

## 13 Fallacies about Nuclear Power

by Mark Diesendorf

With the election of Tony Abbott as leader of the Liberals, a renewed burst of pro-nuclear propaganda is being spread by that party, building on the existing campaign by the Australian Nuclear Science and Technology Organisation (ANSTO) and other vested interests. Many fallacies and lies are being disseminated to the media and the public. Here are refutations of the most common ones.

1. Fallacy: 19% of global electricity comes from nuclear power.

Refutation: Actually, the percentage contribution has been declining steadily through the 2000s to the extent that it reached 14% in 2008. The decline is mainly the result of global electricity demand growing faster than global nuclear power capacity. However, there has also been a decline in the number of operating nuclear power stations since 2002. At the time of writing (April 2010) there were only two new nuclear power stations under construction in western countries, despite enormous subsidies.

2. Fallacy: Peak oil means that we need nuclear power as a substitute.

Refutation: Oil is mostly burnt for transport, not electricity. Globally the main fuels for electricity generation are coal and gas in that order. Until there are lots of electric cars, nuclear power is irrelevant as a solution for peak oil.

3. Fallacy: Nuclear power can help eradicate poverty in the Third World.

Refutation: In most less developed countries, there are two populations: the middle- and upper class power elite who live in cities and the majority of low-income earners who live in villages. Many of the latter are not connected to the grid, so nuclear power is irrelevant to them. Even where villages are grid-connected, most villagers cannot afford electrical appliances. The principal energy needs of most villagers are lighting and fuel for cooking. Tiny solar electric systems are often the best means of lighting and biogas from dung can be used for cooking.

4. Fallacy: Many environmentalists have become pro-nuclear.

Refutation: Apart from Patrick Moore (ex-Greenpeace) and James Lovelock (who is an environmental scientist but not really an environmentalist), there are very few *prominent* environmentalists who are pro-nuclear.

5. Fallacy: Nuclear power produces a tiny fraction of the waste of coal power.

Refutation: Without wishing to defend coal, we can point out that that's a misleading comparison. The fallacy is comparing the amount of *high-level* nuclear waste with all the amount of *all* the waste from coal mining. A fairer comparison would be to compare *all* the waste from both technologies. We must count the huge mountains of low-level waste from uranium mining (100 million

tonnes uncovered at Roxby Downs alone). Then, if we compare nuclear power based on the mining of low-grade uranium ore with brown coal, we find that the amounts of waste are comparable in magnitude.

6. Fallacy: We have solved the problem of managing high-level nuclear wastes for the long-term.

Refutation: Possibly in engineering theory, but not in practice. There is no long-term high-level nuclear waste dump operating in the world. President Obama has terminated work on the Yucca Mountain dump in Nevada. Only Finland and Sweden are building underground dumps. No-one knows how to create social institutions to keep the waste safe for 100,000 years or more.

7. Fallacy: You must choose between coal or nuclear.

Refutation: No, the real choice is between dirty and dangerous technologies (coal and nuclear) on one hand and clean technologies (energy efficiency and renewable energy) on the other. It's interesting that the biggest corporations pushing the fallacy – BHP Billiton and Rio Tinto – are mining both coal and uranium. With their false choice, they would win either way.

8. Fallacy: It's impossible to use reactor-grade plutonium (extracted by reprocessing the spent fuel from a nuclear power station) to make nuclear weapons. Only weapons-grade plutonium (extracted from military plutonium production reactors) is suitable.

Refutation: Although nuclear weapons based on reactor-grade plutonium are less 'efficient' and the amount of damage caused is less predictable, bombs can certainly be made and indeed have been made from reactor grade plutonium. This has been confirmed by many experts, including leading US nuclear bomb designer Dr Theodore Taylor, Dr Victor Gilinsky from the US Nuclear Regulatory Commission, and the US Department of Energy.

- 8a. A variant of this fallacy is: Countries who have developed nuclear weapons have used military facilities, not civil.

Refutation: The truth is that India, Pakistan, North Korea and (shortly) Iran have used the civil nuclear fuel cycle and/or research reactors to develop their nuclear bombs. There is also evidence that the UK and France used nuclear power to add to their stocks of plutonium. In addition, Argentina, Brazil, South Korea, Libya, South Africa and Taiwan used nuclear power and/or research reactors to go part of the way to nuclear weapons (South Africa tested a bomb), but fortunately dismantled their facilities subsequently.

9. Fallacy: If Australia had nuclear power, it would be responsible and would never develop nuclear weapons.

Refutation: Actually a previous Australian government commenced to build a nuclear power station at Jervis Bay, NSW, with the joint purposes of generating electricity and producing plutonium for nuclear weapons. Fortunately a change of

Prime Minister resulted in the project being cancelled after the foundations had been dug. The sad truth is that no government can be trusted to resist the temptation to enhance its political and military power on the global scene by using nuclear power to become nuclear weapons ready.

10. Fallacy: The capital costs of nuclear power stations are only 20–50% higher than those of equivalent coal power stations. The operating costs, including fuel, are less than coal's.

Refutation: The only cases where we can obtain reliable data on the actual costs of nuclear power are in the UK, post restructuring of the electricity industry, the USA, and the two French reactors under construction in Finland and France. Within this limited data set, almost no nuclear power station has been built within budget. The last station to be built in the UK, Sizewell B, ended up with a capital cost of £2500 per kW or A\$6250 per kW (both in 2005 currencies). The 1600 megawatt station that commenced construction at Olkiluoto, Finland, in 2005 is 3 years behind schedule and at least 1.7 billion euros over budget. So far the total capital cost, including the export incentive from France, has risen to 5.5 billion euros or about A\$5500 per kW in 2009 Australian dollars. If all its finance had been raised in a competitive market, its capital cost, including interest during construction, would be much greater. Equivalent capital cost for a new dirty coal-fired power station in Australia would be about A\$2000 per kW.

In Australia, the operating costs, including fuel, of coal and nuclear power stations would be similar in magnitude.

11. Fallacy: Nuclear power has no CO<sub>2</sub> emissions.

Refutation: Every step in the long and complex nuclear fuel life-cycle, except reactor operation, burns fossil fuels and hence emits CO<sub>2</sub>. However, total CO<sub>2</sub> emissions are at present quite small, indeed comparable with those of building some renewable energy systems. At present, nuclear power uses high-grade uranium ore and the emissions from mining and milling are quite small.

But reserves of high-grade ore are limited and could be used up within several decades at current usage rates. Once low-grade uranium ore has to be mined and milled, CO<sub>2</sub> emissions will skyrocket. Then total CO<sub>2</sub> emissions from the nuclear fuel cycle could reach one-quarter to half the emissions of an equivalent combined-cycle gas-fired power station, depending upon which study you believe. Therefore, based on existing technology (that is, no breeder reactors), nuclear power is not a long-term solution to global warming.

12. Fallacy: Nuclear power stations can be built in 3–4 years.

Refutation: The fallacy is only a statement of theory. However, in practice, most nuclear power stations take 8–10 years from planning to first operation. In Australia, which doesn't have suitable infrastructure, the first nuclear power station would take about 15 years, assuming no public opposition (which is an heroic assumption). Therefore, nuclear power is not a short-term solution to global warming.

13. Fallacy: The integral fast reactor (IFR) has several advantages over existing nuclear reactors, specifically a smaller waste problem and less risk of proliferation.

Comment: Possibly in theory, but this kind of reactor doesn't exist in practice – it is not even at the demonstration stage. The task of bringing it to commercial reality would be an enormous, expensive challenge, since the concept comprises two principal features that have so far failed commercially: fast breeder reactors and reprocessing of spent fuel. As a whole system, IFR is only at the R&D stage of development. An Australian government would be crazy to become involved until the technology is commercially available and several reactors have been built to budget overseas.

IFR would produce much more plutonium per unit of electricity generated than a conventional reactor. Although it could be configured and operated to 'burn' up most of this plutonium, it could also be configured and operated to extract the plutonium by conventional reprocessing. Within the present inadequate international nuclear safeguards, there is no guarantee that a government would not use IFR to produce nuclear weapons.

More detailed documented refutations of some of the above nuclear fallacies can be found in chapter 12 of my book *Greenhouse Solutions with Sustainable Energy*.

Other fallacies uttered by proponents of nuclear power are designed to put down renewable energy. They include such fallacies as:

“Renewable energy is intermittent and cannot supply base-load power”.

“Renewable energy has huge land requirements.”

“Switching to renewable energy would cost jobs.”

These and others are refuted in detail in my latest book *Climate Action: A campaign manual for greenhouse solutions* and in an article 'The Base-Load Fallacy' published on <[www.energyscience.org.au](http://www.energyscience.org.au)>.