain legal requirements and policy requirements that need to be executed to condition and development and I'm fairly sure they go back to the ESD objects to the Environmental Planning and Assessment Act and, namely, predictions of water from all water sources for the revised line plan, especially beyond '25. They may have been created already and given to the Department of Planning and DPI water but I'm not sure if they're in the public domain. They really should be published for stakeholder consideration.

Going back to one of the issues that has been stated before is sort of talking about equity and social justice and valuation issues and the impacts of this development. There are some issues. The long-term viability of water sources and assets and make good are currently ill-defined. It's a problem in all developments, not just this one. It has been quite contentious on the QCoal project. How do you actually make good if nobody can agree on what the impact actually is because the models are so uncertain and how to measure it? And with the vagaries of climate and water levels going down, separating what climate impact is from mining impact, it ties up vast amounts of state resources, legal resources and time, and it reduces the economic productivity of the state.

Something needs to be improved in the way that we currently practice and assess these issues and especially for the Bylong Project because KEPCO has bought up a lot of the land around the development and they're – and they state that they don't need to assess the impacts of more than minimal harm on their – on the assets they've bought, the wells – the groundwater wells, because they own them. I think

that's quite a legally grey area. Strictly, if you read the last half of the Aquifer Interference Policy, they would be correct, but the Aquifer Interference Policy is a derivative policy of the Water Management Act. And the object of the Water Management Act is to ensure no more than minimal harm to the water source, but
5 that object hasn't been legally enacted as a requirement for the Minister to condition based on science. He has a discretionary role in that process, and, presumably, that discretionary role is to consider the objects of the ESD and the Act.

And, as I've mentioned, adaptive management and practice is the de facto that we
10 default to when there's uncertainty in assessment and technical assessment, and we rely on design performance measures, triggers, making – and make good promises which very often, as I said, yes, will make good but it's not defined up until the approval. It gets defined in the water management plan with various caveats that stakeholders never get a chance to review until they're approved. And quite often,
15 those performance measures and triggers are written in a way, in my personal opinion, that cannot ever be triggered, and so you end up creating this conflict between landowners, stakeholders, mining companies, New South Wales Government about when an impact does occur. And impacts will occur if this mine is approved.

20 And that conflict can last for two or three or four years before it's resolved, and the resultant conclusion normally is there wasn't enough baseline data, wasn't enough data analysis. You don't know if the impact was caused by the mine or the climate, a lot of money gets wasted, and really everybody loses. It's a bit of a conundrum
25 really. So we need some way of integrating more science into the design performance measures levels, so that they're scientific based, and I think there needs to be more openness with the design of these make good arrangements. Okay. I'll just say thank you for your attention. I can talk amore about the specific storage issue if you'd like later. I had a number of reports in preparation. One being a
30 submission for this project which would be finished in the middle of this week. I've started working on some ideas and concepts for a new model for water and energy practice in New South Wales on how we should make good and what could be done in terms of a better framework to avoid conflict and waste of economic resources. I also have another report on the specific storage matter and why it's so important in
35 modelling currently not publically available. Thank you.

MR KIRKBY: Thanks, Doug. We might – might come back to the specific storage thing after we've been through the other things. Yeah. And we'd appreciate when
40 you get your submission finished midweek, I think you just said, you'll forward that through - - -

MS ZIMMERMAN: Yeah. Absolutely.

MR KIRKBY: So there was no point doing it really, was there. No, that would be
45 appreciated. Okay.

MR ZIMMERMAN: So I think we'll have Tim Buckley- we'll have you present next, is that alright?

MR BUCKLEY: All right. I don't have a presentation.

5

MR KIRKBY: Okay.

MR BUCKLEY: I would reference you to our report and also our reply submission. So I am co-author of the – both the report and our reply to Gillespie Economics' reply to our report. Gillespie Economics makes – questions IEEFAs qualifications and our motives, and I find that – I might just address that, if I may, because I actually am raising a whole lot of issues in relation to the work they are putting forward.

15 My background – I was managing director head of equity research at Citigroup for 17 years at the time Citi was the biggest financial institution in the world, and I've been a financial analyst for 30 years. My – Melissa Brown is IEEFAs head of Asia research. She was also a managing director at Citigroup for 10 years. She was the deputy head of research at Citigroup Asia for a decade while I was there. She now runs IEEFA Asia. She has got 30 plus years experience in Asia and has been a financial analyst for more than 30 years. My boss in America used to run, for 23 years, the New York pension system. He was comptroller, and that was one of the biggest pension funds in America. So the idea that IEEFA doesn't have suitable qualifications I find a little unsupported in Gillespie's statement, and I did want to address that if I may.

I'll get into the second area of Gillespie's analysis in a minute, but before I do, I wanted to address one issue relating to the corporate assumptions. The – Gillespie makes the comment that KEPCO is a huge company, has huge revenues, huge profits, huge equity and therefore is highly likely to equity fund 100 per cent of this project over the life of the project, and therefore they make that assumption that 100 per cent equity funding is the right way to model the mine.

35 Now, I find that a bizarre assumption, and it should actually – I would make this – the reason why I make the statement is it should actually be just struck out of all submissions that companies 100 per cent equity finance projects in Australia, particularly coal mines, when the proponent is a non-listed, non-ASX listed multinational who has every capacity to 100 per cent debt fund it and every incentive to 100 per cent debt fund it, because they have no incentive to pay tax in Australia because they don't pay franking credits, they don't have Australian shareholders, and in fact I would challenge Gillespie Economics to show a single multinational mining company that is 100 per cent equity funded. I would also challenge KEPCO to actually highlight whether they've ever paid tax in Australia, because most multinational mining companies in Australia don't, so the assumption they're going to 100 per cent equity fund I just find a ludicrous assumption, and yet Gillespie says that's the risk profile of the project. Well, practice in my 30 years in Australian financial markets would be you would maximise your tax deductibility. The way

you maximise your tax deductibility is putting debt in a project to assume away the debt as a non-item, just obviously maximises the benefit to Australia that your analysis or Gillespie Economic's analysis is actually putting forward – it has no bearing on reality.

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MR KIRKBY: So you're effectively saying they're not going to be paying company tax.

MR BUCKLEY: They'll pay it in South Korea.

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MR KIRKBY: In Korea but they're not going to be paying - - -

MR BUCKLEY: But under the current law in Australia, most multinationals pay very, very little, if any, tax. Glencore, the biggest coal mining company in Australia, hasn't paid any tax in Australia for a decade that I'm aware of. And in fact they're not required to disclose that. But they have no incentive to pay tax. They have every capacity to not pay tax, and whether it's through debt, transfer pricing, corporate head office charges or a multitude of other things – so it may be a simple question where you ask, what's KEPCO's actual tax payment in cumulative terms in Australia in the last decade? The answer is anything more than zero, I'd be very, very surprised. I do study Glencore, which is the biggest coal miner in Australia, in the world, and they've paid no tax in Australia this decade.

So the idea that you 100 per cent equity fund is at the other end of the spectrum. I'm actually question whether you pay a dollar's tax voluntarily, because there's no other choice, absent a change to the thin capitalisation rule, and I have been talking to the government and the opposition about the need for a change to the thin capitalisation rule to allow the biggest companies in the world operating in Australia to actually require them to disclose and pay tax, but at the moment, they don't have that obligation. So that can be assumed away as zero rather than assumed as 120 million or New South Wales share. The actual is zero, unless proven otherwise, within my – they've got no economic incentive to do it.

Second issue is Gillespie Economics claims that we are selective in our disclosure. Now, I am a financial analyst, and yes, we analyse data and analyse trends. What I would highlight, though, is that Gillespie goes on to reference as the primary focus the current policy settings of the International Energy Agency's analysis as their primary and most likely scenario or forecast. They go on to call the new policy scenario a speculative scenario. Now, I spend a lot of time reading the IEA. They publish huge numbers of reports. I'm one of the peer reviewers of those reports, and you will know – hopefully know that the IEA publishes three main scenarios, the current policy scenario, the new policy scenario, and the SDS, the sustainable development scenario.

Now, Gillespie Economics goes as far as to actually crib out of their report by doctoring the disclosures and documents in the IEA disclosures, pages 10, 11 and 12 of their documents – they've actually cut out the sustainable development scenario

which says the world actually does work on climate change, does actually try to limit climate change to a maximum of two degrees Celsius – they actually doctor it out of their documents, which I find bizarre. I don't know how they can actually get away with that when they, in their reports – I would suggest you actually have a look at the
5 IEA reports, compare that to what Gillespie Economics has done. They've accidentally propped the sustainable development scenario which is the only scenario that gives the world any chance of limiting climate change to maximum of two degrees. Now, rather than calling that a “non-relevant scenario,” I would actually say it's probably the most relevant scenario because the current policy scenario that
10 they work on suggests the IEA models to a temperature rise globally of an average of four to five degrees Celsius, on average.

That's not really a world where we're going to be worrying about opening coal mines; it's a world, I think, we're going to be dealing with millions – tens of
15 millions – hundreds of millions of climate refugees and extreme weather events every day – bushfires, etcetera. I'm not a climate scientist but what I am is a financial analyst and I actually use the new policy scenarios, the main scenario – that's what the IEA says is the main scenario for them – and the sustainable development scenario which says the world has some chance to deal with climate
20 change. Now, I might go one step further on that. It's worth bearing in mind the taskforce for climate disclosures, climate-related disclosures is global taskforce being run by the Governor of the Bank of England.

He is talking about requiring all corporates and all financial institutions to properly
25 disclose – disclose and show how they are proposing to deal with climate scenarios relating to the SDS or thereabouts, or in fact more extreme versions that the world actually does address. Now, ASIC and APRA have both put out major discussion papers in the last 12 months warning corporates, financial institutions and directors of their fiduciary duty to deal with this absolutely key financial risk, climate risk.
30 Rather than dealing with any of that, Gillespie actually just doctors the data out of their report which I find rather bizarre given – let me see if I can highlight that to your attention.

The Gillespie Economics, which obviously the economic repugnant – the
35 proponent's economist has also said they are quoting a global coal plant pipeline of 286 new coal plants, high efficiency, low emissions pipelines globally, including 11 in South Korea. They actually fail to disclose where they're getting that information from. What I would highlight is that the leading global database on coal plants is the Global Coal Plant Tracker. It's available online. It's a public interest full-disclosure
40 document analysis. It's updated every six months and, in that document, they highlight that since the start of 2015 the global pipeline of new coal-fired power plants – the end use of the Bylong coal – has shrunk by 74 per cent since the start of 2015 and it shrunk to 229 gigawatts.

45 The Global Coal Plant Tracker database also highlights that there is only one new proposed coal-fired power plant in South Korea, not the 11 that Gillespie says and unreferenced, so I would cite that database. It's all available. It's all very, very

clearly documented and, since 2010, we've seen South Korea cancel or shelve 7.4 gigawatts of proposed new coal plants. What I'm trying to highlight is there is a dramatic shift in energy policy globally, in Asia and in South Korea. And, obviously, that becomes very key, because the proponent is majority owned by the South Korean government and the South Korean government is actually one of the most aggressive governments for changing to address the issues of air pollution and climate change globally. And that has been evidenced in 2018 very, very clearly. So to highlight that, the government of South Korea has, early this year, announced a 30 per cent increase in their coal tax to US\$40 a tonne – US dollars a tonne from April 2019 onwards.

They've commensurately lowered their tax on LNG and with the stated objective to actually make LNG-fired power generation cheaper than import coal-fired power plant generation. So it's very much part of the government policy. They have the highest coal tax in the world. Will have – they already have, and will have increased that another 30 per cent by April next year. They also have one of the most – highest emissions trading schemes – highest prices on that as well. So South Korea's government, far from being wedded to new coal, I would argue has dramatically changed their thinking, particularly in 2018. You might be aware they've also increased, or implemented a new ban on importing of high sulphur coal from April of 2018.

They said if the sulphur content – the maximum sulphur content you can use is .4 per cent. That is to address air pollution. Now, Australia's exports of coal, thermal coal to South Korea dropped by more than 20 per cent in the months following that introduction. How it pans out over the long-term, only time will tell. But Australia is the most affected exporter of coal to South Korea from that change because our coal has a high sulphur content. Now, the government has also in – sorry, in October 2018, the South Chungcheong Province, which is home to half of South Korea's entire coal fleet, has announced that they have joined the global powering past coal alliance, which means they are committing to a coal plant phase out.

So far from suggesting South Korea is wedded to coal and wedded to a decision to enter the Bylong Project, I would actually say events in the last six months, events the last three to four years, highlights South Korea as actually being a very progressive country rapidly going in the other direction. The South Korean government this year has also announced a program to – sorry, in December last year, announced a program to invest in 58,000 megawatts of new renewables by 2030. So a massive diversification into renewable energy, domestic renewable energy, non-polluting and non-emissions very deliberately. Probably most specific or relevant to KEPCO, is that KEPCO announced in the Korean National Assembly last month that they were ceasing the program to develop the Serabom 3 coal plan in Indonesia.

That's a program that they had been investing in for more than a decade. They announced that that project was no longer relevant and that they were, instead, going to build renewable energy instead of the Serabom 3 coal-fired power plant. So I'm

highlighting that the management of KEPCO, the government of Korea, both are shifting very, very dramatically in their thinking and that Bylong was a decision made many, many years ago with the world was a very different place, and when the alternatives to import coal-fired power plant were few and far between. It's worth bearing in mind, renewable energy prices in a multitude of the major electricity markets around the world have dropped by 50 per cent since the start of 2016.

That, in my view, that is the whole genesis of why IEEFA exists. We do financial analysis for public interest research purposes to highlight the magnitude and speed of that technology-driven disruption. South Korea is proposing to do exactly the same thing. They're seeing the end of market for sea-borne thermal coal extremely challenged both by climate policy, but the reality is also it's challenged by technology and cost; relative cost. And the South Korean government is doing everything it can to, in fact, accelerate that cost differential to accelerate the pivot towards renewables. The other point I might mention is that Marubeni Corp – so pivoting to Japan for a minute, Marubeni Corp announced in October – in September 2018 that with immediate effect they were ceasing the development of new coal-fired power plants globally.

Now, you might argue why is that relevant? Marubeni Corp is the second-largest developer of new coal plant globally outside of India and China, and it's second only to Posco. Global fund managers have – well global investing community has put that pressure on to Marubeni. The same fund managers own Posco, own KEPCO and own Marubeni. So exactly the same questions will be asked of the CEOs of the two Korean listed companies as was asked of Marubeni. Now, Marubeni has literally said with immediate effect they will cease developing any new coal-fired power plants and instead they're doubling their investment in renewable energies to 20 per cent of their total global portfolio by 2023.

That is – and they will halve their coal fleet ownership by 2030. That's a pretty dramatic shift. That's the magnitude of the shift that we're looking at, that's the magnitude of the biggest corporations in the world are evaluating and responding to. South Korea has become an absolute leader in that and I would argue, therefore, the probability, even if KEPCO were to actually get approval for this mine, whether they would then actually commence with it – I know they're documents say they want to proceed with it – the chance of them actually proceeding is very, very questionable, given the announcements of the Korean Government in the last three years.

And, in fact, they've actually announced that they're exiting development of new resource projects globally because they've lost too much money on it so, obviously, that then begs the question: well, why would they be, actually, still pursuing it and the answer is maybe they're hoping to flick it to someone else who might want to develop it, which then begs the question of a whole lot of the assumptions. But the other aspect – and probably more importantly for Australia – the chance of them going ahead, building the project and then well within the life of the project, technology, finance, government policy means that the mine actually becomes a stranded asset and is not able to deliver the benefits over the life of the project.

I would say the probability of that happening is extremely high, otherwise we'll have far bigger issues, we'll be dealing with a world of extreme weather events like we haven't seen yet. So to me that sort of pressing financial risk is very, very clear and so a lot of the assumptions on the cost benefit have to be questioned as to whether
5 they're still valid. I might finish there, unless there are any questions.

MR KIRKBY: Thanks for that.

MR O'CONNOR: Just one question, you referenced investment in an Indonesian
10 project; I wasn't quite clear how that goes back to South Korea. So South Korea are developing an Indonesian coal-fired power station?

MR BUCKLEY: Correct. So Japan, South Korea and China over the last – well,
15 this decade have been the three largest developers of coal plants in the world external to their home markets. So they provide a whole lot of government subsidised finance and then the – KEPCOs, Poscos and Marubeni corps and Mitsui to a lesser degree – but those three are the biggest outside of India and China; they've been developing this massive pipeline across Southeast Asia. Now, they're using government finance to do it. What I'm arguing is that the South Korean Government, the Japanese
20 Government have changed their thinking dramatically; they're actually wanting to become proponents and funders of new renewable energy projects across Southeast Asia; that will dramatically reduce the whole demand profile for new thermal coal mines.

25 And, in fact, the IEA, the World Energy Outlook, their 2018 report, says that the seaborne coal market – seaborne thermal coal market will shrink by 80 per cent in the next 20, 25 years under the sustainable development scenario that – the scenario that the energy systems transition or pivot to renewable energy. Now, that's exactly what Marubeni's announced, that's exactly what KEPCO and Posco, the – the South
30 Korean Government have announced and that's exactly what they're doing with the Serabom 3 announcement: they're closing the coal plant development that they worked on for a decade and they're instead building renewable energy.

We would expect that to be the absolute litmus test. 2018, I think, will prove to be
35 absolute pivotal. I actually study India, which is the second largest coal producer, consumer and importer of thermal coal in the world. And I just spent two – a week two weeks ago in Indonesia talking to – sorry, in India talking to all of the leading government and corporates; they are pivoting to renewables as fast as they possibly can. Coal India, the biggest coal producer in the world, just announced that they're –
40 they announced while I was over there a \$5 billion investment in renewable energy. So the biggest coal mining company in the world has announced a \$5 billion investment in renewables in India and their answer as to why: it's the low cost source of generation.

45 I actually met with the ex-chairman of Coal India while I was there and I debated energy security with him in a public debate, televised nationally and they're now talking about life post-coal, life post-peak coal for India, whereas a lot of the IEA

forecasts still talk about India doubling its coal use, whereas the debate – and the chairman’s – the ex-chairman’s – of Coal India’s key comment was he needs to diversify – Coal India needs to diversify into other areas of operation, into iron ore and into renewable energy because they need to actually keep growing the company and thermal coal’s not going to provide that because it’s no longer the cheap source of energy for India.

Prime Minister Modi has talked about that every week for the last four years, the Coal Minister, Piyush Goyal talks about it every week and the Power Minister talks about it every week. It’s quite phenomenal, listening to India and looking at that and I think South Korea and Japan and China are all on exactly the same sort of pivot and Australia is most exposed to that, given our number 2, number 3, number 4 exports are all fossil fuels.

MR KIRKBY: Just going back, you referred – the reference in pages, whether the bit about the Gillespie Report, I think, not - - -

MR BUCKLEY: Yeah.

MR KIRKBY: - - - dealing with sustainable development scenario – what pages were they in that report just so I can go and have a look.

MR BUCKLEY: Yep. The - - -

MR KIRKBY: 10 to 12 or something?

MR BUCKLEY: Pages 10 to 12.

MR KIRKBY: 10 to 12. Okay. Great.

MR BUCKLEY: It’s – so when you - - -

MS ZIMMERMAN: And do you mean the cropping out of the information?

MR KIRKBY: Yeah. You made reference to say that there was the three scenarios and one of - - -

MS ZIMMERMAN: Yeah.

MR: Yeah.

MR KIRKBY: - - - those is the - - -

MS ZIMMERMAN: Yeah.

MR KIRKBY: - - - sustainable development scenario and that hadn’t been – that had been taken out.

MS ZIMMERMAN: Yep.

MR PEARSE: 11, 12, 13.

5 MR KIRKBY: 11, 12, 13. Okay.

MR BUCKLEY: I mean, there's - - -

10 MS ZIMMERMAN: And that will be in the report that will be submitted.

MR KIRKBY: Yep. Okay.

15 MR BUCKLEY: So we've actually put it into our report so that's – they show history, the current policy scenario, their new policy scenario – and you'll see that it's just accidentally being cropped, that their sustainable development scenario, in our report, we've actually just got exactly the same table but with - - -

MR KIRKBY: I think you've added – yeah.

20 MR BUCKLEY: Well, I mean, if you – when you look at the IEA document, it's pretty hard to accidentally crop out the sustainable development scenario; it's on every page in every document in – they put out 600, I mean, that – I don't know, it's – I've never seen it before, I wouldn't have thought that was appropriate to just crop the last two columns, the sustainable development scenario.

25 MR KIRKBY: Okay.

MR BUCKLEY: Anyway, sorry, that's a little bit vindictive of me but - - -

30 MS LEWIN: Yeah, that's fine.

MR BUCKLEY: - - - I find it bizarre that the proponent is actually doctoring documents from the – or accidentally cropping them, I should say.

35 MR KIRKBY: Okay.

MS ZIMMERMAN: All right. So - - -

40 MR KIRKBY: Move on, we've – who've we got?

MS ZIMMERMAN: We'll move to Rod Campbell.

MR KIRKBY: Rod Campbell on the phone.

45 MS ZIMMERMAN: On the phone, yep.

MR KIRKBY: Okay.

MR WAY: I'm just getting- going to grab his number. Sorry, Georgina, George?

MR KIRKBY: We lost Georgina.

5 MR O'CONNOR: We've lost her.

MR BUCKLEY: Did we actually dial Rod in?

10 MR KIRKBY: We're going to dial him in now, I think.

MS ZIMMERMAN: Yeah, yeah.

MS WOODS: Sorry, I am here, I had myself on mute so you didn't get distracted by any noise by me.

15 MS ZIMMERMAN: All right.

MR WAY: That's okay. I'm just letting you know that we're dialling in Rod Campbell. If I accidentally disconnect, I apologise and we'll dial you back in.

20 MS WOODS: No worries.

MR R. CAMPBELL: Hello, Rod Campbell.

25 MR WAY: Good afternoon, Rod. This is David Way from the Independent Planning Commission, secretariat, how are you today?

MR CAMPBELL: Good thanks, David.

30 MR WAY: Fantastic. Can I also confirm that we still have Georgia on the phone?

MS WOODS: Yes.

MR WAY: Fantastic.

35 MR KIRKBY: Okay.

MR CAMPBELL: Sorry, who – sorry, who else is on the phone then?

40 MR KIRKBY: Okay. Rod, you're in, sort of, a room. This is Gordon Kirkby, I'm chairing the panel for the Bylong Project.

MR CAMPBELL: Hi, Gordon.

45 MR KIRKBY: And I'm here with Steve O'Connor and Wendy Lewin who are the panel for this project – for this determination project. So we've been through a

couple of other submissions and, I guess, it's now come up to you so if you would like to - - -

MR CAMPBELL: Okay.

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MR KIRKBY: - - - start your submission, that would be great.

MR CAMPBELL: Sure. So we've been looking at the economics of the Bylong coal project for a number of years now and, I guess, in summary, my view is that the economic case for this project has been getting worse, not better as time goes on. I guess, I'll, sort of, talk to three main points today, looking a bit at the history of the project and its several cost benefit analyses and then we might talk a little bit about more – the more global context, coal demand and the cancellation of terminal 4 and what that means for this project and, lastly, I would like to touch a little bit on employment and local effects analysis and some of that input output modelling and CG modelling discussion that I'm sure we're all at least somewhat aware of.

So, I think, it's worth – and, sorry, just to ask a question – am I just, sort of, talking for 15 minutes, does this run like PAC hearings used to or should I stop and ask for questions at any time?

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MR KIRKBY: Look, we'll cut in if we've got any questions so just, sort of, yeah, just keep talking - - -

MR CAMPBELL: Okay.

25

MR KIRKBY: - - - and if we've got any questions, we'll cut in.

MR CAMPBELL: Okay. Sure. So I think it's worth realising that the genesis of this project, at least according to the original EIS goes back to 2010 and when KEPCO acquired the rights to explore for and apply for extraction of coal in this area and, in 2010, the world looks really different. We've just seen a decade of really strong and steady increase in coal demand and coal prices were at record highs. So the prospects for a greenfields mine in the Bylong Valley probably looked pretty good in 2010, 2011 when the project they were looking at was first considered but by the time of the EIS and my first submission on the project in 2015, the world has changed.

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Coal prices were then at very low levels and in that EIS and our submission to it, we looked at how, according to the EISs own numbers, the operating costs for this mine are actually really quite high. On the EISs own numbers, it's financially unviable at a coal price of A\$80 a tonne and that has been covered pretty comprehensively and I think it's important to realise that that claim about it had never actually been contested despite several other cracks at cost benefit analysis and – yes, I see there's a June or July 2018 revision – it has never been contested that this is a high-cost mine that needs Australian dollar coal prices of between 90 and 100 dollars a tonne to remain financially viable. The trick that gets played a lot in some of these

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assessments is to say, “Well, we will run our sensitivity analysis over this and include a change in the coal price of 30 per cent,” which was recommended by the peer reviewers at one stage.

5 But what doesn't get analysed in that sensitivity analysis is the overall viability of the project. What gets analysed in table 1 – in particular in table 1 of the January 2018 assessment by Gillespie Economics – is largely the value of royalties so what would happen to royalty values if the coal price goes down by 30 per cent and surprise, surprise, it's still in the hundreds of millions of dollars. But what that sensitivity analysis doesn't tell you is whether or not the proponents or any operator of the mine
10 would be losing a lot of money to produce that volume of coal and how likely they are to be willing to sustain those losses. So my key point here is that this is a high-cost mine and no one has ever contested that.

15 While there's a lot of arguments around, “Well, why would a proponent continue to apply for a mine that's pretty marginal?,” the fact that this is a high-cost project I've never actually seen contested. So I guess we fast-forward a little to 2018 and coal prices have bounced back and we might talk a little bit more about that in a minute but the 2018 assessments again assume that the coal price is never going down again
20 and they assume that the project will continue, it will begin operation, or at least moving towards operation the moment that any approval is given and that the project will run consistently for the 25-year lifetime of the project.

It's never considered whether or not it's likely to be delayed, have periods in care
25 and maintenance and how likely is that to happen. And so I think it's quite misleading to decision-makers like yourselves to be presented with this sort of analysis that doesn't make it pretty clear that this is a high-cost mine and again, according to some other parts of their assessment, producing at least at times, some pretty low-quality coal and making it fairly clear that at times it's going to be a very
30 marginal project and so what does that do to its potential to provide royalties and employment benefits; well, it makes them much less likely.

So I guess to sort of summarise this idea or what we're seeing in the various cost-benefit analyses and our submissions on it is that the project had a – looked pretty
35 good when it was first considered but it really never has gotten over this problem that it is relatively high cost, it's producing not particularly high-quality coal and I guess, importantly, it's a greenfields mine at a time when a lot of other greenfields projects are being abandoned and delayed we're being asked to believe that, “No, this greenfields project, despite being pretty small and high cost, is going ahead,” and I
40 don't think the uncertainty around that is adequately explained in any of the economic assessments and various submissions.

So we might move on to talk a little bit about coal demand and the world outlook and what the implication of the Terminal 4 project are. We were just discussing that coal
45 prices are back up but coal prices are not back up because of a resurgence of demand. Coal prices are back up because of Chinese Government decision to restrict Chinese domestic supply and that took place from about April 2016 and, sure enough, as all –

any economist worth their salt knows, if you're restricting supply, like the Chinese Government is, then you would expect prices to increase and that's exactly what we've seen. So overall, we've seen coal demand in the world plateau.

5 We're all anxiously awaiting the International Energy Agency's latest World Energy Outlook that should be released on Thursday, our time, to follow on from what they found last year – that overall demand for coal had declined for two years running. So we're not saying those coal price increases are off the back of demand in Thailand or boosting the imports to India or anything like that. We're seeing, effectively, the
10 coal price set in Beijing – although a bit more complicated than that – with a lot of interesting interplay between Chinese suppliers and Chinese power stations but, effectively, we're seeing coal prices set in Beijing and coal demand very flat everywhere else.

15 And most relevantly for this project and decision-makers in New South Wales, this has been acknowledged by the markets and by our key infrastructure owners and operators. T4 was abandoned formally in late May, or it might have been the first day of June, and this – I guess this was not entirely unexpected. This didn't come as a bolt from the blue. Most coal industry watchers in New South Wales had seen that
20 the demand through Newcastle just hadn't been there much as we had submitted and the case for T4 had disappeared.

So it's clear that coal exports from – coal exports from New South Wales and being shipped through Newcastle are not forecast to increase, and so we're going to see
25 New South Wales coal mines fighting for slices of a pie that isn't growing. When most of the projects that have been before the Commission and the PAC were proposed, they have mostly been proposed off the back of coal demand forecasts and throughput forecasts at Newcastle that would continually get bigger and bigger, and it's – and for example, it's worth just having a little side track to look at what was
30 forecast to go through terminal 4.

If you were looking at the economic assessment that terminal 4 was based on, by this year, 2018, the Port Waratah Coal Services terminals alone should have been
35 shipping more than 200 million tonnes, and the Port of Newcastle was meant to get to 325 million tonnes in the next couple of years. Instead, the entire Port of Newcastle is looking at 165 million tonnes, so projects like the Bylong project and T4 were all proposed based on these assumptions that not only world coal demand would increase indefinitely but that demand for coal shifted through Newcastle was going to certainly increase into the second half of the next decade, and we just
40 haven't seen that, and I think it's worth noting that the same consultants assessed this project, the Bylong project, as assessed the T4 economic assessment.

In 2012, Gillespie Economics estimated that the T4 project could be worth \$60 billion to New South Wales. A year or two later, they had to revise that down to \$33
45 billion, and a couple of years later it turns out that the entire project was worth zero and isn't financially viable, and I really think that we're going to see something pretty similar happen in Bylong, much as we've seen with other greenfields projects.

The Shenhua Watermark project, which I'm sure you've probably all at least heard of, on the Liverpool Plains, it has also suffered big delays. It was also assessed by Gillespie Economics, who estimated that it would bring economic benefit of \$1.3 billion to New South Wales.

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That didn't happen, and it's not looking like coming online any time soon, I guess a little bit differently, because it wasn't necessarily an export project, but not too far away from Bylong you've got the Cobbora proposal near Dunedoo, which, again, Gillespie Economics considered that it would bring net benefits of \$2 billion and instead it has been completely abandoned and taxpayers left to clean up the mess of local councils who – and a lot of local people who had made decisions based on the assumption that, once approval happened, the project would go ahead, and that didn't turn out to be the case, so I think the Commission needs to be aware, that the assessments of the Bylong project are coming straight from the desks of people with a long history of incredibly inaccurate forecasts and a reluctance to admit their mistakes in relation to coal projects.

Gillespie Economics have been around the coal game in New South Wales a long time, and they have never seen a coal mine that they didn't like, partly because they're paid to, so I'm happy to take any further questions on that, otherwise I will just speak briefly about some of this input-output modelling, CGE modelling and local effects analysis that we're seeing here. The Australia Institute has been - - -

MR O'CONNOR: Rod, I've got one question before you go any further.

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MR CAMPBELL: Sure.

MR O'CONNOR: Just going back to the comments you made about China and the domestic supply being restricted, could you just explain that? I didn't quite follow. Everything else I was on board with, but I didn't quite follow the logic of what you were saying there.

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MR CAMPBELL: Yes, sure. So China is the coal market in a lot of ways. It's the world's biggest consumer and it's the world's biggest producer, and a lot of the growth in international coal trade and coal price that we saw leading up to 2010/2011 was driven by China needing to import coal, so if China's domestic supply doesn't quite satisfy its domestic demand, it's of such a magnitude that it really does impact the rest of the world in quite a big way, but China has got its own problems with coal and with its coal industry, certainly not least the air quality problems that major cities and areas near big coal mines have suffered from, from, in adjacent areas, the mining of coal but also, in cities, the burning of coal, but also a lot of Chinese state-owned coal enterprises had quite a number of loss-making mines on their books, and there are also very large numbers of small, sometimes illegal but generally very unsafe coal mines in China, and so, from 2016, the Chinese government decided to essentially clean up the books of its state-owned coal companies and shut down, really crack down on safety and environmental considerations around a lot of other mines, and in doing so they not only closed a lot of mines but they also imposed

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restrictions on production, and so they had been effectively running all-year round aside from the Chinese lunar holidays, and the requirement was for mines to go back to – I think it's two hundred and – I'm going to get the number wrong.

5 It's about 260 days a year, which effectively comes to the lunar holidays and a five-day week, and so some of those restrictions have eased or been reinstated. There has been some tinkering with them over the last couple of years, and I think what's fascinating, although perhaps not particularly relevant to your considerations, is the internal politics within China where China's coal miners, now with their balance
10 sheets looking a lot better, with loss-making and dangerous mines having been removed, they're really enjoying high coal prices while Chinese coal-fired power stations and the companies that run those are not, and so there's some really interesting dynamics going on within China.

15 That's why I say it's not quite right to suggest that, you know, there's a room at the Chinese Communist Party headquarters and people sit around every week and set the coal price. There are actually a lot of factors at play, but there is no doubt that Chinese government policy and the influence of state-linked coal mining and power
20 generation companies are really having a huge impact on world prices, and the prices you're seeing paid at Newcastle are not entirely reflective of a free world market and free world demand and supply. You're seeing the largest supplier and the largest demander in the world heavily impacted by its government's policy decisions. Does that make sense?

25 MR O'CONNOR: Yes. So was there a net result there that they – that there a shift to more sustainable energy production, or was that not - - -

MR CAMPBELL: Yes. Yes, absolutely. And, again, I'm waiting for new figures to come out at the end of this week, but it's certainly Chinese coal consumption had
30 – again, I'm waiting for new figures. I think it might have increased slightly last year, but before that it had been down every year since 2014. So the Chinese government is certainly serious about using less coal and improving their air quality and transitioning their energy system to one that's far less dependent on coal. That has certainly been pretty clear in most of their public statements and where there –
35 and the statistics for a number of years now.

MR O'CONNOR: Thank you.

MR KIRKBY: Thanks, Rod. Do you want to on to the input-output stuff now?
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MR CAMPBELL: Yes.

MS WOODS: If I just interrupt for a second. I'm very sorry. This is Georg. Hello, Rod.
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MR CAMPBELL: Hi Georg.

MS WOODS: I'm going to have pop off. Thanks so much for having me. But I need to go.

MR KIRKBY: That's okay.

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MS ZIMMERMAN: Thanks. Thank you, Georg.

MR KIRKBY: Thanks, Georg.

10 MR CAMPBELL: Bye.

MS WOODS: Thank you. Yes.

15 MR CAMPBELL: So the debate over – debates over employment figures and local economic effects of coal mines – I guess, taking it – again, taking a quick step back, really go back to the Warkworth court case, which I was involved in, where an input-output model and some strange interpretations had led Rio Tinto's consultants to claim that that project – you know, the extension of an existing project would somehow create 45,000 jobs. And that was called out in the Warkworth case and I was pleased that the judge agreed with us that that was nonsense. And, you know, that was taking place around 2013 when there were – you know, when demand for mining labour in the Hunter was very high and, you know, you were getting those stories of phenomenally high wages to get anyone who could possibly drive a truck into the mines there.

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And so in those kinds of conditions, it was just ridiculous to use an input-output model that assumes you can have as much labour as you like without taking anything away from any other project or any other industry. And that – I guess that court decision and that logic then impacted a number of other court cases. The one around the Ashton Southeast open cut and then all the big Galilee Basin court cases in Queensland where – and I guess, the best known is the Adani example where Adani's input-output model said that it would make 10,000 jobs, where as in court, due to the Warkworth case, they decided not to use that and they used a CGE model to come up with a more realistic estimate of 1500 jobs.

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And so, I guess, the point around all this is any of these models they're only as good as their assumptions. But more importantly, I think – I don't think it's good enough for proponents to – as is happening here – present decision-makers with two different models, with a bunch of different assumptions and say job creation here. It will be somewhere between zero and 800, which is what they're saying to you. And I think it's not good enough because – well, firstly, it's a ridiculously large range, but it's being dishonest in terms of a couple of key assumptions here. And, first, is that one that the project is going to start on time and run consistently through its planned life, and as I've discovered, I think in the case of this project, that that's, you know, certainly something that at least needs to be questioned.

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But I think the bigger problem – and when the pack in relation to this project had asked for different modelling and, you know, there has been a lot of consideration over, you know, how this sort of work should be done in New South Wales. I was quite involved in some of the arguments around new guidelines and this idea that we will do local affect analysis, I think the problem with either of these models and using them, so a local – analysis is no one has actually been to the locality.

This is just tweaking various models and giving you a range of answers and saying, “Here, pick an answer you like.” None of the consultants involved, not Gillespie Economics, not Cadence – as far as I’m aware, none of them has actually been to Bylong, interviewed local businesses, talked to local stakeholders, asked about their supply chains, asked about their difficulties or otherwise with labour skill shortages. This isn’t any real local affects analysis. It’s people sitting in Sydney or, in the case of Cadence, just down the road from me in Canberra tweaking their models until they’re giving you something they think will satisfy you, rather than really providing any kind of in-depth analysis. And so I guess, to round it out – I’m probably pretty close on time here, if not a bit over. I think it makes sense to, on that note, look at this sort of local impact here.

What we’re looking at is not do we have X number of jobs and royalties versus some environmental and social impact. We’re – you’re being asked to approve something that gives the right, but not the obligation to develop. And so it’s about giving the decisions around what gets developed in the Bylong Valley, taking that, to a large degree, out of the community’s hands, out of elected government’s hands and giving it to the project proponents. I don’t pretend to know a lot about the region, but from what I understand and what I read in the earlier pack deliberations, this is a project that will have quite a significant impact on what goes on in the Bylong Valley. There aren’t currently coal mines there, and given the, you know, financially marginal nature of the project, we’re really looking at giving approval to a company that comes with no obligation to provide the benefits that they’re claiming.

It gives them the options of maybe developing while coal prices are high, and then the option to stop or walk away or to sell, and we’ve seen that a lot in coal markets in Australia recently. We’ve seen Rio Tinto leave the Hunter, and we’ve seen their projects start to go down the food chain from those tier 1 companies to smaller coal-specific companies. So I guess the decision you’re being made – you’re being asked to make is not should there be a coal mine there, but it’s should we be giving this proponent the options to develop at some time in the future or not at all or partially. It gives a huge number of options to the proponent, all of which have local impacts, all of which impose a great deal of uncertainty on other industries and landholders in that region, and that comes with costs.

And so I feel like the cost and benefits of the project are, in fact, quite unclear, given that it’s quite unclear when, if or how it would be developed and what those other impacts are. I think the most economic – from an economic perspective, I think the most sensitive thing to do would be to not approve this project, wait and see, allow existing coal mines to fill the demand for coal there in Newcastle that will certainly

exist for some time, but approving a dubious or – approving a new mine with only dubious potential to compete for this shrinking pie, I don't think is in the best interests of the New South Wales community, and I certainly don't think it's in the interests of the Bylong community.

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MR KIRKBY: Okay. Thank you. Thanks for that, Rob. We're going to have to move on, I think. We've got another speaker - - -

MS ZIMMERMAN: Yes.

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MR WAY: I was going to say, in the interests of time, I know we've gone on a bit over. Everyone's still happy to continue on?

MS ZIMMERMAN: Yes.

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MR KIRKBY: Yes.

MS ZIMMERMAN: Thanks so much for that, Rod. We're going to have to move on to the next expert who only has until 5.45. So - - -

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MR CAMPBELL: No worries.

MR KIRKBY: That's all right. Thanks very much for that.

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MR: Thank you, Rod.

MR FARRELL: Thanks, Rod.

MR CAMPBELL: So I'll follow up with my written submissions.

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MR KIRKBY: Yep. That will be good.

MS ZIMMERMAN: Great.

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MR: Thank you.

MS ZIMMERMAN: Thank you.

MR CAMPBELL: Thank you.

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MS ZIMMERMAN: So it's William Steffen.

MR STEFFEN: Hello, Will Steffen speaking.

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MS ZIMMERMAN: Hi, Will. How are you going?

MR STEFFEN: I'm very well.

MS ZIMMERMAN: This is Nadja from the EDO.

MR STEFFEN: Thank you. Yeah. Apologies for the noise. I'm sitting here at the airport.

5

MS ZIMMERMAN: No worries. We're just at the IPC meeting, and you're on speakerphone.

MR STEFFEN: Right. Okay.

10

MR KIRKBY: Hi, William. It's Gordon Kirkby. I'm the chair of the IPC panel, and you have Wendy Lewin and Steve O'Connor as my fellow commissioners, and David Way from the secretariat. So if you could just – yeah. We're sort of getting a bit short of time, so if you could just go straight into your submission, that would be great.

15

MR STEFFEN: Okay. Look, my submission is based in the fact that no new fossil fuel developments – that is, no new coal mines – should go ahead on the basis of their impact on the climate system. My line of argument goes like this – virtually every country in the world, including Australia, has signed the Paris climate accord, which aims to limit temperature rises between 1.5 and 2 degrees Celsius.

20

Now, that is a scientific question – becomes a scientific question as to how much we can emit and stay within that temperature range. So what scientists do this is to use what's called a carbon budget, and that is the amount of carbon that can be emitted from now until no more carbon can be emitted to meet a given temperature target. So we can calculate what that budget looks like within fairly reasonably small error bars. So there's a lot of confidence in the numbers that we come up with. The science is very strong on this.

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When you do that, you find that somewhere between 60 and 65 per cent of existing fossil fuels reserves that are being exploited today – so it's existing coal mines, existing gas wells, existing oil wells – about 60 to 65 per cent of that needs to be left in the ground unburnt if we are to have just a two thirds chance of meeting two degrees. So these are very generous budgets. So the obvious implication of that is that no new fossil fuel developments can be – are compatible with meeting the Paris targets. In other words, our task to meet the Paris targets is to phase out existing coal mines, oil wells, gas wells, well before their economic lifetime is over. That is the only way we'll be able to meet what we've signed up to in terms of the Paris targets.

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There is an interesting further bit of work done by economists saying if we're going to meet this carbon budget, what is the economically most sensible way of doing it in terms of the various fossil fuels, oil, gas and coal. When you do that analysis, what you find is that oil is the most valuable of the fossil fuels, it's the most versatile, used for transport, also lots of other things. Coal is the least valuable fossil fuel. It's used primarily for electricity generation, which of course now can be substituted by renewables. So when you do that analysis, you find that globally, nearly 90 per cent

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of existing coal mines cannot be exploited. In other words, only 10 per cent more of existing coal mines can be exploited and be compatible with two degrees. So it's absolutely clear that we can't be opening up any more coal mines either here in Australia or around the world if we are serious about the Paris target and about
5 limiting the damage of climate change.

So that, in a nutshell, is what the argument is all about. This is well-established science. There's no argument about the fact that we have to limit carbon emissions quite drastically, in other words, get them down very fast, very deeply – basically de-
10 carbonise the global economy in two decades, if we're to meet the Paris target. So to put it basically in one line, you cannot deeply and quickly reduce emissions by actually increasing emissions by opening up new coal mines. So that in a nutshell is the basis of my submission.

15 MR KIRKBY: Okay.

MR O'CONNOR: No questions? No.

MR KIRKBY: Thanks very much for that, William.

20

MR STEFFEN: Sorry, are there any questions?

MS ZIMMERMAN: I – no, there's no questions.

25 MR WAY: No questions.

MR KIRKBY: No, I think that's – that was pretty clear.

MR STEFFEN: Okay. Okay, look - - -

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MR KIRKBY: Well done, Will. Compelling and brief.

MR STEFFEN: Yes. Look – look, if anything does come up - - -

35 MR KIRKBY: Yes.

MR STEFFEN: - - - just give a shout. I will be happy to provide further supporting information if you require it.

40 MR KIRKBY: Okay.

MR: Thank you.

MR KIRKBY: Thank you.

45

MR STEFFEN: Okay.

MR KIRKBY: Great. So I think – can we get in writing the further matters?
Because we've sort of come to the end of our time, I think.

MR ANDERSON: I can give you a couple of headlines, if you want.

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MR KIRKBY: Yes. Yes.

MR ANDERSON: I might just pull up the slides, if I can, to do that – to be able to
do that quickly. Yes. But, basically, so specific storage is a property of the earth and
10 water.

MR KIRKBY: Yes.

MR ANDERSON: And it tells us how much water gets released from an aquifer
15 when it's pressurised, when the pressure level drops every metre.

MR KIRKBY: Yes.

MR ANDERSON: And there's different values for different sediments below in the
20 earth. And previously, we've had a set of literature about these which had existed
since 1965, and they've just been cut and pasted from text books through the ages.
In about 2015 to – we started realising that model predictions weren't matching what
we were seeing in the field, and up in the basin. And people started doing some
work, Richard Evans, from SKM, now Jacobs, and he suggested that there was new
25 limits on storage and – I'll skip through all the slides, I will just give all the proper
references. There's groundwater flow operations for specific storage. So you can
see that specific storage, which controls how much water gets released from a
confined pressurised aquifer controls the rate of pressure that draw-down.

30 It is related to the hydraulic conductivity, how easily water flows through the earth to
the distribution of pressure levels through the space and how they affect change in
space. And then we have recharge, natural discharge, aquifer interference. These
storage controls how fast the water levels fall when you pump, how fast they rise
when we stop pumping, or when it rains. It also helps control because it's in this
35 time term – if you move it over here, we've got hydraulic conductivity, how quickly
the pressure just moves away from the aquifer interference. Charles Theis, who
defined the transient groundwater flow questions, and it's important – there's a lot of
people that say it isn't that important, the hydraulic conductivity is more important.

40 They can be right, but they can also be wrong. In July 2018, UNSW has published a
new paper, the Introduction of Literature, and that confirms the suspicions of Richard
Evans and others that the specific storage value cannot be larger than one times 10 to
the minus five. So that's – if you think about that as a cubic metre of ground, that's
like teaspoons of water gets released from the ground when it gets depressurised – if
45 you contrast this new science and this new understanding which has peer-reviewed,
published in international literature and accepted and you look at the old tables and
values that come from 1965 and earlier, they're orders of magnitude different.

Ten to minus 5, sure. Some rocks have 10 to minus 5, but people have been simulating or understanding that the storage coefficients in these clays and sands are orders of magnitude larger, 10 to the minus 4, 10 to the minus 2. So we're learning more about how groundwater works, and we have to be prepared to change our
5 assumptions. So if you look at what was adopted in the model to predict the impacts of this development, they use the old literature values. The information became available that something was different in 2015. We're here today. I believe the model still has these old values in it.

10 MR KIRKBY: Right.

MR ANDERSON: So what does it mean – I think it might be a question for the IESC to consider, but you've got this graph on the right-hand side here. It's not for this site. It's just something I've made to demonstrate how important this issue is.
15 This aquifer is large. It's a sand aquifer. It's thicker than Bylong and it's pumping about 237 mega litres of water a year. Then put in values of 10 to the minus 3, 10 to the minus 2 – 4 in the model. That's these red lines up here. I've coloured all the warm colours as what we now know as not mathematically feasible. If you put in feasible values at 10 to the minus 5 or less, you get these cool colours.

20 So all of a sudden, you're looking at 1.3 kilometres from your aquifer to interference or four kilometres to six kilometres, you predict more drawdown and you predict more drawdown faster. So if this scientific understanding which has been accepted and published is correct and the model is – are calibrating their models with these
25 large values, they're creating artificial water in their model to limit the drawdown, and – but they're still calibrating their model which means, to achieve that, they must be misunderstanding recharge processes. So something doesn't quite add up and there's a lot more uncertainty than what we realised, and I think it needs to be looked at a lot further.

30 MR KIRKBY: Okay. They – you will provide more info.

MR ANDERSON: I will provide more info. Yes.

35 MR KIRKBY: Okay. Good. It has been valuable. Thank you very much. So I think that concludes – yes, if you just sort of follow up with the written submissions. There a timeframe for that - - -

40 MR WAY: Ideally, by the seven days from - - -

MR KIRKBY: Yes.

MR WAY: - - - after the public meetings. So kind of that midweek to - - -

45 MS ZIMMERMAN: So Wednesday - - -

MR WAY: - - - mid this week timeframe.

MS ZIMMERMAN: Yes. Yes. Okay.

MR KIRKBY: Okay. It would be good to - - -

5 MR PEARSE: We certainly appreciate the opportunity to present in this forum.

MR KIRKBY: Look, thank you for coming down because I think if we were to tack this onto the end of the meeting the other day, we would have all been - - -

10 MR ZIMMERMAN: Yes.

MR KIRKBY: - - - very tired.

MS PLESMAN: You would have been asleep.

15

MR KIRKBY: So we do appreciate you having the time to come in. Is – probably, given some of the technical data, it’s probably a - - -

MR O’CONNOR: A better forum for it.

20

MR KIRKBY: - - - better forum for it, yes, which is good.

MS ZIMMERMAN: Yes.

25 MR KIRKBY: So thank you very much.

MEETING CONCLUDED

[5.44 pm]