



Darwin – The Australia Institute

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Darwin Convention Centre, Darwin

Speaker: Mark Ogge

Hon. Justice Pepper: Thank you. I think we have our next speaker from the Australia Institute? When you're ready, if you can state your name and who you're appearing in front of. Thank you very much.

Mark Ogge: Thanks, Chair. My name's Mark Ogge. I'm Principal Advisor at the Australia Institute.

Hon. Justice Pepper: Thank you very much, Mr. Ogge. When you're ready.

Mark Ogge: No worries. I'd just like to thank the inquiry for giving me the opportunity to comment on the draft final report. We really appreciate it. I thought I'd just start by going through ... I'm sorry. Quickly introducing the Australia Institute. We're a not-for-profit NGO. We've been doing work on climate and energy issues for over 20 years, now.

We've done a large body of research on unconventional gas impacts over the last five years. We publish the National Emissions Audit, which is done by Hugh Saddler. We have a climate and energy programme, which is taking on work of the Climate Institute, which passed that work on to us recently. We also commission two reports that the inquiry cites in the draft final report from the University of Melbourne. One, a review of methane emissions and the other migratory emissions. We've also submitted some work on the economic impacts to the inquiry, as well.

Thank you for bringing us along. To be clear at the start, our view is that fracking in the Northern Territory shouldn't go ahead under any circumstances, because we believe it's going to have major climate impacts. That it's just unconscionable to allow that.

A whole new fossil fuel extraction industry, particularly on that scale, to go ahead. I've just put there a couple of quotes from Ian Dunlop, who's the former Chair of the Australian Coal Association. The former CEO of the Institute of Managers in Australia. He also led the government's task force on emission trading. He worked for years at Royal Dutch Shell internationally.

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He's somebody who's very intensely into all this stuff, and comes from a very informed perspective. This is his submission to the inquiry on the draft final report. He says, "In addressing the potential impact of Northern Territory fracking on global and regional climate change, it is fundamentally flawed as it ignores the systematic existential risk that's now being locked in by global climate change inaction."

Then he's going on to say that, "To suggest that the development of a major shale gas hydraulic fracturing industry in the Northern Territory would have negligible impact on climate warming, and that the associated emissions, whether figurative or life cycle represent a medium risk of low consequences, demonstrates a serious failure to understand the existential nature of climate risk and its potentially catastrophic impact on the Northern Territory."

I think that's his view, but it reflects my concern that climate change is a very- a big danger at the moment. I guess I'm wondering whether the panel acknowledges the magnitude of that risk? On the slide at the moment, we've got projections from the IPCC. They're looking at by the end of the century, four to six, potentially up to eight degree warming.

World Bank has said that that's incompatible with an organised global community. I'd just be interested in that context, approving a whole new fossil fuel industry of that scale seems irresponsible to me. I'd just like to understand whether the panel accepts those IPCC projections and the World Bank interpretation of those consequences.

Hon. Justice Pepper: We certainly do. I would have thought that it's not just incompatible with an organised local community. I would've thought it's incompatible with life.

Mark Ogge: Yeah.

Hon. Justice Pepper: Full stop.

Mark Ogge: Okay, Okay. No worries.

Hon. Justice Pepper: Nobody disputes science.

Mark Ogge: Yes. Okay, well that's good to know. So, that just helps me understand a bit.

Hon. Justice Pepper: That's been stated very early on by the panel very clearly in relation to a number of people who have presented here.

Mark Ogge: Yeah. Okay. Thank you Chair. That's good. That's really comforting to hear.

So, I'll just bring you to the relevance to the Northern Territory. The Northern Territory's particularly susceptible to climate impacts and the Australian government has pointed out on the environmental impact website that currently there's 11 days in the Northern Territory over 30 to five degrees per year and in 2070, that's estimated to increase to 308 per year without strong action on reducing global warming and that combined

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with the increased humidity, et cetera, is just a bit of a terrifying thought on the thought for Territorian and heat waves kill more Australians than all other natural disasters combined.

So, I think it's a very real threat to the Northern Territory community in particular so yeah, I just wanted to reinforce that that's the basis of our concern.

There's a couple of just early things that are kind of in the introduction for the greenhouse gas to chapter that I just wanted to point out.

The first is that on page five of the report it says, "The shale gas revolution turned the US from an energy importer into an energy exporter."

That's actually incorrect. The US still imports a lot of oil. It's reduced the amount of imports so that statement's incorrect and that's pretty kind of an important framing statement in the report so we suggest that it should say, "The shale gas revolution did not turn the US from an energy importer into an energy exporter just to be ... "

Hon. Justice Pepper: So you're saying it exports no gas? Oh, sorry. It exports no energy?

Mark Ogge: It exports a little bit. There's crude oil exports down there but there's a tiny little green line at the bottom.

Are you having to see the presentation?

Hon. Justice Pepper: Yes. Oh, yes. What you can't see is there's a big screen, huge screen in front of us.

Mark Ogge: I'm sorry.

So, the green line at the bottom is crude energy exports and the blue ... Sorry, there's crude production and crude imports, so shale oil and shale gas means that they import less energy but they still actually import a lot of energy into the US.

Hon. Justice Pepper: I don't think that's what that sentence says though. It doesn't say that it doesn't import any energy.

Mark Ogge: "Turned the US from an energy importer into an energy exporter."

Hon. Justice Pepper: It does both, does it not?

Mark Ogge: Yeah, but it implies by saying it turned the US from an energy importer to an energy exporter implies that there's a net export.

Okay, then that's the interpretation of that part.

Hon. Justice Pepper: Thank you for that clarification.

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Mark Ogge: Okay. Thanks.

And similarly, shale gas is a form of natural gas. This is from the first few lines in the greenhouse gas section. "Shale gas is a form of natural gas and is an important source of energy in the Australian energy market."

We don't produce any shale gas at the moment so it's not the important source of energy so we think that should say that shale gas ...

Mark Ogge: Yep. And I think that's important because it frames the whole title of the report so important in that sense.

So, the draft final report backdates the 365 petajoules a year, shale gas fuelled as the basis for all its risk assessments.

And it finds that on that basis, the consequences, the amount of greenhouse gas emission are low, therefore the consequence is low, therefore the risk is acceptable.

So, that single gas field in isolation, so just assuming that single gas field would contribute, according to the report, around 5% of Australia's greenhouse gas emissions.

So, we at the Australian Institute, we think that's an enormous amount of greenhouse gas to be produced by one shale gas field or any shale gas field and we think to increase Australia's greenhouse gas emissions by 5% is an appalling idea.

So, I would just like to ask whether the inquiry feels that it's a low consequence to increase Australia's greenhouse gas emission by 5%. I'd just like to understand.

Hon. Justice Pepper: This is unfortunately ... You're presenting to us. It's not a two way conversation so please continue with your presentation, Mr Oak.

Mark Ogge: Okay.

Hon. Justice Pepper: You do understand the point you're making, though?

Mark Ogge: Okay. Yeah, but I do think it's also a situation like this is an important opportunity in terms of accountability and transparency for people to actually inquire into the [crosstalk].

Hon. Justice Pepper: We will be doing a community forum in Darwin next Saturday from nine till 12 that'd be much more of an open discussion Q and A. You're more than welcome to attend. We'll also be doing that type of format and discussion in Alice Springs, Katherine, Tennant. Again, you're more than welcome to attend any of those or all of those if you wish.

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Mark Ogge: Okay. I think it's difficult to ask in depth questions in those kinds of situations but I'll see if I can make it.

Hon. Justice Pepper: Thank you.

Mark Ogge: Thanks for the invitation.

So along the same lines, that Paris commitment to 26 to 28 percent below 2005 levels by 2030 and so I won't phrase it as a question then but if we increase our emissions from the gas industry then other industries have to pick that up.

So the question is should that be the manufacturing industry? Should that be the tourism industry? Should that be the agricultural industry? Somebody else has to shoulder that burden if we increase Australia's emissions by 5%.

There's obviously the scenarios needed by the DPIR and they have the scenario that I think is 1240 petajoules a year which is the 3400 petajoules a day and that would have [inaudible] emissions according to the report in table 9.4 of 98.8 million times of emissions and sure, some of that is encounter in isn't burnt in Australia or quite a lot of it but putting the equivalent to almost 20% of Australia's emissions into the atmosphere is an enormously, I would say, damaging thing to do that we are very concerned about.

So that's the DPIR scenario. Now, the report based its entire risk assessment only in the isolated 325 petajoules a year, gas fuel, and we think that's actually not consistent with the terms of reference which say that the cumulative impacts and risks should be looked at.

So there is a risk that the production levels could be higher than 365 petajoules a year. In fact we think ... Where our view is it's pretty likely when you throw in shale oil as well and at the very least, a number of scenarios should have been worked out. We think that's not in line with the ... Doesn't fulfil the terms of reference.

The other big question is there's no reference to shale oil. So, in the US and in the US in particular, shale oil is a major driver of shale development over there. The Geoscience Australia think it's likely to be or could be a key driver of development here. There's a 4.7 billion barrel estimate from the EIA of shale oil in the Northern Territory and liquids are very valuable so they are a key driver in development so that can actually make it much more profitable and can actually drive development.

So, it seems really strange to us when given the terms of reference which don't say shale gas in particular does help us to say unconventional reservoirs.

It's very.

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Mark Ogge: Unconventional reservoirs, we think it's strange that the inquiry report is silent on shale oil and this is a ... I actually took this from Tim Forcey's submission and that just gives a bunch, it's illustrative, so it just uses ... it makes assumptions about the value of a barrel of oil and the value of a certain amount of gas and it shows you, depending on how wet or dry the resources that's being exploited, the difference in the relative value of gas and liquids.

So, it's a really, really important thing, I think and I think it's also really worth pointing out that ... well, yeah anyway, I just think it needs to be ... before shale oil ... shale oil has a whole range of impacts and risks associated with it as well, so I think it's-

Hon. Justice Pepper: Have you read the terms of reference? You're aware that there's a particular definition given to unconventional reservoir? That only picks up gas?

Mark Ogge: Okay, does that ... but is shale, is oil not on this, is there some reason that it can't be extracted?

Hon. Justice Pepper: No.

Mark Ogge: Because there's the whole-

Hon. Justice Pepper: As you've pointed out, we're unfortunately guarded by our terms of reference. I made exactly the same point to Origin this morning, when other paths were begun to stray down but the definition of unconventional reservoir limits us to shale gas only.

Mark Ogge: Okay. Well, I think that's really unfortunate and also, we have-

Hon. Justice Pepper: We didn't draft them.

Mark Ogge: No, no and I accept that. That is a very unfortunate constraint. Maybe I'll need to hold another inquiry on that, before that's allowed to go ahead. I mean, Origin-

Hon. Justice Pepper: I'm not volunteering to chair it.

Mark Ogge: I sympathise but Origin are actively looking for ... are actually targeting shale gas in the Northern Territory as well.

Anyway, so on the 365 petajoules a year thing that the whole risk assessment was based on, we think that's possible but Queensland, for instance, went from a standing start to 1500 petajoules in under eight years and they don't have shale oil to make it even more profitable.

Hon. Justice Pepper: It's probably something we can look at. At some point.

Mark Ogge: The Marcellus shale, is a resource that's smaller than the Northern Territory resource and that's doing 6860 petajoules a year, last year.

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So, our view is that the risk analysis should be done on the entire resource. We looked at the entire resource and we looked at the over the lifetime of 256,000 ... 250 odd thousand petajoules, the combustion emissions alone would be 12.2 billion tonnes of CO₂, equivalent; and you can see we've done a couple of ... we've assumed 5% fugitive emissions, you could make whatever assumption you like but fugitive emissions could potentially increase that a lot but the main point is that even if we assumed fugitive emissions is zero, we don't think this should go ahead because 12.2 billion tonnes of CO₂ into the atmosphere is just unacceptable, in our view.

Now there's a few other things ... that's kind of the guts of what I want to say but there's a few things that I want to point out. There's a number of comparisons that we think are misleading or incorrect in the report and one of them is that, at the beginning of the report, for some reason the draft report compares the methane emissions from natural gas production to the annual anthropogenic greenhouse forming effect of carbon dioxide, so all carbon dioxide.

So, for us, it seems a strange comparison. To take a subset of natural gas emissions and compare it to the entire output of carbon dioxide. Sure, compare carbon dioxide to natural gas emissions. Sure, compare methane emissions globally to carbon dioxide emissions globally but to take a small part of ... arguably a small part of the natural gas emissions and compare it to all carbon dioxide emissions, it seems like it's kind of a way to make methane emissions look small and there's also not really a reason to, in the context of the report, to make that comparison on a global scale.

But anyway, in our view, the calculation is in footnote 17 and it's got this equation, 2.3% x 0.9% x 0.33% and we take issue with all three of those numbers. The 2.3% is meant to be the effect of methane, compared to the annual added climate effect of anthropogenic carbon dioxide greenhouse effect, over the decade and yet the report uses a global warming potential over a hundred years, when the correct factor to use would be the 10 year global warming potential because you've made the comparison over a decade.

In which case, the climate effect would be 7%, not 2.3% and the other way you can calculate it is with radiative warming factor. In which case, the result would be 6%.

The second figure is 0.9 ... 0.19 I should say and that's that fossil fuel methane emissions make up a total of ... the proportion that they make up of total global methane emissions. So, our issue with this is that it compares fossil fuel methane emissions, including from natural sources, with anthropogenic CO₂.

So, the more straight forward comparison would be to compare anthropogenic methane emissions with CO₂ emissions and if you did that, rather than fossil fuel emissions being 16% of ... sorry, fossil fuel methane emissions being 16%, they'd be ... I'm confusing myself here ... they'd be ... sorry, rather than being 19%, they'd be 32%.

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So, we just think the comparison is flawed in that case; and the third figure, which is 0.33%, which is the percentage of fossil fuel methane emissions that come from natural gas, we think that shale oil should be included there because we're talking about shale reservoirs that are going to have gas and oil, so we think the appropriate comparison here would be two thirds. So, that really changes the equation and the other thing that actually is the real clincher and I've just taken this quote from Dimitri Lafleur's submission, who's one of the Melbourne University researchers. He says, "The most glaring omission" and that's in reference to this comparison, "is that the effect of methane emissions from gas production are being compared to total global carbon dioxide emissions, without acknowledging that 18.2% of the carbon dioxide emissions come from that same gas production."

So, the gas that is being burned, it's ignoring all the actual combustion emissions in that comparison that comes down to the 0.2%. So, we don't think that this entire comparison even is really relevant and needs to be in the report but things like that, when you put it in, it frames the report and gives a, we think, a misleading impression about the importance of methane emissions, it understates ... but all of those things consistently understate the impact of methane emissions on the world's climate. That's our concern with that.

Look, this is probably going into it a bit much but it's kind of important, there's a section of the report that says that methane emissions from natural gas, as a fraction of production, have declined from approximately 8% to 2% over the last three decades and this research has actually come out since the draft final report but it's important that NOAA and NASA, in a report called Worden reconciled the methane budget anomaly and found that actually, fossil fuel methane has increased by 12 to 19 million tonnes a year and it actually resolves the anomaly that [Schweitzker Et Al 01:49:46] report is referring to. Talking in a little more detail but it's probably just something to note I think.

Finally, really on the likely level of methane emissions, this is from our report that the draft report cites about a review of methane emissions among conventional gas in Australia. We compare the various levels of measured methane emissions, when methane's being measured in the atmosphere to the factor based emissions assumptions that are used by so many American petroleum Institute Compendium and other sources. You can see some of them are ranges, but the basic point is that every time they figure out a theoretical factor based likely level of emissions, and then every time they fly a plane over these shale fields, they find actual leakage rates that are far, far higher. Higher to the point of being pretty scary, up to seventeen percent.

Now, the draft final report essentially dismisses the higher ratings. What it says is in particular it is difficult if not almost impossible to distinguish between many sources of emissions, when considering the results from top down investigations. So, it's essentially dismissing all of those higher measured emissions in favour of the factor based ones that aren't measured. They're based on assumptions.

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The thing is that statement is actually incorrect to say that it's almost impossible to distinguish between the many sources of emissions. I'm sorry. All of those reports that we cite do exactly that. They go into great detail to distinguish between the various sources of emissions. I'm just pointing out one example here. You can look at more, in our submission. Frankenburg et al. 2016 used top down infrared imaging to be able to accurately identify individual methane plumes, as small as two kilogrammes per hour. So, the statement that it's impossible, or difficult to actually identify the sources of the emissions is inaccurate. If you look in detail at those reports, you'll ... or just look at these photos, where they can actually pinpoint them to pipelines, processing plants, well pegs, et cetera.

So, we think it's pretty clear that you can't just dismiss all the measured stuff, and assume that the theoretical bottom up measurement is correct. The classic example is actually Allen et al., which is one of the biggest studies of bottom up ever done. They did it. There's details in our submission, but they measured a huge amount of well pads, and processing plants, and belvs and widgets, all over the place. They came up with, I think, 1.8% leakage rate. Then, they were found to have misinterpreted their measuring equipment, and were out by a factor of three to five.

That's proven. That is shown to be the case. Nobody has disproven these top down atmospheric measuring that are undertaken by the NOAA, and a whole lot of very, very highly regarded organisations. So, our recommendation is ... I've actually missed a slide there, but just to kind of make it clear, what we could be talking about in terms of a comparison that we've been making in terms of the total resource. If you burnt that total resource, which essentially is on its way to happening in the case of Marcellus shale. It'd be the equivalent to building, depending on your assumptions on fugitive emissions, somewhere between 50 and 130 coal power plants in Australia. No one would ever consider doing that. No one should ever consider opening up this resource, for exactly the same reason.

So, our recommendation is that the development of gas fields in the Northern Territory should not go ahead, under any circumstances, regardless of the level of fugitive emissions, from hydraulic fracking operations. Thank you.

Hon. Justice Pepper: Thank you. Have you got ... Are those slides what was delivered, very late to the inquiry, yesterday? On Sunday?

Mark Ogge: The slides I just brought in on a USB.

Hon. Justice Pepper: Right.

Mark Ogge: But the report, and apologies it's so late, but the report was delivered late on Sunday.

Hon. Justice Pepper: No, no. That's fine. I'm glad we've proceeded. That's the main thing. I just ... So, we have got a copy of your slides, as well?

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Mark Ogge: Yes, you do. Yes.

Hon. Justice Pepper: All right. Okay. Yes. Thank you.

Questions?

Yes. Dr. Beck.

Dr. Vaughan Beck: Yes. Just a couple of questions, observations. You're making the point of saying, I think in your concluding statement that you shouldn't go ahead and utilise all of the resource that's available in the Northern Territory.

Mark Ogge: We don't think the industry should be allowed to go ahead, because it's unpredictable. Well, it's likely to be massive.

Dr. Vaughan Beck: Okay. Now, in terms of the numbers that you were using. You're using 257 odd thousand petajoules, as the resource?

Mark Ogge: Yes.

Dr. Vaughan Beck: Now, in table, I think it's 6.1, it talks about a reserve, and then contingent resources, and prospective resources. Are you aware of the differences between those?

Mark Ogge: Yes. I am.

Dr. Vaughan Beck: So, the 257,000 petajoules represents which category?

Mark Ogge: The total resource.

Dr. Vaughan Beck: Total resource.

Mark Ogge: Sorry. I've taken the 257,000. I didn't see table six point one. I was looking at chapter nine, on the greenhouse gas emissions for ...

Dr. Vaughan Beck: In your submission, you've quoted 257,000 petajoules .

Mark Ogge: Yes.

Dr. Vaughan Beck: As the resource.

Mark Ogge: Yes.

Dr. Vaughan Beck: That resource, I think is what's called a prospective resource.

Mark Ogge: Yes. That's correct.

Dr. Vaughan Beck: A prospective resource ... Just so we're talking the same things.

Mark Ogge: Yeah.

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Dr. Vaughan Beck: There's a reserve, which are proved.

Mark Ogge: Yes.

Dr. Vaughan Beck: There are contingent resources?

Mark Ogge: Yes.

Dr. Vaughan Beck: Which are not yet commercial, because of need of further development of technical, or better economic conditions. Then, the third category is what one that I think you've used, which is prospective, and that's based upon speculative data, and the ... so there's a high level of uncertainty attached to it, is the first thing.

Second thing is that there is a very large ratio between contingent resources and prospective resources. Just taking the example of a table six point one, there's a factor of at least 50 times the difference level, in resources. Just trying to put some context around it.

I'm wondering, have you any sort of indication of what that would do to Australia's production, if we used all of the contingent resource that you are talking about, 250,000 petajoules , over a 50 year period?

Mark Ogge: Yeah. That's the 12.2 billion tonnes of CO₂.

Dr. Vaughan Beck: In terms of Australia's current use of gas, averaged over a 50 year period, that represents more than 100% of Australia's current usage of gas.

Mark Ogge: Yeah. It's assumed that most would be exported. That's the assumption that the inquiry uses as well.

Dr. Vaughan Beck: We haven't made any assumptions, in regard to utilisation of 250,000 petajoules. That's your assumption that you're saying that all of that resource will be used. Certainly, that is a conting- Sorry. It's a prospective resource. There's no guarantee that will be that amount of resource available to be actually extracted, under technical and commercial conditions.

Mark Ogge: Yeah. To be clear, we're not saying that that 250,000 petajoules would definitely be extracted and burned. We don't know what's gonna happen. The comparison I'm making is that in the case ... So, that's an unknown. With reserves, as I'm sure you're aware, a couple of years ago, everything was prospective reserves, in the Northern Territory. As time goes on, they get proved up, and prospective reserves, turn into contingent reserves, turn into ... Sorry. The prospective resource, turns into contingent reserves, turns into proven reserves, and may get exploited. More gas is sometimes discovered, and added to the prospective reserve.

For instance, before about 15 years ago, nobody would have thought any of this gas could have been extracted, because the technology didn't exist. So, the resource could actually end up being greater, in theory. Let's hope not,



but I agree. What I'm saying is I completely agree with you that it's an unknown, but if you're doing a risk assessment, you need to base the risk assessment on the figure that you sight as being the resource. Because it's not saying that that would all be extracted, but there is a risk that that would all be extracted, or a large part of it would be extracted. The figures we're putting up there, is we're saying this is what it could be, if I had the time that was extracted and to support that and to just kind of illustrate that that is actually a real danger. I've mentioned that the CSG in Queensland went from a standing start to 1,500 petajoules a year in seven years, and that resource is ... that they're all put together resource including perspective and contingent and proven is about 130 petajoules at the moment.

Marcellus shale is their resource ... It's always difficult to completely compare figures, but the figures that we've looked at for Marcellus in the US is a bit smaller than what's thought to be in the Northern Territory and they're doing 6,800 petajoules a year, and they don't export.

So, we're not saying that it will all definitely be exploited, but we're saying the inquiry needs to include that range of possibilities in the risk assessment not based on one isolated gas field that may or may not end up being the production at some particular point in time.

Dr. Vaughan Beck: I think in your presentation, you may have used some slides from Mr. Forsey and I think he ... So you showed the slides where all of that resource was being used and you were making predictions that they would be the emissions. So, I think at least it appeared to me in the presentation that you were working on the assumption rule that resource would be used. All the contingent resources to find. But-

Mark Ogge: I'm sorry if I gave that impression. I hoped I was being more clear. But what we're trying to show is that's the resource that's being identified and Tim would, I work with Tim a lot, Tim would agree with that assessment that he's saying. It wouldn't necessarily all be extracted, but it could well all be extracted. And so here's what it looks like if you extract it all, but he's not discounting the possibility-

Dr. Vaughan Beck: [crosstalk] In your submission it doesn't-

Hon. Justice Pepper: It doesn't, no. To that extent, would you agree that your submission's a little misleading? As far as it's not expressed as clearly as it could be.

Mark Ogge: Well, I'm very happy to go back and have another look. I can't remember the exact wording off the top of my head, but I'm certain that I wouldn't have said that we believe the entire resource will be extracted. We're saying this is the size of the resource, and if it was extracted compared to this would be the resulting emission.

I mean, if it turns out to be half that, it would still be a disaster, but we're trying to get across the scale of the risk.

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Dr. Vaughan Beck: As I sort of noted, if it was all extracted over a 50 year period then it's greater than Australia's current usage of gas which is both domestic and export.

Mark Ogge: So, the Queensland CSG within 7 years was triple the amount of Australia's domestic use. And you have an international market, you can just keep building LNG terminals.

Dr. Vaughan Beck: I don't think it's tripled, our domestic use? I think it may have tripled the total gas production-

Mark Ogge: Triple production.

Dr. Vaughan Beck: The domestic use has remained reasonably constant.

Mark Ogge: Sorry, it's tripled production. So the exports have doubled. Our domestic use, which is around 5 or 6 hundred petajoules a year. But I guess the point I'm making is that our domestic use is no guide to the market when you're opened up to global exports of LNG.

Dr. Vaughan Beck: Just one other observation, and I'll let other people have an opportunity to comment. I think you went through and made some observations about the applicability of some of the analysis in your study, the 2.3%. I would have to disagree quite strongly with a number of assertions that you've made in the submission and in the presentation. They are technical, and I'm happy to have some discussion at a later juncture. But I just want to put on the record that I disagree with that analysis.

Mark Ogge: Okay. I'm very happy to fill over up with you, Dr. Vaughan... Dr. Beck.

Hon. Justice Pepper: Dr. Ritchie.

Dr. David Ritchie: Thank you. I'm in the new side of the panel that certainly appreciates having the Australian Institute available to apply what we expect of our, at least to an extent, possible disinterested look at the data and get to the bottom of some very complex issues.

The fact that the Institute has reached a conclusion that it is ... the main point of your submission to us today that it is, you completely believe that it's an unacceptable risk under any circumstances to develop this resource. That we have a kind of problem matching how to then deal with your economic analysis. Because you seem to have taken very much the high end of the ... looking at the worst-case scenario. Which would if eventuate, it would in effect make it extremely profitable. And yet in the economic report, your argument is that it's basically barely, it's a marginal economic proposal. And I'd just invite you to perhaps reconcile the two reports.

Mark Ogge: Sure. I'm sure Rod would be really happy to talk to go through the economic impacts in detail. I didn't do that. But the main point is that ACIL report, as far as I can see, excluded shale oil from its analysis.

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Hon. Justice Pepper: For the reasons I've explained.

Mark Ogge: For the reasons you've explained. Now if shale oil is the key driver of ... I mean Rod actually wasn't, I shouldn't state for Rod actually, but as far as I know he hadn't looked at the implications for shale oil. But shale oil, if those basins are opened up, shale oil is going to be a big part of it. You know quite possibly the key driver and the ACIL analysis completely excluded it. So when I realised that shale oil had come into play, that changes it.

Dr. David Ritchie: I understand that, but it's the other way around isn't it? If the shale oil becomes incredibly profitable, so what's the economic analysis ... I mean we, as a panel have been grappling with why do this? We're very aware, conscious of the risks involved. And so we're looking at ... Any risk has got to be matched by what benefit is there? That was the basis of this commissioning the ACIL report. Your economic analysis has said that on the basis of that, it's probably even more marginal, the benefit than the report. And as your presentation here is, well, actually it's very highly valuable resource, at least in a short term economic sense, yet has catastrophic, as you have put it, environmental consequences.

Mark Ogge: Yeah. So-

Dr. David Ritchie: Kind of for both I guess is what I'm saying.

Mark Ogge: Yes. And who knows how the market plays out in the end. It's all speculation by any of us. But what I would say is that the ... And I haven't looked at it in a huge amount of detail, but the gale scenario. That gale scenario, best case, is I think a peak of 530 jobs a year. And so if that's your best case, that's in the overall scheme of jobs in the Northern Territory or in Australia, that's quite small for an industry. The gas industry is very good at getting resource out of the ground and to market without using very many people. And so maybe the gale theme is the outcome, maybe it's even more than that, but if 530 people is your best case ... And remember, if you think that's going to be Territorians, when you've got a whole experienced industry winding down in Queensland, I would say that it's likely that very few of those would actually be Territorians.

Dr. David Ritchie: I really do understand that. My point is that in your analysis of our dealing with the environmental risks, you have made a point that our terms of reference cast some doubt about our ability to make a sound finding because it doesn't include oil. You did not make that point in your economic analysis.

Mark Ogge: No because at that stage when Rod did that work we hadn't checked it. I didn't start my work on it until after we'd made that submission.

Mark Ogge: Okay.

Mark Ogge: So that's why that's it started ringing alarm bells for me.

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Dr. David Ritchie: So just to [crosstalk 02:10:33] be clear, we would be ... You would say that economic analysis made did in fact turn out to be a much brighter economic analysis and the environmental consequences considerably higher.

Mark Ogge: Yeah. I think the economics could be brighter for the gas industry for sure but I don't think that many of those benefits pass on to the local economy and also I think there's a couple of things that are really important to remember, and one is that there's a displacement effect with gas development and that's being clocked throughout every gas development ever. Knocks out other industries and you have to also think about the truck movements, things like the truck movements not just from fracking but from oil where they actually use tankers to get oil. I'm just imagining what that's going to do to other industries in the Northern Territory. So sure, maybe ... I'm just saying even if you get your gale as I'm suggesting, is a risk here, the economic benefits are definitely not as rosy as they've been painted.

Hon. Justice Pepper: Yes. Professor Hart.

Prof. Barry Hart: I had ... You've obviously focused on green house gas.

Mark Ogge: Yes.

Prof. Barry Hart: Aspect ... I'm just wondering whether the Australia Institute has any other views on some of the other potential risks of a shale gas industry? Water, land, cultural ...

We don't have the luxury of only viewing one aspect.

Mark Ogge: Yeah. That's right. I mean ... I guess I'm ... Sorry, I'm not speaking to a specific piece of research here but you know, views on it. I think it's well documented. Overseas there's a lot of cases of contamination of water resources. There's been a lot of mishaps, a lot of explosions, a lot of cases of contamination. There's been questions over health. I think there's a whole lot of other risks that concern me. I think it often badly impacts other ... I mean, one thing I am really aware of because I travel a lot talking in communities that are actually dealing with this in Queensland. And it has a big impact on existing industries so I think it's-

Prof. Barry Hart: That's coal seam gas.

Mark Ogge: Yes.

Prof. Barry Hart: You're not talking shale.

Mark Ogge: No, but I don't have an Australian comparison to that so ... But the elements of the industry cause the issues in Queensland like, the worker's camps, FIFO the kind of boom and bust cycle to small economies. The crowding out of agriculture, the taking up of transport, and capacity, all of those kinds of things are the same whether it's shale or CSG. Possibly worse with CSG, just with shale because you've got to move a whole lot more water and fracking fluids around, etcetera.

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But yeah, we've done some research on the local economic impacts and I think that there's worries there, but I'd be ... My area, water and health, and stuff like that really aren't my area of expertise.

Prof. Barry Hart: Thank you.

Hon. Justice Pepper: Any further questions? I just wanted to clarify one thing that you said on your slides, it's in your submission that certainly we did say that development of the single shale gas-filled and isolation would increase Australia's greenhouse gases by five percent and you've given a reference there. Then you've gone on and said, "Incredibly the inquiry concludes this as low and a low consequence, and acceptable risk." Now, I'm just struggling to see where you get that information from given at 9.6 the risk is describes, or at least is assessed as medium. As it is at 9.6.2, medium. And then when you go to the back of the chapter, it certainly talks about a mitigated risk being achieved with ... After mitigation measures, are deemed to achieve an acceptable risk. Did you want to clarify what you've said in your submission to us?

Mark Ogge: So low consequences and what ... Sorry.

Hon. Justice Pepper: Medium. We've come up with a medium unmitigated risk.

Mark Ogge: Okay. But the acceptable risk is mitigated.

Hon. Justice Pepper: Yeah.

Mark Ogge: Yeah.

Hon. Justice Pepper: Is that another illustration of where you've perhaps been a bit misleading?

Mark Ogge: It might be. I'll need to look at it, but it could be a mistake. But for me the key thing is that the consequences are considered low.

Hon. Justice Pepper: You'd also have to agree with me that nowhere do we recommend approval of an unconventional gas development. Do we?

Mark Ogge: Where did I say that?

Hon. Justice Pepper: Yes. You have, in your executive summary.

Mark Ogge: So it ... I think the overall gist of the draft report is to effectively recommend that it would be approved.

Hon. Justice Pepper: Nowhere in our report, in any report, in anything we've published have we ever recommended that this industry be approved. Have we?

Mark Ogge: We are not at the stage of making formal recommendation to the government at the moment, but I-

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Hon. Justice Pepper: I said, published material. Nowhere ... Let me repeat the question again-

Mark Ogge: No, that's true.

Hon. Justice Pepper: Thank you. And I can assure you that nowhere will we do so. Thank you Mr. Ogge for your detailed submissions. And we look forward to further discussions and further points of clarification in your material. Thank you.

Mark Ogge: Thank you Chair.