



## **Labor Members' Dissenting Report**

### **A Dangerous Distraction**

- 1.1 For Australia to change the long-held bipartisan position against the development of a nuclear power industry in Australia it would have to make sense to do so. Yet on any analysis it doesn't, as the evidence to this inquiry has shown. Above all, there is no economic case for pursuing nuclear energy.
- 1.2 In fact the events (like Fukushima), innovations and advances in renewable energy, and emerging climate and energy system developments of the last ten years have made nuclear power even less relevant and appropriate in the Australian context at a time when nuclear power is already in decline elsewhere. There is simply no case for wasting time and resources on a technology that is literally the slowest, most expensive, most dangerous, and least flexible form of new power generation.
- 1.3 With respect to all the key considerations – namely, our future energy needs, the changing nature of our energy system, the comparative costs and delivery timelines of different sources of generation, the serious risks and dangers to the environment and public health, and the impact in terms of regional nuclear proliferation – the pursuit of nuclear energy in Australia would be deeply irrational.
- 1.4 On the basis that Government members were prepared to ignore the evidence and support recommendations that Australia should move towards the use of nuclear energy, Labor members cannot support the inquiry report.

1.5 There is no basis for lifting the legislative prohibition on nuclear energy (Recommendation 3). There is no need for additional work or specific investigations into the science or economics of nuclear energy (Recommendation 2) as Australia already has significant expertise and engagement in this space through the Australian Nuclear Science and Technology Organisation (ANSTO), the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the Australian Energy Market Operator (AEMO), the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and through our nuclear-related international treaty-based collaborations. Devoting resources to a nuclear wish-fulfilment exercise, including what sounds like a nuclear propaganda exercise (e.g. ‘manage a community engagement program that would educate and inform Australians’) would be a costly and wasteful distraction.

1.6 For those reasons Labor members of the Committee moved to delete Recommendation 2 and insert an alternative recommendation, as follows:

**Recommendation B**

The Committee recommends the government maintain support for the relevant energy agencies, including AEMO, ANSTO, ARPANSA, ASNO, and others, and reverse the funding cuts it has made to scientific and research agencies like the CSIRO, so that Australia can maximise the benefits, innovation, job and export opportunities that exist as part of a properly managed energy transition.

1.7 Australia’s focus – and the government’s focus – needs to be on settling a national energy policy that delivers affordable and reliable power as we move more rapidly to decarbonise our electricity system, and in turn, address our present state of liquid fuel insecurity.

1.8 On that point, responding to perhaps the clearest and certainly the most unchallenged theme of the hearing evidence, Labor members moved a recommendation (see below) that the government’s first priority should be the design and settlement of a national energy policy; the glaring absence of which means that Australians pay more for their power because investment in new generation, storage, and transmission is being stymied through uncertainty, and it means Australia continues to be off-track with respect to the government’s inadequate emission reduction target under the Paris Climate Agreement.

1.9 Given the weight of evidence to the inquiry in support of this common sense recommendation it is surprising that government members voted against its adoption:

### **Recommendation A**

The Committee recommends the government focus on delivering a settled national energy policy as its highest priority within the energy portfolio so as to ensure that Australia can make a rapid, efficient, and effective transition to a decarbonised electricity system that delivers reliable and affordable power to households and businesses alike while making a substantial contribution guided by the science in the global effort to address climate change.

- 1.10 As Dr Ziggy Switkowski said at the first public hearing for the inquiry:  
...[W]hat is the role for government? To produce a coherent national energy strategy which is ideally technology agnostic, balances costs with resilience and risk, delivers on national emissions targets, restores energy as a source of national competitive advantage and has bipartisan support.<sup>1</sup>
- 1.11 When Mr Ian Macfarlane, Chief Executive of the Queensland Resources Council was asked, at the Brisbane hearing, 'would you agree with Dr Switkowski that the No. 1 priority in Australia is a settled national energy policy framework?' he answered:  
Of course I would, having been the longest serving energy minister in Australia and seeing the various and diverging views. Until we settle on a single energy policy you'll continue to have the investor uncertainty that is creating all sorts of issues combined with the unreliability of the grid, due to different mixes of energy which don't sustain the frequency and, therefore, are prone to blackouts and shortages of energy at certain peak periods. So it would be, in my opinion, a great outcome to achieve a single national energy policy.<sup>2</sup>
- 1.12 When Mr Patrick Gibbons of the Minerals Council of Australia was asked 'Would you agree that getting a settled national energy policy that balances the need for us to have affordable and reliable power going forward and addresses the Paris Climate Agreement is the No. 1 priority to deal with that investment problem?' he said:

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1 Dr Ziggy Switkowski AO, *Committee Hansard*, Sydney, 29 August 2019, p. 3.

2 Mr Ian Macfarlane, CEO, Queensland Resources Council, *Proof Committee Hansard*, Brisbane, 30 September 2019, p. 2.

Pretty clearly I think there is an issue around the National Electricity Market not being able to provide a long-term signal that people are prepared to invest in. That then gets us to the next point, which is that governments have been grappling with this issue as it has become more apparent and the consequences have become more apparent. The National Energy Guarantee, put in last year, is a very clear attempt to do that, as is underwriting new generation investment policy, because what that's really getting at is the heart of the investment quandary that's confronting the energy sector today.<sup>3</sup>

## The Global Context: Nuclear Power in Decline

1.13 To consider Australia's position from a global perspective it is important to note that nuclear power has been in decline across the globe for years. Contrary to those who would like to create the impression that nuclear energy is expanding as a source of electricity, the *World Nuclear Industry Status Report*<sup>4</sup>, issued in September 2019, provides the following salient information:

- nuclear power generation peaked in 2006, the number of reactors in operation in 2002, the share of nuclear power in the electricity mix in 1996, the number of reactors under construction in 1979, construction starts in 1976. As of mid-2019, there is one unit less in operation than in 1989.
- The nuclear share of the world's gross power generation has continued its slow decline from a historic peak of 17.46 percent in 1996 to 10.15 percent in 2018.
- In 2018, ten nuclear countries generated more power with renewable than with fission energy. In spite of its ambitious nuclear program, China produced more power from wind alone than from nuclear plants. In India, in the fiscal year to March 2019, not only wind, but for the first time solar out-generated nuclear, and new solar is now competitive with existing coal plants in the market. In the European Union, renewables accounted for 95 percent of all new electricity generating capacity added in the past year.
- Globally, wind power output grew by 29% in 2018, solar by 13%, nuclear by 2.4%. Compared to a decade ago, non-hydro renewables generate over 1,900 TWh more power, exceeding coal and natural gas, while nuclear produces less.

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3 Mr Patrick Gibbons, Principal Adviser, Energy, Coal and Uranium, Minerals Council of Australia, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 49.

4 See World Nuclear Industry Status Report, 2019, <https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2019-HTML.html>, accessed 12 December 2019.

- A record 165 GW of renewables were added to the world's power grids in 2018, up from 157 GW added the previous year. The nuclear operating capacity increased by 9 GW.
- Over the past decade, levelized cost estimates for utility-scale solar dropped by 88%, wind by 69%, while nuclear increased by 23%. Renewables now come in below the cost of coal and natural gas.

### Timing: too late, too slow

- 1.14 Australia needs to move quickly to be part of concerted global action to keep the rise in global average temperatures to well below 2 degrees, and to take advantage of the employment and technology-development opportunities inherent in emerging energy systems.
- 1.15 Time is of the essence. Australia is not acting effectively to reduce emissions and is not on track to meet our emission reduction targets under the Paris Climate Agreement, let alone deliver reductions that are consistent with the goals of that agreement. By any reasonable estimate, a nuclear power plant could not be fast-tracked into operation in Australia much sooner than 2035. Aside from all the other reasons for not pursuing nuclear, it is simply too slow.
- 1.16 As Professor John Quiggin observed in his evidence:
- In my view, energy and environment policy in Australia is in a very bad situation. We have rising emissions of carbon dioxide. If we meet our Paris commitments by 2030, it will only be through once-off accounting devices, leaving us with no path to achieve the reductions in emissions that need to be achieved by 2030, with greater ambition, and certainly by 2050.<sup>5</sup>
- 1.17 According to Dr Matthew Stocks, a research fellow in the School of Electrical, Energy, and Materials Engineering at the Australian National University (ANU):
- Thirty-one years ago, I sat in a seminar at ANU and I said, 'Nuclear was the solution to climate change.' I believed at that time that that was the way we should be going forward and that we did not really have an alternate solution. My view has changed significantly in that 31 years. I believe that we need to act on climate change in a time frame which does not lend itself to Australia now shifting towards nuclear being a big part of that

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5 Professor John Quiggin, *Proof Committee Hansard*, Brisbane, 30 September 2019, p. 7.

solution. I think that is really supported by what the world's view is in terms of change at the moment.<sup>6</sup>

- 1.18 There is no prospect of Australia being able to generate nuclear power inside a decade. In response to a question taken on notice, ANSTO observed that in relation to workforce capability alone:

...it would take between 10 to 15 years to develop sufficient numbers of skilled workers to operate a future power reactor / reactor fleet or to contribute to any other nuclear fuel cycle activities that might be established.<sup>7</sup>

### **Costs: nuclear is 'frightfully expensive'**

- 1.19 One of the most blinding myths about nuclear power is that while it is slow and complex to deliver, and while it involves significant health and environmental risks, it is nevertheless capable of delivering cheap electricity. That is simply not true.
- 1.20 The fact is that nuclear energy, in the words of AK Saxena, Senior Director, Electricity and Fuel Division, The Energy and Resources Institute, New Delhi, is 'frightfully expensive', and it has only ever been delivered through very considerable government financial support.
- 1.21 Despite being an industry with 60-plus years of development, the capital cost of nuclear energy per kilowatt hour has increased, and there is no apparent 'learning curve' with respect to cost reductions, which is in stark contrast to the rapidly declining cost of renewable energy.
- 1.22 Projects under construction in the United Kingdom and France, both of which have well-established nuclear industries, bear this out. The following exchange with Dr Jim Green, President and National Nuclear Campaigner, Friends of the Earth Australia, is instructive on this point:

**Mr JOSH WILSON:** I think the most important thing for this committee is setting public policy based not on corporate claims or paper fantasies but on reality. We're often pointed to France, France being a country that has a very high proportion of electricity from nuclear power. EDF is delivering a reactor in France, and the Hinkley Point C reactor in the UK. Just in the last week, there have been further time blowouts and cost blowouts in relation to both of those projects. In the case of the UK project, Hinkley Point C, they've added a further nearly A\$3 billion, or two

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6 Dr Matthew Stocks, Research Fellow, the Australian National University, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 1.

7 Department of Industry, Innovation and Science, Supplementary Submission 211.2, Answer to Questions on Notice, p. [4].

billion pounds, and that large reactor – which all economic theory and practice would tell you is going to deliver power at a cheaper cost than a smaller version – is based on a government commitment to a strike price of A\$165 per megawatt hour for 35 years, indexed to CPI.

**Dr Green:** That's the guaranteed return to the developers. I don't think that's necessarily the electricity production costs. But they've been guarantee that payment – 92 British pounds per megawatt hour.

**Mr JOSH WILSON:** Which is the twice the going price of electricity.

**Dr Green:** Yes, exactly. The subsidies over the lifetime of Hinkley Point, one nuclear power plant, albeit a very large one, with 3.2 gigawatts, are estimated to be A\$55 billion – that's the lowest estimate I've seen – to A\$91 billion. That's for one nuclear power plant. It's obscene. The UK government are not entirely stupid, but they've walked into this deal and it's appalling. The subsidies are extraordinary and they will go on for decades. They will hurt consumers and they will hurt poor people the worst, and this is exactly what we've avoided, thanks to the infinite wisdom of John Howard.<sup>8</sup>

- 1.23 In any case, the most reputable analysis of cost in the Australian context is the *Gen Cost 2018* Report by AEMO and the CSIRO which shows that nuclear energy, whether large-scale or small-scale, is exorbitant.
- 1.24 In the course of the Sydney hearing on 29 August 2019 it was pointed out that the transition under way in our energy generation system, transmission grid, and market would need new generation sources that were quick to be delivered, flexible in terms of variable power contribution, cost competitive on a total system cost basis, and with low capital costs considering the pace of change and disruption that is occurring. Nuclear power does not meet any of these requirements.
- 1.25 At that Sydney hearing the Chair of the AEMO, Dr Alex Wonhas, said:
- What we find today at current technology cost is that unfirmed renewables in the form of wind and solar are effectively the cheapest form of energy production. If we look at firmed renewables, for example wind and solar firmed with pumped hydro energy storage, that cost, at current cost, is roughly comparable to new build gas or new build coal-fired generation.
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<sup>8</sup> Dr Jim Green, President and National Nuclear Campaigner, Friends of the Earth Australia, *Proof Committee Hansard*, Melbourne, 1 October 2019, p. 9.

Given the learning rate effect that we have just discussed, our expectation is that renewables will further decrease in their cost, and therefore firmed renewables will well and truly become the lowest cost of generation for the NEM.<sup>9</sup>

- 1.26 There is no genuinely commercial nuclear power industry to speak of anywhere in the world. In recent years the most significant companies in the nuclear power industry, Westinghouse (USA) and AREVA (France), have gone bankrupt. Past and current nuclear projects are dependent upon government support, usually involving both direct funding and commitments to uncompetitive long-range power purchase agreements. Nuclear power plants cannot obtain private insurance; their disasters are underwritten by government.
- 1.27 At the 29 August Sydney hearing Dr Ziggy Switkowski said there is 'no coherent business case to finance an Australian nuclear industry',<sup>10</sup> and he added 'I have emphasised that one of the things that have changed over the last decade or so is that nuclear power has got more expensive rather than less expensive'.<sup>11</sup>
- 1.28 Professor Andrew Blakers, a professor of engineering at the ANU, observed:
- You have to ask: why is it that nuclear is completely stagnant and renewables are now two-thirds of global net new generation capacity, and 100 per cent in Australia? The answer is very simple: renewables, like wind and solar, are much cheaper than any alternative, including nuclear. That's why almost all new generation capacity in Australia, and most of it around the world, is wind and solar. This is not likely to change any time soon because the cost of wind and solar are now low. They continue to fall year by year and they will continue to fall throughout the 2020s.
- By the time we get to 2030, which is the earliest possible time that you could have a nuclear reactor ready to go into service, if everything went right, wind and solar will be up around 80, 90, 100 per cent of all electricity generation. There will just be no room for nuclear on a gross generation side of things, let alone the need for flexible operation in the face of the high level of renewables, which Matt [Dr Matthew Stocks, ANU] just alluded to. In short,

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9 Dr Alex Wonhas, Chief System Design and Engineering Officer, Australian Energy Market Operator, *Committee Hansard*, Sydney, 29 August 2019, p. 23.

10 Dr Ziggy Switkowski, *Committee Hansard*, Sydney, 29 August 2019, p. 2.

11 Dr Ziggy Switkowski, *Committee Hansard*, Sydney, 29 August 2019, p. 2.



nuclear missed the boat because it is too expensive. It doesn't really matter if we legalise nuclear, or whatever, it just can't catch wind and solar; they're so far ahead now.<sup>12</sup>

- 1.29 Professor Ian Lowe, Emeritus Professor in the School of Environment and Science at Griffith University, said:

The basic point I want to make is that nuclear power doesn't make either economic or political sense in 21st century Australia. Even groups who are very friendly to nuclear power, like the Switkowski committee, the Uranium mining, processing and nuclear energy report in 2007 and the South Australian Nuclear Fuel Cycle Royal Commission, have concluded that there is no commercial case for nuclear power in Australia.<sup>13</sup>

## Energy Needs

- 1.30 Australia needs investment in new sources of reliable and affordable power generation, supported by a 21st Century transmission system, while ensuring that carbon emissions from the electricity sector are reduced as quickly as possible.

- 1.31 This involves managing a transition that is already occurring at a time of significant technological change and market disruption. As the Australian Energy Market Commission said in evidence to the Committee:

Looking forward, in terms of the work program and the reform agenda, the commission is prioritising reforms in five key areas so customers can access safe, secure, reliable energy at the lowest possible cost as we transition. The reforms are based on five key trends we are seeing in the market.

First, there is a shift from large, geographically concentrated generation to small, geographically dispersed generation. This requires us to rethink how it is that we plan and develop the grid and how it is that we better coordinate generation and transmission investment which will lead to getting reliable supply for consumers.

Secondly, power system services that were previously provided for free as a by-product of power generation are now not necessarily provided by the new generation entering the mix. This requires us to find ways of procuring enough of these technical services to keep the power system secure.

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12 Professor Andrew Blakers, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 2.

13 Professor Ian Lowe, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 55.

The third trend is that customers are increasingly adopting small-scale solar and energy storage technologies. This requires us to integrate these distributed energy resources and to rethink how network infrastructure is used so customers and the grid can get the most out of these technologies.

The fourth is that the power system and the market are increasingly underpinned by digital technologies that make it easier to choose and control how, when and where policy is delivered and used. We are increasingly focusing on involving market frameworks so customers can signal their needs in real time and be rewarded for doing so.

Lastly, more variable demand from customers and more variable supply from generators makes forecasting and balancing supply and demand a challenge. The link between financial incentives facing market participants and the physical needs of the system is important to maintaining this balance. We're looking at ways to restore and reinforce that link.<sup>14</sup>

- 1.32 Some members of the community and some members of the Committee seem to take it as an article of faith that renewable energy and storage technology has already reached its limit to contribute to our future energy needs. Those who questioned whether Australia could ever reach 20 per cent renewable energy by 2020 have blithely ignored the early achievement of that target, and, in the course of the 2019 election campaign, turned up their scorn in describing Labor's target of 50 per cent by 2030 as "economy wrecking". Yet the Department of Energy's latest update (Australia's emissions projections 2019) includes a projection that by 2030 the share of renewable energy in the National Electricity Market will be 51 per cent!
- 1.33 The majority Committee report shows a lack of balance and attention to the evidence when it supports the proposition that nuclear energy is necessary to decarbonise the electricity sector, which in turn assumes that firmed renewables are incapable of achieving that outcome. In the relevant section of Chapter 1 the report quotes extensively from proponents of nuclear power. It fails to refer to evidence from energy sector experts like the scientists from the Australian National University who gave detailed explanations of how this could occur.

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14 Ms Suzanne Falvi, Executive General Manager, Security and Reliability, Australian Energy Market Commission, *Committee Hansard*, Sydney, 29 August 2019, p. 19.

- 1.34 For example, in evidence to the Committee Professor Blakers referred to work that he and other ANU colleagues had undertaken in 2017 on precisely this point:

The cost of balancing 100 per cent renewables has three components: storage, transmission and occasional spillage – when all the storage is full and you've got lots of wind and sun. The three components are roughly equal. Transmission is required so you can shift energy from a place where the wind and sun are good to where the wind and sun are bad, on a particular day. Storage is to time shift so that if it's a very sunny, windy day, like yesterday, we can store for a day in the future when it's not sunny and windy. Spillage is required because if you build enough storage to absorb all the solar and wind then you'll have built storage that you use once every five years and you're paying for things you don't need. So it's a balancing. Basically, the cost of wind and solar now is about \$50 per megawatt hour. If you want to firm up 100 per cent wind and solar you'll add \$25 on top, so you'll get to \$75 a megawatt hour. That \$75 a megawatt hour is below the spot price in every state in all periods in the last financial year; in other words, a fully backed up, firmed solar-wind base with some existing hydro is cheaper to run than the entire current electricity system, and this reflects the fact that wind and solar just keep falling in price.<sup>15</sup>

## Waste

- 1.35 Nuclear waste is dangerous and remains dangerous for an extraordinary length of time. It is not just costly but technically difficult to store nuclear waste. Indeed, despite the fact that the nuclear power industry has existed for 70 years, there is no permanent high-level nuclear waste repository in operation anywhere in the world (though Finland appears to be close to delivering the first).
- 1.36 The mining of uranium in Australia has resulted in numerous unresolved contamination and remediation issues. The following exchange involving Associate Professor Gavin Mudd, a mining and environmental expert with 25 years' experience, is instructive:

**Mr JOSH WILSON:** I don't want to interrupt you, but to bring that to a conclusion, this is in the details of your submission. The Ranger mine: \$800 million plus and the risk that the site can't fund remaining rehabilitation from expected production revenue. Mary

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<sup>15</sup> Professor Andrew Blakers, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 5.

Kathleen: further rehabilitation works. Nabarlek: groundwater contamination. Rum Jungle: extreme water pollution issues. Olympic Dam: tailings seepage. In all of these instances, despite the best Australian know-how and the learnings from these mine operations, you have all kinds of ongoing, unresolved problems with enormous associated costs.

**Prof. Mudd:** Absolutely. At Rum Jungle I think we've already spent another \$10 million or \$15 million over the last fifteen years just on studies to work out what we do next. At Olympic Dam at the moment, I argued in the last assessment process for the previous expansion in about 2009-10 that once they've finished mining the tailings should be excavated and put into the pit, like Ranger is doing. Unfortunately BHP argued in response that it's impractical to put tailings in a pit during operations, which of course is not what I said. Ranger has finished mining the pit and now they're putting the tailings back in. That is an expensive process, but the standards for Ranger have been set right from the start. The promises have always been made that those standards can be met. Now we're finding that they are very expensive. Of course they are. That's always been the concern with Ranger – that the bond that's held aside is not sufficient to cover the sort of works required to achieve those sorts of standards. I could go into much greater detail, having been involved there for over twenty years. The standards that Ranger sets are good standards: putting the tailings back in the pit, covering all the waste rock and so on back into the pit. The basic standards and ideas that Ranger is asked to meet are top notch. I don't know of any other mine in the world that is required to demonstrate a case that they're [*sic*] tailings are not going to be causing groundwater contamination for at least 10,000 years.<sup>16</sup>

- 1.37 While Australia has operated the Lucas Heights OPAL reactor for decades we still do not have a permanent arrangement in place for storing even low-level and medium-level waste. Presently work is being done to establish a national radioactive waste facility that will permanently dispose of low-level waste and temporarily store intermediate-level waste. Representatives of the National Radioactive Waste Management Facility Taskforce advised the Committee that this process has been in train for 40 years without resolution. It has cost \$55 million in spent or budgeted funds to date, and to construct the facility it is estimated to cost a further \$325 million. The Committee was advised that a budget and timetable for
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the delivery of the permanent repository of intermediate-level waste does not exist because at this stage government has not decided on a responsible entity for that task.

## Environment, Health, Non-Proliferation

- 1.38 Nuclear energy involves unique risks to human health and the environment, and it is strongly associated with and related to the acquisition of nuclear weapons. Any decision to pursue nuclear energy technology would have regional geo-political consequences.
- 1.39 Even a small and exceptionally well-run nuclear medicine reactor like the OPAL facility operated by ANSTO continues to feature accidents and safety issues. Indeed in 2017 there was a Level 3 incident (on the International Nuclear and Radiological Event Scale) at ANSTO involving the exposure of a worker resulting in radiation symptoms which was the most serious incident reported in the world that year.
- 1.40 In the case of the OPAL facility the requisite emergency management plan requires the Health Department of New South Wales to maintain an adequate supply of iodine treatments. Earlier this year, France expanded the radius of its iodine treatment preparations by 2.2 million people in order to cover a radius of 20 kilometres around each nuclear plant rather than 10 kilometres which had been the treatment zone set in 2016.<sup>17</sup>
- 1.41 As Fukushima demonstrated, there is no such thing as a safe nuclear plant. That disaster has so far cost \$200 billion, there are still 40,000 people displaced, and contaminated water continues to be discharged into the environment. The operator, TEPCO, has said the clean-up/remediation may take 30-40 years, and the Japan Centre for Economic Research has estimated the final cost at between \$470-660 billion.<sup>18</sup>
- 1.42 There is a well-established link between nuclear power generation and the development of nuclear weapons capability. That was acknowledged in the evidence provided to the inquiry by representatives from the Australian Safeguards and Non-Proliferation Office (ASNO) and the Arms Control and Counter-Proliferation Branch, International Security Division, Department of Foreign Affairs and Trade (DFAT).
- 1.43 For example, Mr Jeff Robinson of DFAT said:

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17 'France to give millions of residents iodine pills while EDF spots problems in six nuclear reactors', *The Local*, 18 September 2019, <https://www.thelocal.fr/20190918/france-to-give-millions-of-people-iodine-pills-in-case-of-nuclear-accident>, accessed 12 December 2019.

18 'Clearing the Radioactive Rubble Heap that was Fukushima Daiichi, 7 Years On', *Scientific American*, 9 March 2018, <https://www.scientificamerican.com/article/clearing-the-radioactive-rubble-heap-that-was-fukushima-daiichi-7-years-on/>, accessed 12 December 2019.

...nuclear is an area very much of dual-use technology. There are nuclear energy benefits but also concerns about nuclear weapons. The nuclear non-proliferation treaty very much acknowledges that with its three main pillars. One is disarmament, which relates to the countries that already had nuclear weapons when the NPT came into force. But also, very strongly, the second and third pillars are nuclear non-proliferation.<sup>19</sup>

1.44 He further observed:

DFAT doesn't have a particular view on the appropriateness of each country, including Australia, as to its sources of energy. Our concerns relate to the potential for those things to go down a path that may lead to broader international security concerns.<sup>20</sup>

1.45 Australia recognises the dual-use aspect of nuclear technology with its attendant proliferation risks in its uranium supply agreements. There are also broader geo-political and security concerns. To claim otherwise is blind, naïve, and dangerous.

## **Social License**

1.46 The Committee received more than 5000 emails from Australians who regard the consideration of nuclear power as a pointless and dangerous distraction.

1.47 Australians are rightly concerned and sceptical about nuclear power. Events like Fukushima have justified that concern.

1.48 As Dave Sweeney, Policy Analyst and Nuclear Campaigner, Australian Conservation Foundation, said in evidence to the Committee:

I suppose from all of that the take-home message for the committee, from my perspective, is that there are strong, continuing and unresolved issues and concerns. Many of these have been identified in detail in the joint environment group submission to the committee, and many have been touched upon and distilled into the joint civil society statement on domestic nuclear power, which was written by a collection of environment, public health and Indigenous trade and faith based organisations representing many millions of Australians across a broad

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19 Mr Jeff Robinson, Assistant Secretary, Arms Control and Counter-Proliferation Branch, International Security Division, Department of Foreign Affairs and Trade, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 42.

20 Mr Jeff Robinson, Assistant Secretary, Arms Control and Counter-Proliferation Branch, International Security Division, Department of Foreign Affairs and Trade, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 42.

demographic and geographic lens. Some of those issues continue to be unresolved issues and concerns. Of course, these are issues around safety, security, cost as well as the time of nuclear as a response mechanism to the urgent need for energy and climate action and policy. And there are the really profound and unresolved issues of radioactive waste, and I think it's really salutary for the committee to take a look at the Australian domestic nuclear waste situation and how difficult, how divisive and how slow that has been to advance a pathway forward for the management of long-lived low- and intermediate-level waste and to translate that into potential management for the highly problematic high-level radioactive waste that would come from any reactors.

I say to the committee that, if the choice was between burning coal and using uranium, our nation would be facing a difficult series of discussions, but it's clearly not, and there really is no social licence for the nuclear sector. As Dr Green just said quite compellingly, existing reactors are costly and underperforming; future reactors are non-existent – one's too dear, one's not there and neither are the basis for a creditable national energy policy. Surely that is what we need to identify and advance. The Australian Conservation Foundation is, along with many, many civil society groups, clearly of the view that nuclear is a dangerous distraction to the real energy choices, challenges and opportunities that we face as a nation. We strongly support the current legal prohibition and strongly support moves to a renewable energy future fund. We also look at the guidance provided by Prime Minister Morrison to this issue. He said that what would be needed would be a power source that would not require massive public subsidies and would deliver cheaper electricity. On those two lenses alone, nuclear simply fails to deliver.<sup>21</sup>

- 1.49 The Minerals Council of Australia recently circulated the results of a survey that purported to show support for nuclear energy was increasing. In fact the survey showed that 60 per cent of Australians did not support a change to current laws and restrictions on nuclear power. As with all surveys of relatively small sample size one must consider the context in which a response was sought. First, it is notable that the 'qualitative' sessions were assembled by first excluding people identified as having 'extreme negative attitudes towards nuclear as an energy source' yet

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21 Mr Dave Sweeney, Policy Analyst and Nuclear Campaigner, Australian Conservation Foundation, *Proof Committee Hansard*, Melbourne, 1 October 2019, p. 3.

there's no indication that people with strong positive views were similarly excluded.

1.50 Second, the material used as the basis of the quantitative survey at various points is wrong, inaccurate, and misleading. For example:

- The Executive Summary says information about Small Modular Reactors (SMRs) is an important part of the argument and goes on to say that 'The news that they are smaller, safer and cheaper is important'. But this is not 'news' because SMRs don't exist and indeed these are merely optimistic vendor claims that are inconsistent with both the evidence and the industry's record.
- The Executive Summary identifies 'case studies' that were considered to be motivating in terms of generating a positive response, for example, 'We already use nuclear products made from uranium for medicine, so uranium could also be used for power'. This is described as a key argument, when it is nonsensical: the OPAL reactor at Lucas Heights is not a power reactor and does not produce high-level waste.
- The Executive Summary identifies the top four facts that drive positive opinion, but two of these claims are not facts: (1) the claim that 'Nuclear is the only zero-emissions energy source capable of meeting Australia's energy demand' is not a matter of fact, but rather a self-serving assertion; and (2) the claim that France generates 75 per cent of its electricity from nuclear is inaccurate (it is 72 per cent) and misleading (France has committed to reducing the share of nuclear energy to 50 per cent by 2035). If you want a clearer picture of the nuclear industry in France consider the October 2019 audit report released by the French Finance Minister on the Flamanville reactor currently under construction by EDF. This project, which began in 2007 and was expected to commence operation in 2013, has been massively delayed, will not begin loading fuel until 2022 at the earliest, and is already four times over budget.

1.51 The Minerals Council survey claims to have achieved majority support for lifting the current ban on nuclear energy in Australia once those surveyed were (a) able to consider some 'balanced messaging and facts about nuclear', which the information presented was clearly imbalanced and inaccurate; and (b) were told that a majority of Australians supported lifting the ban (which at that point, even within the context of the survey itself was untrue).



## Small Modular Reactors

1.52 Claims were made to the Committee by nuclear power vendors in particular that small modular reactors (SMRs) would in future prove to be dramatically cheaper and safer than existing nuclear technology.

1.53 By contrast, economists like Professor John Quiggin, whose submission included detailed reference to the substantial delays and cost blowouts in current nuclear projects, made the point that the optimistic claims for SMRs are questionable in the absence of evidence:

I think there are reasons for being sceptical that small modular reactors will be the panacea that has been suggested by some. The first is, of course, that they don't yet exist. As somebody said, the paper based designs are always the most efficient ones. Everything works on paper.<sup>22</sup>

1.54 Similarly, Simon Holmes à Court, Director of the Smart Energy Council and an adviser at the Energy Transition Hub, observed:

This brings us to small modular reactors. Firstly, as the committee has heard from many, they don't exist – or, rather, they exist only on paper, which makes them very low down the technology-readiness scale. I explained that in more detail in my submission. Heroic efforts are now in play to realise these plants, but even the most advanced are expected to be completed around 2027. It will be a number of years before these pilot plants are commercialised, and well into the 2030s before they're progressed to a point where they are bankable. It's quite likely that the first plant in Australia would not be generating a megawatt hour of power until the 2040s. It's fanciful to believe that we now know what they will cost, especially when the nuclear sector has an appalling track record on time lines and budgets. Dr Jon Koomey, a renowned US energy academic, wrote recently that he has adopted a 'show me' stance with the nuclear sector: 'Don't tell me what you're going to do and at what price show me; I'll believe it when I see.'<sup>23</sup>

1.55 And Jim Green, President and National Nuclear Campaigner, Friends of the Earth Australia, gave detailed evidence in relation to the costs of SMRs:

Thanks for the invitation to speak. Mr O'Brien, I would respectfully ask you to revisit and reconsider your express view that small modular reactors and other new technologies are

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22 Professor John Quiggin, *Proof Committee Hansard*, Brisbane, 30 September 2019, pp. 7-8.

23 Mr Simon Holmes a Court, *Proof Committee Hansard*, Canberra, 18 October 2019, p. 54.

leading to 'cleaner, safer and more efficient energy production'. That argument would be compelling if there were fleets or networks of these SMRs operating anywhere in the world and operating successfully, but as you know, and as Dr Switkowski mentioned in his testimony, there are no such networks anywhere in the world, so we have no idea if or how a network of SMRs might operate in Australia. Further, there isn't even one single SMR operating anywhere in the world. There isn't even one prototype SMR operating anywhere in the world. So operating SMRs, of which there are precisely none, clearly provide...

...I was reading the Minerals Council's submission yesterday. They assert that the CSIRO and Energy Market Operator GenCost 2018 study was wrong with its SMR cost estimates. That study gave a figure of a construction cost of \$16,000 per kilowatt, and I agree that's wrong. In Argentina the cost is \$32,400 per kilowatt, that's twice the figure from CSIRO and the Energy Market Operator. In Russia it's \$14,800 per kilowatt for their floating nuclear power plant. In China the figures are very rubbery, but we have a figure from the World Nuclear Association of just under \$9,000 per kilowatt. So I would say that the CSIRO and Energy Market Operator costs are reasonable, but there's a wide degree of variance and a high degree of uncertainty. Another way we could arrive at the figure would be to look at the cost of large reactors and add a premium for a first-of-a-kind plant and a premium for smaller reactors, because of the inevitable diseconomies of scale. The only large reactor under construction in the US is in Georgia – it's called Plant Vogtle – and the cost of that is over A\$16,000 dollars per kilowatt. So once again I would suggest that the CSIRO and Energy Market Operator figures are reasonable and quite possibly an underestimate, whereas the Minerals Council complains that NuScale's estimates should be taken at face value.<sup>24</sup>

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24 Dr Jim Green, President and National Nuclear Campaigner, Friends of the Earth Australia, *Proof Committee Hansard*, Melbourne, 1 October 2019, pp. 1-2.

- 1.56 There is no basis for believing that SMRs will defy the history of the nuclear industry and the logic of economies of scale by being any cheaper than large-scale nuclear plants, which are extraordinarily expensive.

**Mr Josh Wilson MP**  
**Deputy Chair**

**Mr Josh Burns MP**  
**Member**

**Mrs Fiona Phillips MP**  
**Supplementary Member**

