COMMONWEALTH OF AUSTRALIA

Proof Committee Hansard

SENATE

ECONOMICS LEGISLATION COMMITTEE

Estimates

(Public)

MONDAY, 1 JULY 2024

CANBERRA

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ECONOMICS LEGISLATION COMMITTEE

Monday, 1 July 2024

Members in attendance: Members in attendance: Senators Hodgins-May, O'Neill, David Pocock, Rennick and Walsh

INDUSTRY, SCIENCE AND RESOURCES PORTFOLIO

In Attendance

Senator Ayres, Assistant Minister for Manufacturing, Assistant Minister for Trade

Commonwealth Scientific and Industrial Research Organisation

Dr Doug Hilton, Chief Executive

Mr Tom Munyard, Chief Operating Officer

Committee met at 08:00

CHAIR (Senator Walsh): I declare open this hearing of the Senate Economics Legislation Committee into the 2024-25 budget estimates. I begin by acknowledging the traditional custodians of the land on which we meet today and pay my respects to their elders, past and present. I extend that respect to Aboriginal and Torres Strait Islander peoples here today.

The committee is due to report to the Senate on Tuesday 2 July 2024, and it has fixed Friday 9 August 2024 as the date for the return of answers to questions taken on notice in today's proceedings. The committee's proceedings today will examine the Commonwealth Scientific and Industrial Research Organisation.

Under standing order 26, the committee must take all evidence in a public session. This includes answers to questions on notice. I remind all witnesses that, in giving evidence to the committee, they are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee, and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence.

The Senate has endorsed the following test of relevance of questions at estimates hearings: any questions going to the operations or financial positions of the departments and agencies which are seeking funds in estimates are relevant questions for the purpose of estimates hearings.

I remind officers that the Senate has resolved that there are no areas in connection with the expenditure of public funds where any person has a discretion to withhold details or explanations from the parliament or its committees unless the parliament has expressly provided otherwise. The Senate has resolved also that an officer of a department of the Commonwealth shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to superior officers or to a minister. This resolution does not preclude questions asking for explanations of policies or factual questions about when and how policies were adopted. Witnesses are reminded of the Senate order specifying the process by which a claim of public interest immunity should be raised. I incorporate the public immunity statement into the *Hansard*.

The extract read as follows—

Public interest immunity claims

That the Senate—

(a) notes that ministers and officers have continued to refuse to provide information to Senate committees without properly raising claims of public interest immunity as required by past resolutions of the Senate;

(b) reaffirms the principles of past resolutions of the Senate by this order, to provide ministers and officers with guidance as to the proper process for raising public interest immunity claims and to consolidate those past resolutions of the Senate;

(c) orders that the following operate as an order of continuing effect:

(1) If:

(a) a Senate committee, or a senator in the course of proceedings of a committee, requests information or a document from a Commonwealth department or agency; and

(b) an officer of the department or agency to whom the request is directed believes that it may not be in the public interest to disclose the information or document to the committee, the officer shall state to the committee the ground on which the officer believes that it may not be in the public interest to disclose the information or document to the committee, and specify the harm to the public interest that could result from the disclosure of the information or document.

(2) If, after receiving the officer's statement under paragraph (1), the committee or the senator requests the officer to refer the question of the disclosure of the information or document to a responsible minister, the officer shall refer that question to the minister.

(3) If a minister, on a reference by an officer under paragraph (2), concludes that it would not be in the public interest to disclose the information or document to the committee, the minister shall provide to the committee a statement of the ground for that conclusion, specifying the harm to the public interest that could result from the disclosure of the information or document.

(4) A minister, in a statement under paragraph (3), shall indicate whether the harm to the public interest that could result from the disclosure of the information or document to the committee could result only from the publication of the information or document by the committee, or could result, equally or in part, from the disclosure of the information or document to the committee as in camera evidence.

(5) If, after considering a statement by a minister provided under paragraph (3), the committee concludes that the statement does not sufficiently justify the withholding of the information or document from the committee, the committee shall report the matter to the Senate.

(6) A decision by a committee not to report a matter to the Senate under paragraph (5) does not prevent a senator from raising the matter in the Senate in accordance with other procedures of the Senate.

(7) A statement that information or a document is not published, or is confidential, or consists of advice to, or internal deliberations of, government, in the absence of specification of the harm to the public interest that could result from the disclosure of the information or document, is not a statement that meets the requirements of paragraph (1) or (4).

(8) If a minister concludes that a statement under paragraph (3) should more appropriately be made by the head of an agency, by reason of the independence of that agency from ministerial direction or control, the minister shall inform the committee of that conclusion and the reason for that conclusion, and shall refer the matter to the head of the agency, who shall then be required to provide a statement in accordance with paragraph (3).

(d) requires the Procedure Committee to review the operation of this order and report to the Senate by 20 August 2009.

(13 May 2009 J.1941)

(Extract, Senate Standing Orders)

CHAIR: I remind all senators that, as we continue our work implementing the *Set the Standard* report, as chair I will ensure that proceedings are conducted in an orderly, respectful and courteous way.

The committee has agreed to authorising all media outlets to record the proceedings of the public hearings, subject to the broadcasting resolutions in the standing orders and the following conditions. Media entry is subject to not exceeding the maximum capacity of the hearing room, and social distancing must be observed. The committee or a witness may object to being recorded at any time, and the committee may require that recording cease at any time. Recording must not occur from behind the committee or between the committee and witnesses and must not otherwise interfere in the proceedings. Computer screens and documents belonging to senators, members and witnesses must not be recorded, and flashes must not be used. The directions of the committee secretariat must be followed at all times.

Commonwealth Scientific and Industrial Research Organisation

[08:04]

CHAIR: I now welcome Senator the Hon. Tim Ayres, representing the Minister for Industry and Science and the Minister for Resources. I welcome the officers from CSIRO, Dr Hilton and Mr Munyard. Would you like to make an opening statement or proceed straight to questions?

Dr Hilton: I'm very happy to proceed.

Senator Ayres: I might just observe that the CSIRO has been asked here for a spillover hearing. That's a significant commitment in terms of their time. It is an opportunity for senators to ask questions about the whole range of issues in relation to the CSIRO but, particularly, following the questions that the Leader of the Opposition raised about the *GenCost* report, an opportunity for Liberal and National senators to ask questions about the costs of nuclear. I note that nobody from the senior leadership team of the Liberals and Nationals in the Senate has turned up to defend their uncosted, expensive and risky nuclear reactor plan. That shows how keen they are to defend it! In any case, we'll go to questions, and I'm sure senators will have good questions for Dr Hilton and the CSIRO.

CHAIR: Senator O'Neill.

Senator O'NEILL: It's been a privilege to be on this committee for a number of years and to read the *GenCost* report. It's something that many Australians wouldn't know—they'd know the name CSIRO, and I'm pleased to convey that Australians hold it in high esteem. And, as a former teacher, going to the CSIRO for information is a source that would be highly accorded.

So this is the *GenCost* report. It's a 124-page report—very substantial and very substantive. My questions go directly to the source, the information, here. I do note as a former academic that at the back you have a series of comments in appendix D which go to critiquing the methodology that you used. If anybody is genuinely interested, this is a fulsome document that explains much. But I want to check my understanding because, unlike you, Dr Hilton, I am not a scientist. I'll ask you to explain this in the clearest possible way, so ordinary Australians like me who are not scientists can clearly understand what it is that you're saying.

This report has been the feature of some media reports about the cost of energy, and that's where Australians really do pay attention. Now, there's a metric that you're using there, and it's called 'levelised cost of electricity'. When I get my bill, I don't see that term. As an ordinary Australian I don't know what it means. Could you explain what this metric is? How does it integrate with the costs of electricity that we hear about? We've got wholesale prices, we've got this levelised cost and then we've got the consumer prices. How does this work? What is 'levelised cost'?

Dr Hilton: In simple terms, levelised cost is a way we can compare the cost of generation across different technologies—something we do with AEMO, the market operator—and provide that data to those making policy and investment decisions in the future.

Senator O'NEILL: When you say 'compare across technologies', one of the things I do understand in common terms is that you can't compare apples with oranges or apples with bananas. You've got to line these things up next to one another and compare apples with apples. Is that what levelised cost is, for the ordinary person?

Dr Hilton: Yes, fundamentally, that's true. There are obviously different ways to generate electricity—renewables like solar and wind, large- and small-scale nuclear, gas and coal—and then, obviously, there's a need to have technologies to firm renewables. The report takes into account the different ways of generating electricity and provides a simple comparative cost estimate.

Senator O'NEILL: Okay. So, instead of having the confusing bits of different methodologies, you've levelled the playing field and you've put them all against one another so you can see at a glance what they all mean.

Dr Hilton: Yes—using common assumptions and a reasonable way of comparing across different technology generation.

Senator O'NEILL: That's very, very helpful. People can read this report with confidence, knowing they will get a comparison of apples with apples without a whole lot of messy information that we can't control for in our own lay terms.

I'd like to ask about the assertion that you have made that renewable energy is the cheapest energy available, because there have been a lot of people making a lot of noise about that, Dr Hilton, and as a consumer I want the truth about this. How are the transmission and energy costs that we know are a part of this factored into your assertion—because you're telling Australians that renewable energy is the cheapest available, even when you put in storage and transmission. How does that occur?

Dr Hilton: The integration costs were incorporated more recently in response to feedback. As I've mentioned previously in answers, I think the ability to respond to feedback is one of the characteristics of good science and good reports. As you would understand, the report has been produced for the last few years, since 2018, and each time has involved an iteration responding to the information that the community and policymakers and energy generators want to see. One of those was to incorporate those costs that you discussed. Still with the incorporation of those costs, renewables are estimated to be cheaper than other forms of energy generation.

Senator O'NEILL: I found a new term in here that I hadn't seen before. It was FOAK. Then there was NOAK. I'm interested in those acronyms. What's FOAK?

Dr Hilton: I am not a content expert on the report; I'm a protein chemist, which is a long way from being somebody who is expert in energy generation. I'm happy to take those on notice. Or I can look in the glossary.

Senator O'NEILL: You explain it to people like me who don't know. It's 'first of a kind' and 'nth of a kind'. I thought, 'What an interesting concept.' Sometimes you do the thing for the first time. Then, once you've done it a few times, you actually know what you're doing. Or at least I find that with me. The *GenCost* says that FOAK, first-of-a-kind, premiums of 100 per cent cannot be ruled out for nuclear energy. Can you explain why that's the case?

Dr Hilton: That's quite a simple concept. The first time you build anything, it tends to be more expensive, so there are two types of cost. There is that first time, and then there's the cost if you've committed to an ongoing building program. It doesn't really matter what it is, whether it is renewable energy generation through wind and solar or whether it is small modular reactors or a large reactor, building it for the first time in a country tends to be more expensive. Then, as you would expect, as you roll those facilities out multiple times, there's experience, there's scale, there are suppliers, and it becomes cheaper.

Senator O'NEILL: There's probably a workforce too.

Dr Hilton: All of those things.

Senator O'NEILL: There's this debate about older technologies that are being used in other countries and the transferability, but, if you've never done it in your country, you're starting from scratch. Is that it in a nutshell?

Dr Hilton: Yes.

Senator O'NEILL: So this first-of-a-kind disadvantage would count even if a small modular reactor used overseas were then considered to be deployed in Australia?

Dr Hilton: Yes. The report assumes that the first time you build anything, it's going to be more expensive. But I should also say that we don't take that into account in providing the estimate. So, in that sense, it's quite a conservative estimate on a first-build cost. What we assume is that there is going to be an ongoing program of builds in any particular technology.

Senator O'NEILL: There have been recent reports of a massive cost blowout on nuclear builds in the UK and the US. How would they impact your assessment?

Dr Hilton: I'll take that on notice.

Senator O'NEILL: Could you have a look at where blowouts would be possible in Australia, given what we can learn from overseas? Clearly that seems to me to be the picture. I'd like to go then to the *GenCost* report assumptions that any future base load power generation could have the capacity factor between 53 per cent and 89 per cent. How did you come to that conclusion?

Dr Hilton: As you would understand, for nuclear, we don't have any historical examples in Australia. Each energy system in different countries is very different in terms of continuous demand through a 24-hour cycle and through seasons. So what we've looked at is to estimate the operating percentage of time for nuclear, based on coal-fired power stations historically. It's a similar sort of base load generation. So we believe it's not a bad estimate for the Australian environment. I think the highest rate was 89 per cent or something like that. That was for those stations generating the cheapest power because they could bid into the market at a point where power demand is lowest and therefore cheapest. We calculated the average, which I think was something like 60 per cent, and then, for a lower range, we subtracted 10 per cent from that. So we've got the range 53 per cent to 89 per cent, which we believe is a reasonable estimate of usage for base load power generation in the Australian context.

Senator O'NEILL: Could you give me an idea of the impact it would have on the predicted capacity factors on nuclear energy?

Dr Hilton: I don't quite understand the question.

Senator O'NEILL: Of the 53 per cent to 89 per cent.

Dr Hilton: The estimate is for a base load generating facility. For nuclear, we think the range will be in that range.

Senator O'NEILL: I've brought a little item that's been talked about an awful lot lately. It's a Coke can. According to the Rolls-Royce website, a small modular reactor is going to generate around 285 cubic metres of waste over its 60-year lifetime or 4.75 cubic metres of waste each year. Does that assessment sound accurate to you based on what you know, Dr Hilton?

Dr Hilton: I'm not in a position to give you an answer on whether that's accurate or not.

Senator O'NEILL: Are they the figures that have been produced in the public place based on Rolls-Royce?

Dr Hilton: I don't know the source of those and I'm not an expert in waste generation from nuclear plants, so it would be inappropriate for me to comment.

Senator O'NEILL: That's a bit of a problem for all of us, isn't it? We are actually having documents now pulled off the web—promos from Rolls-Royce—and we've got the Leader of the Opposition making all sorts of assertions, including his assertion that the *GenCost* report is discredited. His assertion is that the waste produced by a small modular reactor in one year would be about the size of a Coke can. That's 380 cubic centimetres in one year. On anybody's basic maths, that is absolutely and totally at odds with the 4.75 cubic metres predicted by Rolls-Royce in its own documentation. Dr Hilton, do you agree with that?

Dr Hilton: As I said, I don't know the basis of the Rolls-Royce figures. I think it would be inappropriate to comment on something that I haven't seen and where I'm not an expert.

Senator O'NEILL: I'm glad at least somebody in the public place is being cautious about this, but I can assert to you that that is the number that Rolls-Royce themselves have put into the public place. Is there any way that anybody with any scientific knowledge could agree that 380 cubic centimetres, demonstrated in this little can, is the same size as 4.75 cubic metres?

Dr Hilton: They are clearly different volumes.

Senator O'NEILL: Of some considerable proportion.

Dr Hilton: Indeed.

Senator Ayres: Dr Hilton is being cautious, appropriately, about answering questions that aren't within his direct knowledge. I'm sure he'll be able to come back to you about the difference in those volumes but also the role that calculations about costs around waste play in the way that they've prepared their material.

Senator O'NEILL: Could you provide anything on notice that you think would help people understand science from an ordinary operating, Australian point of view? I've got one more question.

CHAIR: This is your last question before I share the call.

Senator O'NEILL: One of the things that concern me in the public debate is that there has been a set of assumptions that are much different from your sensible ones, which you've just described, about managing ranges et cetera. There's some potential argument of forcing nuclear reactors to run at 95 to 100 per cent capacity. Would that lead to the loss of money, would it be economically viable or unviable, or would other lower cost generation need to be curtailed to allow for such high nuclear capacity factors?

Dr Hilton: We haven't modelled those detailed scenarios in which different energy mixes are forced by policy to operate at different levels. It's not something that the *GenCost* report covers, and it's probably not appropriate for me to comment on.

Senator O'NEILL: Would you take that on notice? I've got some more questions if time allows.

CHAIR: Senator Hodgins-May?

Senator HODGINS-MAY: Thank you so much for coming in and participating in today's spillover hearing. I will continue with my previous line of questioning shortly, but, while we're on the topic of nuclear, I might just ask a couple more questions. It's true that nuclear power would be at least 50 per cent more expensive than wind and solar backed by batteries, but you're saying that, with this first-of-a-kind technology, that could be significantly more than 50 per cent.

Dr Hilton: There are two types of generation: large and small modular reactors. The large reactors are estimated to be 1½ to two times the cost of firmed renewables. The small modular reactors are estimated to be four to six times the cost of firmed renewables. In both cases, we don't take into account the first-of-a-kind extra cost associated with those builds. We assume the technology will be rolled out in an ongoing way.

Senator HODGINS-MAY: Is it true that, despite inflationary pressures, renewables, including storage and transmission costs, remain the lowest cost new-build technology?

Dr Hilton: That's correct.

Senator HODGINS-MAY: Is it true that the cost of gas and black-coal fired generation with carbon capture and storage is similar to the cost of nuclear power, which would be twice as expensive as renewables?

Dr Hilton: I will check the report and come back to you on that.

Senator HODGINS-MAY: Thank you so much. Are CSIRO concerned that investment in nuclear energy would mean diverting resources away from investment in renewable energy and, therefore, slowing down Australia's energy transition?

Dr Hilton: No. CSIRO is absolutely agnostic to the mix of power. That is something that's up to policymakers and the energy sector.

Senator HODGINS-MAY: I might continue with a line of questioning that I started in our last estimates in relation to the job cuts at CSIRO. During budget estimates, you said that 43 people within the health and biosecurity units would be impacted by job cuts, and you said there were still consultations happening in relation to further cuts. Can you provide an updated figure on how many cuts were made in the last financial year?

Dr Hilton: Those potential cuts are still being discussed with staff, as is absolutely appropriate. There are important periods where there's consultation. We still have not got a firm number, but 43 is the number of potentially affected staff that will be impacted by the health and biosecurity changes.

Senator HODGINS-MAY: Do you have an idea of when the consultations are likely to conclude?

Dr Hilton: I think that will be relatively soon. I'm hoping we'd be able to update.

Senator HODGINS-MAY: I've seen reports that you're aiming to cut 25 per cent of expenditure across the CSIRO. Can you explain the main drivers for such a drastic cut?

Dr Hilton: That's not correct. We are looking to reduce the cost of the non-research side of the organisation by 25 per cent. That's because, over the last few years, it's grown as a proportion of our labour costs from about 22 to

28 per cent. We think it's important to have our non-research side as efficient and effective in supporting the science as possible, and reducing the size of expenditure in that area is an appropriate response to the ending of the budget measures during COVID.

Senator HODGINS-MAY: Did CSIRO ask the government to maintain or increase funding ahead of the budget?

Dr Hilton: We have known for a long time that the budget measures during COVID would come to an end and that we would need to adjust our spending. No additional requests for funding were made.

Senator HODGINS-MAY: Are you able to talk to what impact the reduction in CSIRO's workforce will have on research?

Dr Hilton: The thing that's top of mind for me is the impact it will have on individual staff members and their families I think this is prudent both in terms of operating within our budget and delivering the maximum impact for the country, especially given the investment of $900-plus million in an ongoing way through appropriation. The primary concern that I have is the impact for staff affected.

Senator HODGINS-MAY: So you don't think that these impacts will impact on Australia's preparations for major challenges in biosecurity and artificial intelligence, for example?

Dr Hilton: No, I don't. I think there are opportunities to refine the capability that we have in our research teams, to ensure that it is the capability that allows us to address the most important challenges confronting the nation. That's something I would expect my research leaders to do in an ongoing way.

Senator HODGINS-MAY: Thank you. I have a couple of questions about the CSIRO chief scientist. The media has reported that as part of the restructure the chief scientist has effectively been demoted. Are you able to tell us whether that role of the chief scientist of CSIRO still exists?

Dr Hilton: As you'd be aware, the chief scientist of CSIRO has announced that she's taking a wonderful position at the University of New South Wales as deputy vice-chancellor of research. We're considering how we operationalise the role of chief scientist going forward. It's something that we haven't made a decision on yet, but it is an important role and one we're considering really carefully.

Senator HODGINS-MAY: Thank you. So, the authority and autonomy of that role is still being decided?

Dr Hilton: No, I don't think it's anything to do with the authority or autonomy of the role. The chief scientist has always been a member of our executive team who, like our other members of the executive team, reports in to the chief executive. So there's no issue around authority or autonomy. We have, as you would understand, many senior and expert scientists in the organisation, so we're considering whether having a single chief scientist makes sense and whether we might have several people empowered to talk on behalf of the organisation on research matters on which they're subject domain experts, or whether we retain a single chief scientist. So, we're really open minded about it, and the fact that we're thinking of it is in no way to be interpreted as a diminution in the importance of research for CSIRO.

Senator HODGINS-MAY: Thank you. We'll wait for further information on that. In relation to research projects that are set to be impacted by the funding cut to CSIRO, how many research projects will end prematurely in health and biosecurity? Do you have any information on that?

Dr Hilton: In terms of projects, that depends a little on how you define them. There'll be a number impacted. For example, one of the areas that will be impacted will be plans that we have around clinical trials. We made a very strategic decision about clinical trials. The health and medical research sector in Australia is extraordinarily vibrant. We have fantastic faculties of medicine and health sciences across a large number of universities. We have 40-plus independent medical research institutes that create a truly vibrant sector. Many of those are co-located in hospital precincts, with really extensive clinical trials capacity. For CSIRO, we've made the decision that that isn't the best place for us to invest the resources the community entrusts with us, and that we'd be better off focusing on things like public health, population health, the intersection between data and community health. So it's about how we identify the place where we can contribute to the Australian community being the healthiest 26 million people in the world in a way that respects our skills and the skills of the rest of the sector.

Senator HODGINS-MAY: Thank you. In the interests of time, I won't go through each of those questions. I will put on notice: how many research projects and which projects are going to be impacted in health and biosecurity, food and agriculture, and specialised equipment or software?

Dr Hilton: Sure.

Senator HODGINS-MAY: That would be great. Thank you. Chair, I've got some more questions. Should I let someone else have a turn?

CHAIR: You've got a total of another five minutes or so, and then I'll share the call. You can have it now or later.

Senator HODGINS-MAY: I think five minutes should do it; we'll see how quickly I read. I asked some questions about Middle Arm last session, and I have a few follow-ups. In particular, I'm keen to dig in, again, to the APPEA journal article about a CCS utilisation project in the Northern Territory.

Dr Hilton: I think we'll have to take that one on notice. Our head of energy, environment and resources is on leave. I'm always conscious of the wellbeing of my staff, and I didn't think it was appropriate to recall him from leave, but he would be delighted to take that one on notice.

Senator HODGINS-MAY: Terrific. I will submit that one, then, rather than read it out now.

Dr Hilton: Thanks for your understanding.

Senator HODGINS-MAY: In relation to methane underreporting, who would be—

Dr Hilton: I think we will take that one on notice as well.

Senator HODGINS-MAY: I have one other question about the RV *Investigator* funding. Can you please confirm whether funding has been found to 2027 for 300 marine days per annum?

Mr Munyard: We might have to take the detail of that question on notice. We've been working through it with our partners to confirm how many days, so I'll take that one on notice as well.

Senator HODGINS-MAY: Thank you. And if you could confirm where that funding is coming from, that would be excellent.

Mr Munyard: Will do.

Senator HODGINS-MAY: Without Middle Arm and methane, I think I'm finished. Thank you very much.

CHAIR: Great, thank you. Senator Rennick.

Senator RENNICK: My questions are in regard to the *GenCost* report. Is it correct that *GenCost* assumes there's no extra cost for storage and transmission lines until renewables hit 60 per cent of the grid?

Dr Hilton: I'll take that question on notice.

Senator RENNICK: Have you got someone there that can answer it now?

Dr Hilton: No. As I said, our expert on *GenCost*, Paul Graham, and his direct superior, Peter Mayfield, are both on leave. I'm very happy to take that on notice.

Senator RENNICK: Given that *GenCost* is the talk of the town at the moment, I'm a little bit surprised that you haven't got someone here that could provide more information about that.

Dr Hilton: I'm happy to take it on notice.

Senator RENNICK: Okay. Well, it's going to be very difficult. Next question: is it correct that *GenCost* assumes a wind capacity of 48 per cent for onshore wind and 52 per cent for offshore wind?

Dr Hilton: I'm very happy to take that question on notice.

Senator RENNICK: You're going to take that on notice, are you? Are you aware that the average wind capacity for the last five years has been 30 per cent?

Dr Hilton: I'll take that on notice. I'm not an—

Senator RENNICK: You don't have to take it on notice; I'm telling you that the average wind capacity for the last five years is 30 per cent and that the *GenCost* report has a wind capacity for onshore wind of 48 per cent and offshore wind of 52 per cent. Why is it that the CSIRO is overestimating the capacity of wind?

Dr Hilton: I don't believe that's the case, and I'm happy to take your detailed questions on the figures and assumptions to Paul Graham, who is the lead author of the report and someone who's answered questions in quite some detail in this forum previously.

Senator RENNICK: Does the *GenCost* report include the cost of recycling renewables?

Dr Hilton: Senator, I'm happy to—

Senator RENNICK: Batteries, wind turbines, solar panels—

Dr Hilton: I'm happy to take those detailed questions on notice.

Senator RENNICK: Okay, no worries. Are you aware that the US Department of Energy says that nuclear has the highest capacity factor of any power source and that they're quoting 92 per cent? I note that you did know

that the capacity of nuclear was 53 per cent to 89 per cent in the *GenCost* report. Why is it that the *GenCost* report has a much lower capacity factor for nuclear than the US Department of Energy thinks it's capable of?

Dr Hilton: I'll make two comments there. The first is that we're not the United States, we're not Mongolia, we're not Mauritius; we're Australia. The system operates differently. I'd also say that the upper end of that range of 89 per cent is pretty close to 92 per cent. That's a three per cent difference—

Senator RENNICK: But what's your average across the whole *GenCost* report?

Dr Hilton: and 53 per cent to 89 per cent is a range we've given. The assumption is that the mean utilisation rate of coal fired generation is 60 per cent and that that would be reasonable in the Australian context for nuclear because the cycle of demand for energy in Australia is very different from that in other countries. I think the Australian community would expect us to model Australia and not the US or Japan or other places where population centres are very different

Senator RENNICK: How is it that you assume coal has a capacity of 60 per cent? That's only because renewables get first dibs at the grid throughout the middle of the day, isn't it? Coal generators have a capacity of close to 90 per cent as well, if they're allowed to run 24 hours a day.

Dr Hilton: That's probably a question for the market operator.

Senator RENNICK: That's right. But the historical capacity of coal, prior to renewables, was closer to 90 per cent; that's correct, isn't it?

Dr Hilton: My understanding is those mechanisms of generating that are cheapest can bid in at low demand times of the day. There are coal plants that can do that very well, which is why you get the 89 per cent higher estimate. But not all coal plants can do it as cheaply, and that's why you get the range.

Senator RENNICK: In regard to the amount of storage that's needed for solar and wind, how much of the proposed—say, for example, solar and wind provide 30 per cent of energy into the grid. How much storage capacity have you got for that 30 per cent?

Dr Hilton: I'll take that question on notice.

Senator RENNICK: Can you also take this on notice: of that required storage capacity, how much of that storage capacity is batteries versus pumped hydro?

Dr Hilton: I'd be delighted to take that question on notice.

Senator RENNICK: In regard to the pumped hydro capacity factor, or how much pumped hydro you're going to need to store the energy, can you tell me where those sites are going to be by 2030?

Dr Hilton: I'll take that on notice.

Senator RENNICK: Can you tell me why you're aware that nuclear, from the questioning before from Senator O'Neill, has a capacity of 53 to 89 per cent, yet you don't know the capacity of wind farms?

Dr Hilton: There's a whole lot of detail in the report, and I'm not across every piece of detail. There are a number that have been discussed widely in public and for which I have been asked a number of questions, and, of course, I'm more familiar with those. I also had the privilege of meeting the shadow minister, and discussed the capacity factor of nuclear, and other issues, with him for an hour or so. I'm more familiar with those things that have been raised with me directly by elected representatives.

Senator RENNICK: But isn't costing all about relative costs? Surely, if you know the capacity of nuclear you must know the capacity of wind farms as well.

Senator Ayres: Mr Hilton is the CEO of the CSIRO.

Senator RENNICK: Exactly. He should know what's in *GenCost*.

Senator Ayres: As he's indicated, he is not the subject matter expert or the team. He is answering these questions in an appropriately cautious way—that is, making sure what he's putting into the public domain are facts.

Senator RENNICK: He's not putting any facts into the public domain. He doesn't know any of them.

Senator Ayres: He has every right under this process to take questions on notice so that the appropriate person can do it—that is, wild assertions not being made in relation to these important questions around costs and energy. You have been coming to these proceedings for quite some time. I've observed questions in detail from you—

Senator RENNICK: Don't make any personal reflections.

Senator Ayres: very enthusiastically asked about this range of questions, and a range of other boutique areas in terms of the COVID vaccine and all that sort of stuff.

Senator RENNICK: Point of order: that's a personal reflection.

Senator Ayres: I understand you've got an interest in the detail of these—

Senator RENNICK: Point of order: this is filibustering. These guys can't answer questions.

Senator Ayres: and Dr Hilton will answer questions appropriately, and that's what he's doing. I won't have you trying to belittle the CEO of the CSIRO.

Senator RENNICK: Senator Ayres, my next question is for you: are you aware that in the last June quarter the generation from wind was exactly the same as it was in the June 2021 quarter, despite the fact there's been 2,400 more megawatts of capacity added in wind energy? Don't you think that reflects the unreliability of wind power as an energy source when we really need stable and reliable energy?

Senator Ayres: I have seen all sorts of uncosted, imprecise and political claims being made about energy, and over the course of the last few weeks I've seen the diminishing enthusiasm over time of the senior levels of your political party to turn up, front up and ask questions—

Senator RENNICK: Point of order, Chair: he's not answering my question.

Senator Ayres: and I think that's reflected in the turnout today.

Senator RENNICK: Point of order: the National Energy Market has just measured the amount of wind generation in the last quarter, and it is the same as it was in the June quarter of 2021, despite 2,400 more gigawatts of energy capacity being put into the system. Don't you think that that is a good example of why wind power is unreliable and can't be relied upon for base-load energy?

CHAIR: Before you answer the question, Minister, I'll just indicate that I'll share the call next with Senator David Pocock.

Senator Ayres: The expert scientific, engineering and economic advice that's provided by Australia's most—

Senator RENNICK: These are real figures, Senator Ayres.

Senator Ayres: trusted scientific institution—

Senator RENNICK: It's not some assumption or advice. It's a real figure.

CHAIR: Let the minister answer the question.

Senator Ayres: As I said, the expert engineering, economic and scientific advice provided by the CSIRO and the GenCost report uses the best available assumptions and the best scientific knowledge available to Australia—

Senator RENNICK: We're talking real-world data, and world data is not assumptions.

CHAIR: Senator Rennick—

Senator RENNICK: He's not answering the question.

CHAIR: Well, let him answer the question.

Senator Ayres: and what it does is make it very clear that, if we're to have the lowest-cost-possible—

Senator RENNICK: Do you know the difference between facts and assumptions?

Senator Ayres: electricity environment for Australian households and business—

CHAIR: Order!

Senator O'NEILL: Do you know the difference between centimetres and metres, Senator Rennick? That's a big problem; centimetres and metres seem to be a concept that your leader can't get across.

Senator Ayres: It is very clear that the information that is being provided for policymakers and investors is of great assistance to the government and to the investment community. That is the lowest cost proposition for Australia—

Senator RENNICK: These assumptions are clearly wrong.

Senator Ayres: That is the basis. We're not going to be there with your show, criticising Australian institutions as fake news. We are going to make decisions—

Senator RENNICK: I'm not criticising. I'm asking questions that they're not answering. They're not answering questions that they should be aware of.

CHAIR: Okay—

Senator Ayres: that are in the best interests of low prices.

CHAIR: Neither of you have the call. Senator Pocock.

Senator DAVID POCOCK: Thank you for your time this morning. Following on from the job cuts, Senator Hodgins-May was asking about the 43 from health and biosecurity. You said you were still consulting. At estimates, you said there are 30 from ag and food and five from manufacturing. Are there any in addition to that yet?

Dr Hilton: Not on the research side, no.

Senator DAVID POCOCK: What about on the non-research side?

Dr Hilton: As I mentioned, we're considering how we bring into place a 25 per cent reduction in costs in total. Our first port of call, as you would expect, would be for us to look at operating costs. So that is non-labour costs. Once we've gone through that—and we are in consultation at the moment—we'll then consider what staff reductions we need, but they can be a range of reductions, including end-of-term contracts, voluntary redundancies and, as a matter of last resort, redundancies.

Senator DAVID POCOCK: But, to confirm, as yet no redundancies have been offered.

Dr Hilton: No.

Senator DAVID POCOCK: You also said there are no plans for Data61. Is that still the case?

Dr Hilton: Yes, there are no workforce plans. So, once we have a plan, we will be consulting with staff, but we always ask research leaders to consider the capability they need and their budgets. I know Data61, like other research units, are looking at that. So there are thoughts, but there's not a tangible plan and nothing has been brought to staff.

Senator DAVID POCOCK: So, if there are cuts in Data61, it will be to projects and systems rather than personnel.

Dr Hilton: No, that's not what I said. They're considering their budget and considering how they operate within that and the capability they need, but there is no plan as yet for those staff cuts.

Senator DAVID POCOCK: What's the timeline for that plan for Data61?

Dr Hilton: Probably weeks and months. It depends a little bit on the capability they need, and they're discussing that at the moment. So I can't give you an exact time. It's certainly not years.

Senator DAVID POCOCK: Are these redundancies linked to the reduction in ASL funding in the next budget?

Dr Hilton: In the end of the budget measure for COVID?

Senator DAVID POCOCK: Yes.

Dr Hilton: All of the financial pressure is linked partly to that. So the budget measure for COVID was a time-limited measure, as many budget measures are, and we've been working out as an organisation, for probably the last 12 months, how we adjust to that end point. What you're seeing playing out now is our response to that.

Senator DAVID POCOCK: So what is the total budget cut going into the next financial year?

Dr Hilton: There's not a budget cut; there's the end of a time-limited budget measure.

Senator DAVID POCOCK: What's the quantum of that?

Dr Hilton: It was $450 million over four years.

Mr Munyard: It was $454 million over four years.

Dr Hilton: So we're adjusting to that change, and we're looking at different ways of mitigating that. That represents part of our budget—the appropriation. We also leverage the appropriation by finding and securing funds from industry and from government departments on specific budget measures and then through flexible resources that we can find—for example, through commercialisation of the work we do. So we're looking at all of those, to ensure that the impact on staff is as small as possible.

Senator DAVID POCOCK: I've heard concerns about the consultation process. I'm interested to know if you're calling any staff back from leave to inform them of their redundancy. You said earlier that you valued staff's leave and you didn't want to bring someone back for estimates.

Dr Hilton: Yes. I'll take that on notice and get back to you.

Senator DAVID POCOCK: I've also been informed that some staff are being told they've been made redundant and given notice without line managers being told.

Dr Hilton: I'm not aware of staff being made redundant in any of the three research areas that we've spoken about—

Senator DAVID POCOCK: What about outside of research?

Dr Hilton: I don't believe there have been any redundancies in enterprise services to date. We're consulting on that.

Senator DAVID POCOCK: Anywhere in CSIRO?

Dr Hilton: I'll take that on notice. 'Anywhere' is broad and CSIRO is large. So I will take that on notice.

Senator DAVID POCOCK: Thank you.

Mr Munyard: But I'm definitely not aware of your assertion in relation to line managers—not aware of any instance—

Senator DAVID POCOCK: Take that on notice, then. When did the CSIRO engage in contracts with the South Australian Health and Medical Research Institute and Westmead? When did those contracts commence?

Mr Munyard: I'll take the exact date on notice. I know that the Westmead contract was executed around 12 to 18 months ago. The SAHMRI one that you referred to in Adelaide was a bit earlier than that, but I'll take the exact dates on notice.

Senator DAVID POCOCK: I understand that the facility at Westmead cost in the vicinity of $4½ million and is now not going to be used—a brand-new facility. Is that correct?

Mr Munyard: The lease costs there are around $1½ million. We've made no decision yet, in relation to our arrangements at Westmead; that's part of consultation with staff.

Senator DAVID POCOCK: So that decision hasn't been made, and, currently, that facility will be used?

Mr Munyard: We are in consultation with staff in relation to the broader research portfolio work that's done there, and no decision on the property itself will be made until after that time.

Senator DAVID POCOCK: What's the intention of that consultation? You must have something in mind, as an executive.

Mr Munyard: That's linked in, in relation to the consultation that we referred to earlier in relation to the human health program.

Senator DAVID POCOCK: How many jobs is the CSIRO proposing to cut from each of these sites?

Mr Munyard: Site by site? I would have to take—

Dr Hilton: Take that on notice.

Mr Munyard: that detail on notice. Again, that's part of consultation.

Senator DAVID POCOCK: Coming back to the Chief Scientist, was that a resignation? How did that happen?

Dr Hilton: The Chief Scientist found a role that she thought was a fabulous role, and I have to agree with her. Being deputy vice-chancellor of a university that's ranked in the top 20 in the world is a great opportunity. Professor Fox came out of the university sector, gave remarkable contribution to CSIRO and has made a career choice, and I was excited for her and supportive of her transition.

Senator DAVID POCOCK: Thank you.

CHAIR: Senator O'Neill.

Senator O'NEILL: I've got a couple of documents that I'd like to table, if I could. I'll just go back to the much-cited declaration of how much waste a small modular reactor would generate, according to the Leader of the Opposition—which happens to be, in his language, the size of a Coke can. The reality is somewhat different. I will take you to the document that I've just put in front of you, from Rolls-Royce's website. They talk about the small modular reactor generating an amount of fuel over the period of life. If I can take you to page 2 of that document, Dr Hilton, it says, 'An SMR generates around 285 cubic metres of spent nuclear fuel over its 60-year lifetime.' If we divide the 285 cubic metres by 60 years, that gives us about 4.75 cubic metres per annum. Do those maths sound roughly write you, Dr Hilton?

Dr Hilton: Without a calculator here, I will take your word for it.

Senator O'NEILL: You indicated before that there's a very big difference between square centimetres—most people know what a centimetre is—

Dr Hilton: Cubic centimetres?

Senator O'NEILL: Sorry, yes, cubic centimetres. The volume of a metric metre cubed is quite a different size. I put it to you, Dr Hilton, that the reality of one year of spent fuel from a small modular reactor generates, in fact, 12,500 cans of Coke worth of nuclear waste per year. I'd like the CSIRO to check those calculations, but that is based on the actual facts in the marketplace by Rolls-Royce themselves.

Dr Hilton: CSIRO would look at a range of different estimates, so I would not take one estimate from a supplier of technology at face value. We don't do that for any of the numbers that go into GenCost, so it's not a number that I would add credence to without doing a proper analysis.

Senator O'NEILL: Thank you, Dr Hilton, that is why we do rely on the CSIRO. You don't make things up on the fly, and you certainly don't deceive the Australian people. Going to your costs analysis, you rely on the experience of South Korea. You indicated, in your response to colleagues here this morning, that you've really looked at the cycle of demand in Australia as being quite different from other jurisdictions. You've chosen South Korea for a particular reason. Why is that?

Dr Hilton: South Korea has, over the last period, manufactured or built both coal-fired and nuclear fuelled power plants. Therefore being able to benchmark the costs at which they build their coal-fired power plants with the cost of similar plants in Australia can give us a relative build cost.

Senator O'NEILL: If you were to change the model in any way by using the estimates from what you know about the UK and the US for your analytical approach, how would that impact?

Dr Hilton: I'll take that on notice.

Senator O'NEILL: Are you aware of the recent reports of these massive cost blowouts for nuclear builds in both the UK and US?

Dr Hilton: I'm not aware of those.

Senator O'NEILL: Would you take that on notice. Thank you very much. Going back to the levelized cost of electricity and power bills? On the levelized cost of electricity, which we were discussing earlier, which was your technique to compare one sort of technology with another: would it be appropriate to summarise it as saying that the costs of production directly feed into the costs that consumers pay?

Dr Hilton: I suspect that will be a complicated link, and I'll take the question on notice.

Senator O'NEILL: In your view, Dr Hilton, is the levelized cost of electricity the best metric to use when comparing the relative cost electricity for consumers from different technologies?

Dr Hilton: No, I don't think it's for consumers; I think it's for those building and managing the construction of our electricity system. I think it is an important metric to consider when you're investing. Obviously electricity costs to consumers are dependent on a whole range of other policy matters like subsidies, reimbursements, tax or particular schemes that electricity suppliers will run.

Senator O'NEILL: So that I understand this, before we get a head of steam on misinformation like one can of Coke waste versus 12,500 cans of Coke, let's go to this levelised cost of electricity, because I've got a feeling that that will be the next bit of jargon that comes out and gets misrepresented to the Australian people. If I heard you correctly, the levelised cost of electricity is a measure of investment cost, and it doesn't actually align perfectly in any way with the eventual cost paid by the consumer.

Dr Hilton: No, it is not a one-to-one relationship.

Senator O'NEILL: So, if there were an effort to use this levelised cost and wrap it up in some dodgy sums that might end up with the wrong answers, that would be a misuse of the levelised cost?

Dr Hilton: I think I would answer that with a specific example in mind, rather than as a generality. How people use the report is not something CSIRO has a view on.

Senator O'NEILL: I guess it's a bit like a fishing story. One centimetre to a metre—there's a lot of poetic licence in between. We know how exaggerated fishing stories can be, but we should expect the Leader of the Opposition to tell the truth, rather than come out with fishing stories to scare the Australian public. Thank you very much for your answers today, Dr Hilton.

CHAIR: The committee tables the document provided by Senator O'Neill. Senator Rennick.

Senator RENNICK: How long does the CSIRO estimate it takes to build a nuclear power plant in Australia? Have you taken that into account at all?

Dr Hilton: From what I recall of my briefings, the estimate was that it would be unlikely to have been built by 2040.

Senator RENNICK: One—that's just any one? I note that it's estimated that South Korea, China, and Russia can build nuclear power plants in five to six years on average. I accept that, obviously, because it would be the first time we'd build a nuclear power plant here, there's an amount of skill knowledge that needs to be built up. So you're estimating somewhere between 12 to 15 years. Is that correct?

Dr Hilton: Yes, that is my understanding.

Senator RENNICK: Is that because of our inability to get people, engineers and the required skill set here, or is it because of the union industry and the fact that they're always doing work stoppages and things like that? How much of that is to do with industrial relations versus the actual cost of building a power plant?

Senator O'NEILL: Is that a serious question?

Senator RENNICK: Yes, it is a serious question, actually.

CHAIR: The question has been put, and we'll see if Dr Hilton is an expert on industrial relations as well as other things.

Senator RENNICK: It's a relevant fact when it comes to building any source of power in this country.

Dr Hilton: I'd be happy to provide you a list of the considerations that the CSIRO and AEMO took into account when estimating build times.

Senator RENNICK: Okay.

Senator Ayres: On that question, Senator Rennick, the CSIRO has got to make assumptions based on the best available information. It is hard, given that Mr Dutton's plan is for an unknown number of nuclear reactors—

Senator RENNICK: That's not correct.

Senator Ayres: that have never been built before—

Senator RENNICK: That's not correct. We've got two small and five large.

Senator Ayres: that Australia has never built before. What has happened in comparable jurisdictions overseas is multiyear blowouts in terms of time—

Senator RENNICK: Not in Finland. Not in South Korea.

Senator Ayres: and billions and billions and billions of dollars of additional cost. The United Kingdom, as we know—

Senator RENNICK: You're cherrypicking.

CHAIR: Senator Rennick, let the minister answer.

Senator Ayres: The Hinkley C reactor has ended up costing $85 billion—

Senator RENNICK: That might be a question of the British.

CHAIR: Senator Rennick!

Senator Ayres: and is more than a decade over time. Dr Hilton will take that on notice, but the CSIRO has to make the assessments that they've made. They appear to me to be quite generous, actually, but they make the assessments that they make, and I don't criticise them for that. But it is absolutely open to people to point to a comparable jurisdiction's—

Senator RENNICK: South Korea, China or Russia—five to six years.

Senator Ayres: massive cost blowouts and massive time overruns.

Senator RENNICK: Thank you. Just one more question, Chair.

CHAIR: Final question.

Senator RENNICK: I accept that you'll probably have to take this on notice. Has the CSIRO increased how much extra power will be used in the grid as a result of the uptake of electric vehicles, and how do they plan to deal with that? Who will actually provide that extra capacity in terms of battery power? Will the private sector step in and fill the battery power needed, or will that be something that the taxpayer has to underwrite?

Dr Hilton: I don't think we have a view of who is paying for it in terms of whether it is taxpayer funded or private. We try to provide a levelised cost estimate of electricity. I'll take your previous two questions on notice.

Senator RENNICK: So you don't distinguish between the public sector and the taxpayer funding things?

CHAIR: Thank you, Senator Rennick. Thank you, Dr Hilton. Thank you, Minister. That concludes our questions.

Committee adjourned at 09:00