Submission No 8

INQUIRY INTO URANIUM MINING AND NUCLEAR FACILITIES (PROHIBITIONS) REPEAL BILL 2019

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SUBMISSION TO THE NSW LEGISLATIVE COUNCIL's STANDING COMMITTEE ON STATE DEVELOPMENT INQUIRY INTO REPEAL OF THE URANIUM MINING AND NUCLEAR FACILITIES (PROHIBITIONS) ACT 1986

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I make this Submission in good faith and in a personal capacity only. I am not employed by, nor do I represent, any vested interest, commercial, political, or otherwise. I am a chemical engineer, holding degrees in applied science, chemical engineering and business administration, plus post-graduate qualifications in environmental studies and energy studies. I am a Fellow of the Institution of Chemical Engineers, a Chartered Scientist of the UK Science Council, a Fellow of the Australian Academy of Technology and Engineering, and a Foundation Fellow of the Australian Institute of Company Directors.

Executive Summary

As the driest continent on earth, Australia is facing adverse climate changes arising from the continued global use of fossil fuels and land use changes.

The Act in question is a relic of a bygone era, and must be repealed without delay to enable proper consideration of the use of modern, emissions-free, nuclear power technology to generate electricity in the nation's leading State of New South Wales. For maximum effectiveness, this should be done at the same time as repeal of similar prohibitive legislation within the Commonwealth jurisdiction.

The following points are germane --

- the generation of electricity within the National Electricity Market of Australia is at risk of developing an overreliance on intermittent, variable sources of energy without an underpinning of dispatchable forms of generation. This could require another coal or gas fired power plant in the near term -- but for the longer-term, reliable, all-weather, emissions-free, dispatchable nuclear power will be required.

- as the most important State in the Commonwealth and driver of economic growth, it is appropriate for NSW to act promptly to strengthen its supply of always-available clean electricity, making repeal of this Act a first step to that end.

- any such action by NSW will be futile unless contemporaneous action is also taken by the Commonwealth to repeal similar nuclear prohibitions found in the *Environment Protection and Biodiversity Conservation Act 1999*, and the *Australian Radiation Protection and Nuclear Safety Act 1998.* It is imperative that NSW pushes hard for bilateral and bipartisan action on this score.

- there is much development taking place across the world around Smaller Modular Nuclear Reactors (SMRs), particularly in the USA, UK, China, Canada, and Russia, in which many of Australia's neighbours in Asia are taking a keen interest. NSW should take the lead in examining these opportunities, and to assess their worth in helping the nation develop a new industry based on advanced nuclear technology.

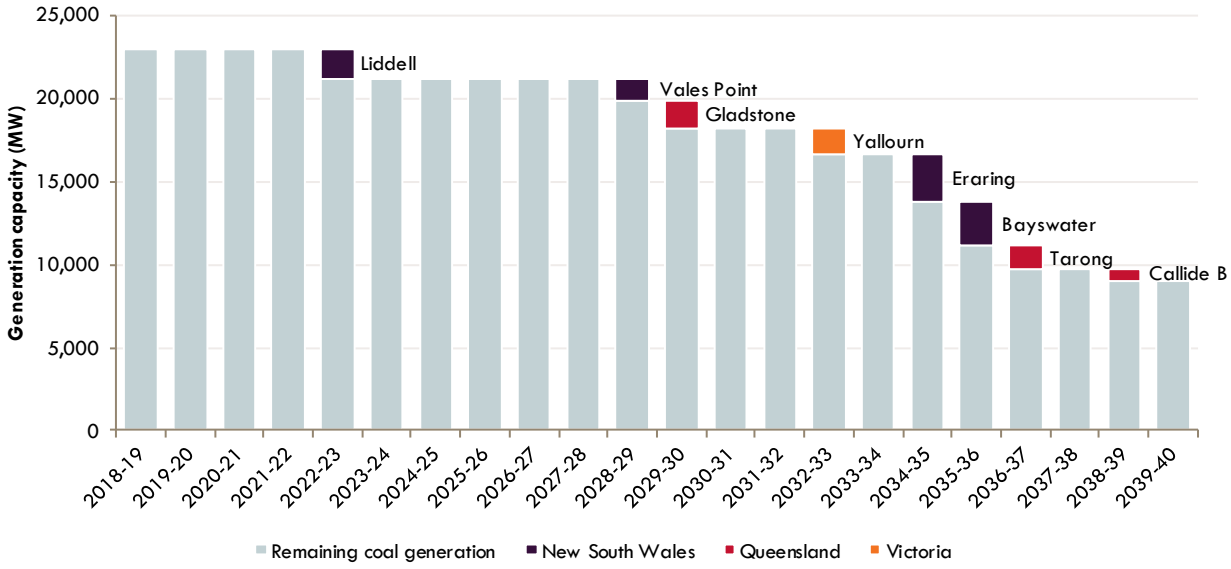
- thesematters and their implications should be at the forefront of discussion and action by the COAG Energy Council. Close cooperation by the Commonwealth and States is essential, if the nation is to have any chance of developing effective action to deal with climate changewhile maintaining a reliable energy supply for its citizens.

Discussion

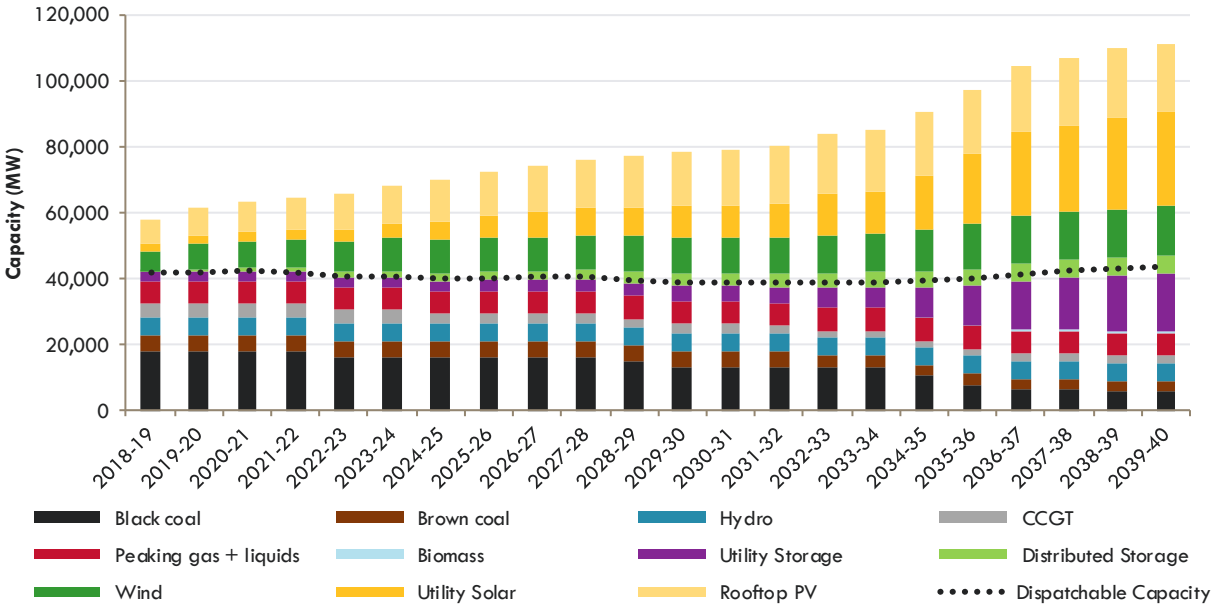
(1) Implications of where we are heading

The forward picture can be illustrated in the following two Graphs from the AEMO Integrated System Plan 2018, viz. –

NEM coal-fired generation fleet operating life to 2040, by 50th year from full operation or announced retirement



Forecast NEM generation capacity in the Neutral case



Only time will tell if these events all occur at the time and in the orderly way pictured above. However, without belabouring the point, two observations can be made --

- Fig. 2 : This pattern of probable coal-fired plant retirement has been known for some years, but there does not appear to be an agreed Plan between plant operators and Governments about how these plants will be replaced to maintain system security while lowering emissions.

  Some NSW operators have announced an intention to replace existing dispatchable generation with a collection of intermittent variable options, but it is not clear if the NSW Government agrees with this solution, or if so, to what extent ?

- Fig. 9 : This is AEMO's best guess of what forward replacement forms of generation will be needed by 2040, with an increasing growth in non-dispatchable renewables. No discussion of, or inclusion of, nuclear is shown.

  Will this work ? -- especially if existing coal-fired plants find that the preference for renewables in the daily energy cycle starts to make their continued operation uneconomic, thereby forcing their earlier-than-expected shutdown ? What will be the implications of this ?

  For example, calculations by *Environmental Progress* in the USA show that if the pattern shown in Fig. 9 does actually occur, then battery storage capacity in the order of 696 times more than the Tesla-supplied battery at Hornsdale SA would be needed by 2040 to provide four hours back-up for the Australian grid, costing in the order of US$ 50 billion in today's dollars.

(2) NSW the most important State to get it right

It goes without saying that NSW, as Australia's largest economy, has an obligation to thoroughly understand these implications and be prepared to lead the development of a viable operating plan for our future energy needs. It is not obvious to the casual observer that this has been happening.

The complications are obvious and well-known, but exploring solutions is difficult if the only reliable, all-weather, zero-emissions technology, viz. modern nuclear power, is excluded from the table because of outmoded Commonwealth and State legal prohibition.

Unless NSW takes the lead and demonstrates resolve to pursue the best possible combination of technologies to address these difficult issues, Australia will be the loser.

A clear statement that the Uranium Mining and Nuclear Facilities (Prohibitions) Act 1986 will be repealed would do much to restore faith in the political process, and encourage a proper look at the latest nuclear power technology from around the world.

(3) The Australian Parliament must take similar action, and it must be bipartisan

It is sad but true that the existing Federal prohibition on using nuclear energy to generate electricity was imposed 20 years ago to placate the then Greens and Democrats in order to

get other needed legislation through the Parliament. It has no practical, social, or scientific merit, but remains in place as the only such ban in the developed world.

As the rest of the world comes to terms with how best to deal with these important issues, Australia is looking timid and hypocritical in not removing the ban long before this, given that this country holds around 1/3 of the world's known uranium reserves which it is happy to sell to others, but will not use at home. It is time to join the real world.

As NSW takes the lead in this matter, it should make the point that the removing of such prohibitions must proceed with the full public support of both major political groupings. This will be essential to demonstrate, beyond doubt, that the nation is serious about getting the right balance of modern technologies in place to deal with climate change risks, and to reassure investors, public and private, that they can rely on the policy being in place for the longer-term.

(4) We need to catch up with the rest of the world

Australia is seriously lagging in its interest in modern nuclear power to help deal with the risks of adverse climate change.

Apart from the 30 countries that currently employ nuclear energy technology to generate zero-emissions electricity, the World Nuclear Association and the International Atomic Energy Agency (IAEA) report, as a sample only, that the following countries have indicated 'interest' in, or are already on a pathway to adopt, modern nuclear power for this purpose -- Bangladesh, Egypt, Indonesia, Jordan, Turkey, Kenya, Chile, Vietnam, Malaysia, Singapore, Croatia, Poland, Romania, and others.

Our largest trading partner, China, has 39 reactors in operation, 17 under construction, and is planning to add another 290 by 2050. Failure to have any nuclear power industry of our own could jeopardise our trading relationships with Asia at some future time. We are falling seriously behind.

(5) The COAG Energy Council should drive the catch-up

The COAG Energy Council would appear to be the perfect vehicle to table and explore the need for Australia to be taking a closer look at what the rest of the world, and especially Asia, is doing to adopt the use of nuclear energy for electricity generation.

It appears that the terms of reference for *The Independent Review into the Future Security of the National Electricity Market (the Finkel Report)* did not cover the possibility of nuclear power generation for Australia. Whatever the reason, the aftermath has not advanced the question which so many other countries have concluded must be examined.

It is reasonable to think that the COAG Energy Council, as the Ministerial Council embracing all the States and Territories of Australia, should be the body to initiate this kind of high-level examination.

With the advent of Small Modular Reactors (SMRs) gaining momentum across the world, it is now urgently necessary that Australia take advantage of its membership of the *Generation*

IV International Forum, which is looking at six revolutionary SMR designs in order to access the latest knowledge, contribute what we can, and bring the Australian people into the loop so that a strong sense of trust and social understanding can be developed.

Better knowledge of this work could well be the catalyst we need to gain community acceptance, and make more informed decisions about the appropriate balance of technologies we need for our essential electricity future.

Conclusion

The risks of adverse global climate change means Australia must look at all feasible low-carbon means of electricity generation.

Early measures such as solar, wind, and pumped hydro are appropriate, but their variable operating characteristics, low capacity factors, and increasing costs / but lower values as prime sites are used up, will mean they are not the whole answer. Australia should be looking at advanced 24 x hour nuclear power, especially in its smaller modular forms, to work with renewables and hydro.

This process should start now with some genuine political leadership. NSW has the chance to lead the nation and start a new industry by repealing the Uranium Mining and Nuclear Facilities (Prohibitions) Act 1986.

I trust this Submission is of assistance to the Committee.

Barry Murphy
26 July 2019

Attachments :

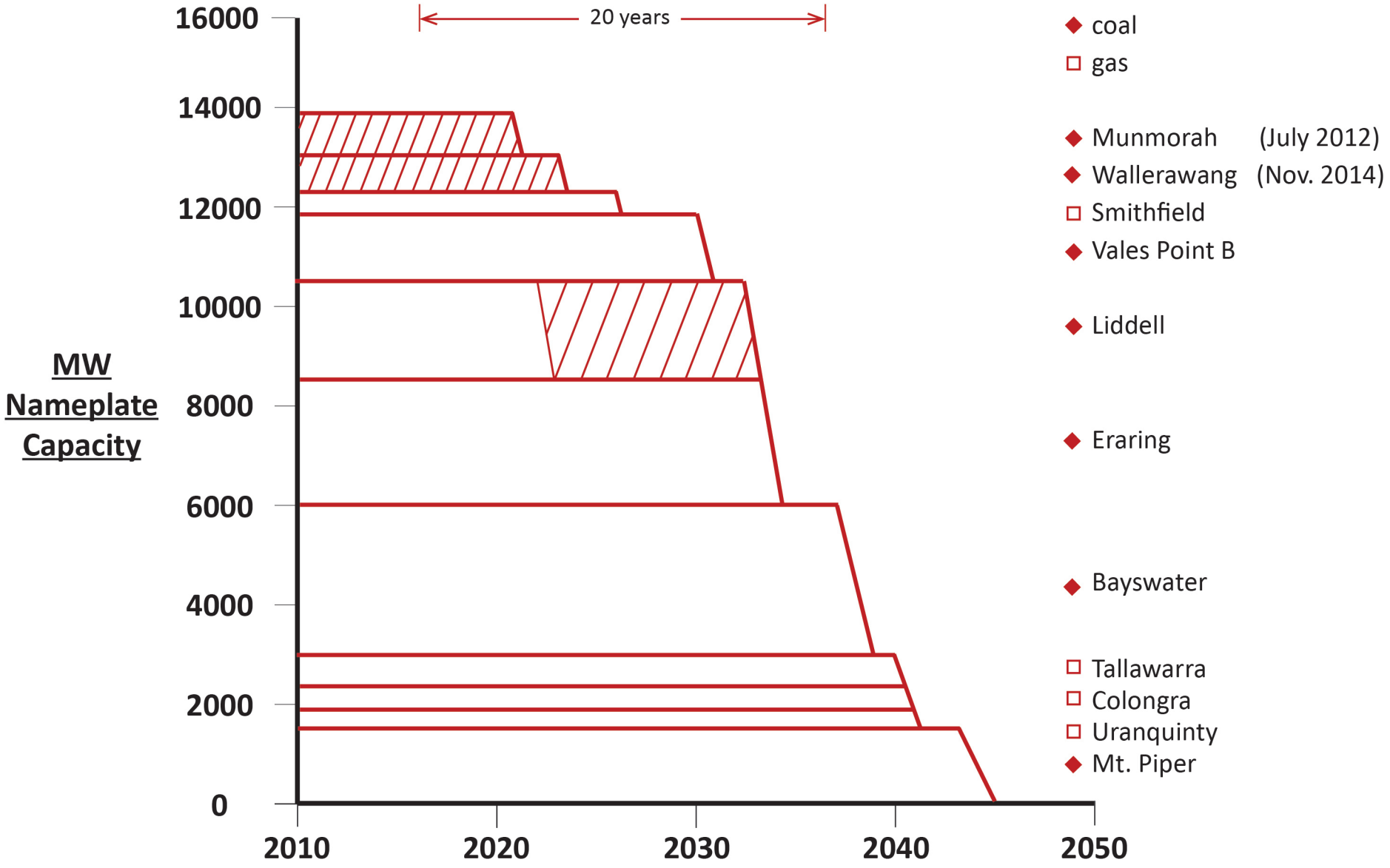
(1) NSW Thermal Generation Outlook

(2) How does Australia feel about nuclear ?

(3) It can be more than electricity

(4) A road to the use of Advanced Nuclear Power Technology in Australia ?

NSW thermal generation outlook



*Adapted from submission by Cape Otway Associates to Finkel Inquiry, June 2017

How does Australia feel about nuclear?

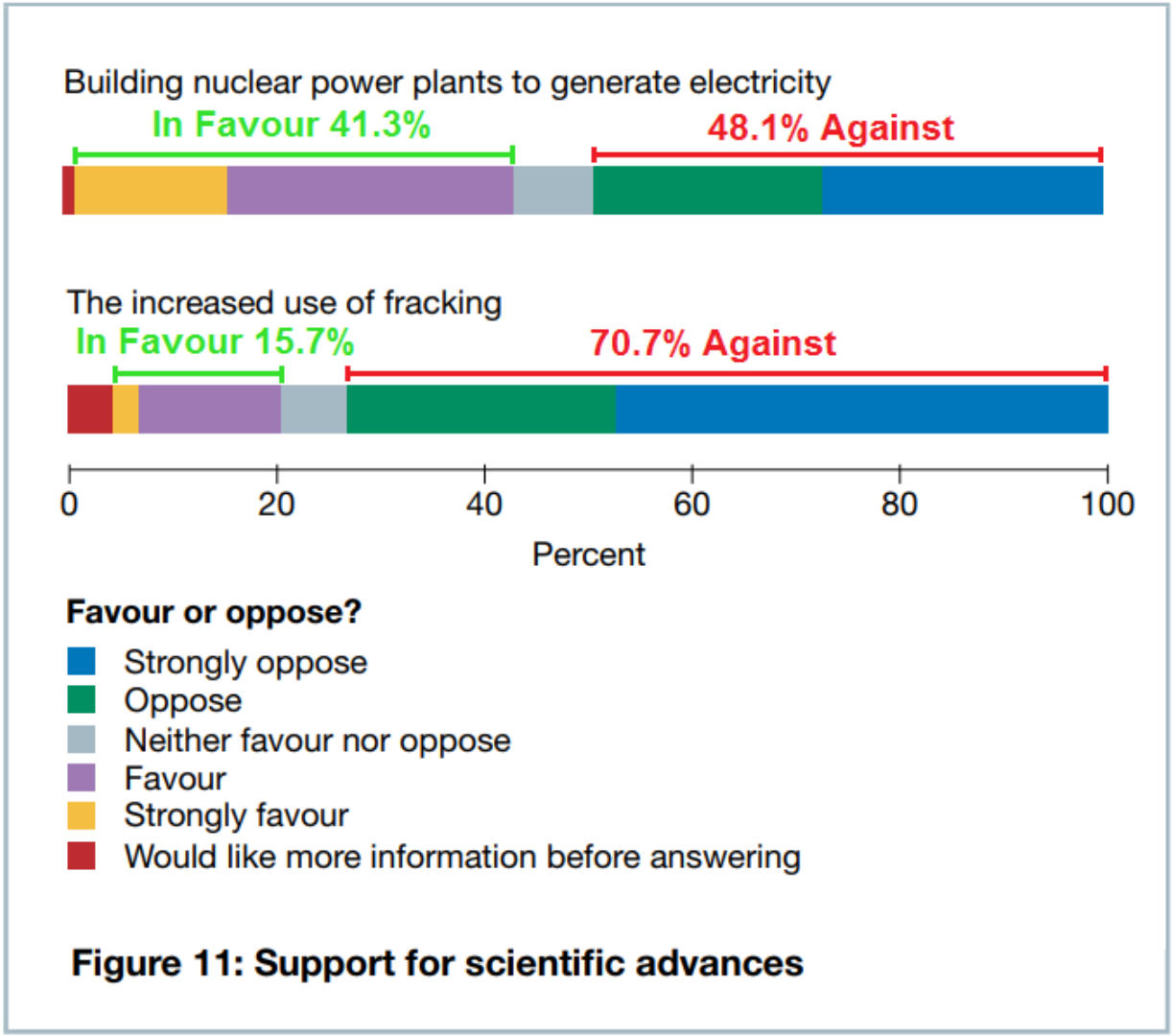


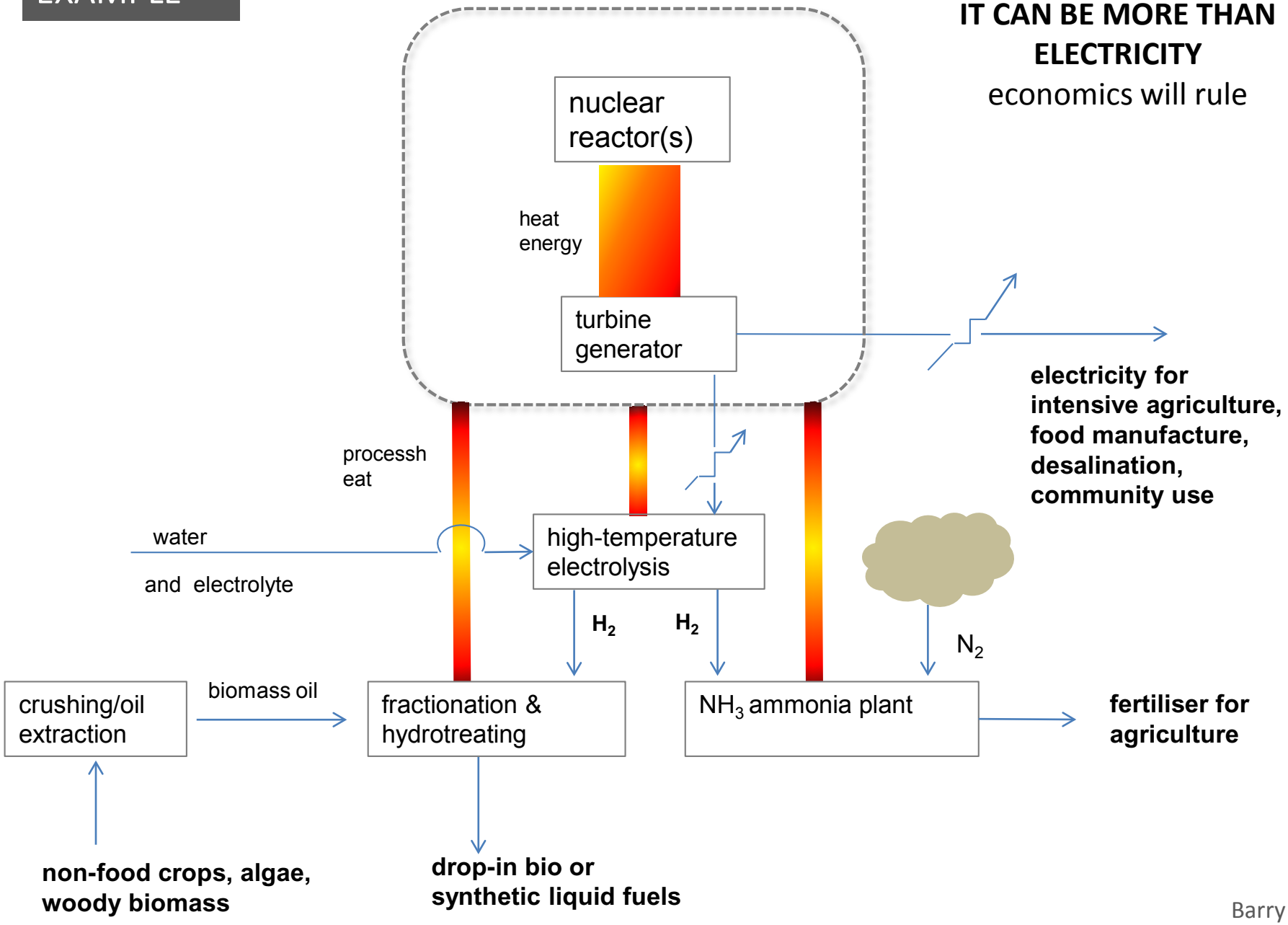
Figure 11: Support for scientific advances

Source: ANU, The Australian Beliefs and Attitudes Towards Science Survey 2017

EXAMPLE

IT CAN BE MORE THAN ELECTRICITY

economics will rule



A road to the use of Advanced Nuclear Power technology in Australia ?

TIMELINE