



New Clear Future

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Nuclear advocates have long felt that once people start to look again at nuclear technology, confront their fears and begin to understand the relationship between the hazards and the actual risks, opposition will soften to the development of nuclear energy. It is remarkable that despite more than 40 years of anti-nuclear fearmongering, the public appears to have become much more open-minded. Could it be that ground-breaking science and the benefits of nuclear technology are finally starting to overcome the scare campaigns of anti-nuclear bullies?

For example, in October last year, SBS *Viceland* ran a Facebook poll on whether Australia should lift its ban on nuclear power. Historically, nuclear power's traditional support base has tended to be politically right of centre and older. Yet even on SBS *Viceland*—a platform that according to SBS is “tackling the issues that matter to young people today”—61 per cent of 13,400 votes agreed the ban should be lifted! In case you thought that might have been an aberration, it was virtually repeated on an ABC Brisbane Facebook poll. And in June this year, Essential Research



ran a poll asking Australians whether they supported nuclear power. The result was a four per cent increase from 2015, with 54 per cent affirming they agree nuclear would be a reliable energy source for the future. It is becoming clear that people's attitudes are starting to reflect the weight of evidence. As Bob Dylan sang, "the times they are a-changin'".

There is no mistaking the low-emissions nature of nuclear power, even taking into account the full nuclear fuel cycle. The International Panel on Climate Change (IPCC) has determined the full lifecycle emissions of nuclear power are 12gCO<sub>2</sub>eq/kWh, a value confirmed by the National Renewable Energy Laboratory in the US. But don't just take it from the IPCC; even anti-nuclear Greenpeace has admitted nuclear power is low carbon. The IPCC in its *Special Report: Global warming of 1.5°C*, in the mitigation pathways chapter, notes the increased development and deployment of nuclear power, stating "Nuclear power increases its share in most 1.5°C pathways..." Under their models, by mid- century the majority of primary energy comes from both renewables and nuclear power. This pathway is corroborated by the International Energy Agency in its Sustainable Development Pathway released in 2018, requiring nuclear power to grow by 88 per cent to 2040.

The IPCC notes nuclear power needs to be a part of emissions mitigation pathways, but "the future deployment of nuclear can be constrained by societal preferences assumed in narratives underlying the pathways". In other words, the efforts of groups such as Greenpeace to oppose the development of nuclear power. If we're supposed to listen to the IPCC on climate science, the same should be said of their assessments on nuclear power. Otherwise, environmental advocates are just cherry-picking science to suit themselves.

Nuclear power's low-carbon attributes have led environmentalists who used to be anti- nuclear activists to change their views. Stewart Brand—founder of the *Whole Earth Catalogue*, a publication for communards—wrote about 'Environmental Heresies' in 2005 in the MIT Technology Review. Previously opposed to nuclear power, Brand called for change in the environmental movement, even detailing his transformation in the documentary *Pandora's Promise*. During the making of this film, director Robert Stone also changed his views in favour of nuclear power.

For climate change scientists, James Hansen, Director of the NASA Goddard Institute for Space Studies from 1981 to 2013, is considered the grandfather of climate change advocacy. In 1988, his testimony to US Congress raised the awareness of the risks of climate change. And in 2008 he listed five priorities then US President Obama should adopt, nuclear being one of them. Dr Hansen— along with other pre-eminent climate and earth scientists Prof. Kerry Emanuel, Prof. Tom Wigley, and Ken Calderia—wrote in 2015 that nuclear power must be a part of the decarbonisation of the energy sector, with advanced fourth-generation designs playing a crucial role.

Writing in *The Guardian*, they noted:

The future of our planet and our descendants depends on basing decisions on facts,

and letting go of long-held biases when it comes to nuclear power.

In Australia, 77 conservation scientists wrote an open letter in 2014 calling for all low-carbon electricity sources, including nuclear power, to be deployed. Even though they were all pressured by Australian anti-nuclear campaigners to retract their support, not one did. In 2018, 41 scientists and environmentalists wrote another open letter to leaders of the G20 nations calling for a fair assessment and inclusion of nuclear power.

In a survey by the Pew Research Centre of members of the American Association for the Advancement of Science (AAAS), the world's largest multidisciplinary scientific professional society, on building nuclear power plants to generate electricity, 65 per cent of all AAAS members surveyed favoured the building of nuclear power. The environmental movement and scientists in general are turning to support nuclear, even if the big green groups remain stubbornly opposed. The tide has turned and there is now broad scientific support for nuclear power. Yet the anti-nuclear movement still falls back on its tired variants of "But Chernobyl! What about Fukushima?" These shibboleths become rapidly outdated with the benefit of hindsight and scientific inquiry. When these accidents are taken into consideration, the threat to humanity that nuclear power poses is not as apocalyptic as imagined or claimed.

The Paul Scherr Institute in Switzerland undertakes a risk assessment of all electricity generating sources. The safest of all, including renewables, is nuclear—even considering Chernobyl and Fukushima. According to the Institute's figures, 0.04 people per terawatt hour of nuclear energy die as a result, 0.15 for wind, 0.44 for solar, 1.4 for hydro, 4.0 for gas, 36.0 for oil and 161.0 for coal.

James Hansen's 2013 paper *Prevented mortality and greenhouse gas emissions from historical and projected nuclear power* concluded that between 1971 and 2009, nuclear energy prevented the death of 1.8 million people from air pollution caused by coal and gas combustion. So, according to the grandfather of climate change activism, nuclear has saved more lives than it has ever taken. Fukushima is the largest accident involving a western-designed reactor. Its impact can be summed up by the World Health Organisation (WHO) and United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) reports on the disaster, which state:

No radiation-related deaths or acute diseases have been observed among the workers and general public exposed to radiation from the accident. No discernible increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants.

What's the response by anti-nuclear activists to this? "A total cover-up to protect the nuclear industry," says Helen Caldicott.

What these WHO and UNSCEAR reports don't mention is the experience of the Onagawa nuclear power plant in Japan. It was hit harder by the magnitude 9 earthquake, its seawalls shielded it from a giant tsunami, and it even provided shelter to local communities that lost everything in the



disaster. The IAEA inspected the facility and reported: “The structural elements of the NPS [nuclear power station] were remarkably undamaged given the magnitude of ground motion experienced and the duration and size of this great earthquake”. If activists claim the experience of Fukushima should push us not to go nuclear, should the experience of Onagawa not also be considered?

What both accidents have taught us is the mass evacuation of people in and around a nuclear accident is far more harmful than the incident itself, and that overreacting to the radiological risk can lead to stigmatisation, depression, anxiety and dislocation. This demonstrates the need to better communicate the hazard—radioactive contamination—along with the relative risk. The fear of nuclear harms more than the plant itself, and it’s time the anti-nuclear movement recognises the real harm caused by exaggerating the impacts and risks of nuclear power. The exaggeration of the risks of nuclear power by certain environmental NGOs and their advocacy of the “greatest threat to mankind”—climate change—is an odd juxtaposition. On the one hand nuclear is proven to reduce emissions, as seen in France, Ontario and Sweden, thereby addressing “the biggest threat to humanity”—but the past accidents of two plants are worse.

Presently, the economics of nuclear is the main argument used to oppose its development. Gigawatt-scale nuclear projects are multi-billion-dollar investments that involve advanced manufacturing processes and high-end technological development and require careful management processes to ensure hazards are adequately contained to minimise risks. It involves millions of dollars in feasibility studies and man-hours to design the plant, undertake the regulatory processes and develop large supply chains to ensure the project is built efficiently and adequately.

For any prospective government that aims to stimulate a local economy with jobs and economic development that can be sustained for decades (supporting a multi-billion-dollar civil works project that will require tonnes of materials, high end technology, labourers, managers, scientists and engineers), nuclear power is very attractive.

As a large gigawatt (1,000,000 kilowatts) plant will likely be built near the ocean for cooling purposes, the economic prospects for a regional community are too large not to be explored. Once the project is built, it can provide hundreds of ongoing, high-wage jobs in an advanced industry. For local communities in the United States near a nuclear power plant, they provide millions annually in taxes and ensure local services such as hospitals, schools and shops are maintained for decades to come. The value a nuclear plant provides to a community also shows in polling data. Community support for a neighbouring nuclear plant in the USA is 89 per cent; 69 per cent would find it acceptable to add another reactor on site, and 73 per cent agree more nuclear plants should be built.

Let’s take the example of the Columbia nuclear power plant in Washington State. This plant was commissioned in 1984 as a 1.1GW plant, produces 8,128 GWh annually and would cost \$7.32 billion to construct in today’s dollars. Over the past half-decade, the plant’s economic operation has come under scrutiny to determine whether it provides value for consumers. The Bonneville Power Administration, like the Australian Energy Market Operator, concluded it provides “unique firm, baseload, non-CO2 emitting power with predictable costs for ratepayers” costing 3

cents/kWh (USD). In 2001 with the Enron scandal in the western US energy market, the operation of Columbia “saved ratepayers US\$1.4bn” compared to the rest of the market and replacement power. So Columbia saved US\$1.4bn in an energy crisis, provided 3c/kWh (USD) wholesale electricity, and is low carbon. Today, the cost of power for the US nuclear industry as a whole averages 3.2 cents/kWh. In comparison, wholesale electricity in Australia’s NEM to date in 2019 is between 5.5-7c/kWh (USD).

Once operational, nuclear can be a powerful electricity supplier at a stable and predictable rate. The need is clear for more predictability in an energy market that has pricing volatility events, such as in South Australia in July 2016, which caused major electricity users to reconsider operating in the market. The current knowledge of nuclear power shows it can be economically competitive. It is low carbon and its relative risk is low.

Australians are increasingly supporting the removal of our nuclear power prohibition. But the market cannot test its feasibility without that prohibition being removed. The Prime Minister, Scott Morrison, has stated he has “no issue” with nuclear power, but doesn’t think it stacks up financially. Until the prohibition is repealed, the Prime Minister will never really know. Give the nuclear sector the freedom to demonstrate its feasibility. When the people are free to choose and understand nuclear they vote in favour, which is exactly what the anti- nuclear movement fears.

Signs of a shift of momentum in the past year include:

- When the public was free to vote recently in Taiwan on a referendum to remove the early closure of their plants, they supported the motion.
- In Arizona voters rejected by a two-to- one margin a motion to close the Palo Verde nuclear plant, and in 2016 Illinois and New York prevented plants from closing prematurely.
- In 2017 a South Korean Citizens Jury went from 60 per cent opposed to 60 per cent in favour after discussing nuclear.
- In Europe a poll of 18,000 Dutch citizens this year found 54 per cent for and only 35 per cent against nuclear power.
- In South Australia, a poll found 48 per cent support and 33 per cent oppose nuclear power.
- Essential Research found a 4 per cent increase in support for nuclear power since 2015 in Australia.
- In Ohio, legislators voted to save their nuclear plants from early retirement.

These are inconvenient truths for Australia’s anti-nuclear movement. When the public is free to listen to scientific experts and institutions, they are open to nuclear power. Where there is nuclear power, people choose to live next to it. Even in Australia, we built a nuclear research reactor in the middle of nowhere—Lucas Heights in New South Wales—only to see many people move there and suburbs develop around it in the subsequent decades.

We now have no less than three government inquiries into nuclear power opportunities and prohibitions:

- The NSW Parliament is inquiring into a law introduced to remove prohibitions on uranium



mining and nuclear power.

- The Federal Parliament is inquiring into the prerequisites for nuclear energy in Australia (removing the prohibition will no doubt be one!).
- The Victorian Legislative Council has initiated an inquiry into the *Nuclear Activities (Prohibitions) Act 1983*.

The plethora of inquiries reflects the intuitive fact there is something wrong with our laws, which clearly do not match our scientific understanding. Those objecting to these inquiries should just agree to normalise our legislation and allow economics to determine what if anything happens next. Let the market and the people—not an archaic prohibition— have the freedom to determine its viability. It's time Australia ended its discrimination against nuclear energy.