

## **Nuclear costs low-balled to keep it in energy debate**

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Accurate cost estimates for nuclear energy are vitally important for the current energy policy debate in Australia. The Prime Minister's nuclear Review headed by Ziggy Switkowski found that nuclear energy is Australia's 'least cost low-emission baseload technology option'. Given Australia has never built a commercial nuclear reactor, how reliable are these economic estimates? The most recent overseas evidence sheds important light on this.

Construction costs are a critical factor in estimating the costs of nuclear electricity because [IslandAd] they absorb up to three-quarters of total expenditure. In partially deregulated energy markets like Australia's, cost-overruns are the kiss of death for nuclear power outlays, something that has historically plagued the industry.

The last nuclear reactor built in the US was the Watts Bar-1 facility in Tennessee, which started operation in 1996. It took 23 years to build and cost \$9 billion. In Canada, the last reactor was built near Toronto, started operation in 1993 and ended up costing \$14 billion, a 250 per cent cost over-run.

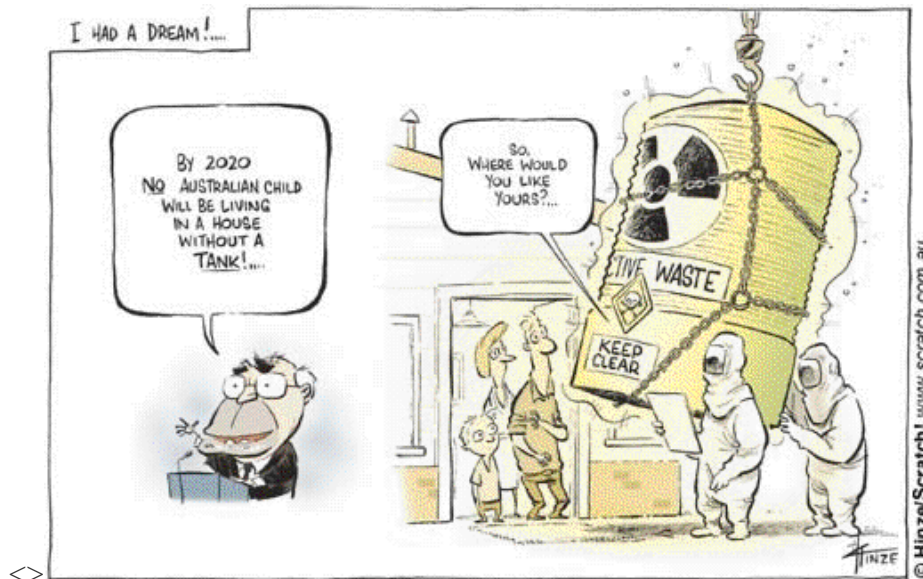
In the UK, the last and most technologically advanced nuclear reactor to be constructed was the Sizewell B facility in the county of Suffolk in eastern England. After 15 years of planning and construction, the final construction cost of \$7 billion blew out by 35 per cent by the time it was up and running in 1995.

So the last reactors built in the UK, USA and Canada cost between \$7 and \$14 billion even after 40 years of experience in building nuclear reactors in these countries. However the Switkowski Review does not include these recent overseas experiences and predicts construction costs of \$2-3 billion for an Australian nuclear reactor, despite Australia's lack of nuclear know-how.

Cost blow-outs greatly increase the final cost of electricity from nuclear reactors, so electricity cost estimates that don't take this into account are of questionable value. When accounting for estimated 'first of a kind' technology costs at Sizewell B in the UK, a recent government report stated that the cost of electricity from this advanced 2<sup>nd</sup> generation nuclear facility is currently \$140 per megawatt-hour (MWh). This is between double and triple the cost of those reported by the Switkowski Review (\$40-65 / MWh).

You would think Japan has cheap nuclear power given its longstanding nuclear industry. The Japan Atomic Energy Agency employs 4400 scientists and has had an annual R&D budget for nuclear energy of over \$2 billion for over 25 years. Japan built two 3<sup>rd</sup> generation nuclear reactors in 1996 and, according to the Uranium Information Centre (a nuclear energy advocate), the cost of generating electricity from these most advanced nuclear reactors is about \$100/MWh.

Let's summarise. The last reactor in the UK produces power at \$140/MWh, while the world's most advanced reactor in Japan produces power at \$100/MWh, with both countries having highly trained nuclear skills and experience in building reactors. It therefore must be difficult to see how in a country with no nuclear technicians or experience in nuclear construction, the Switkowski Review could estimate a cost of \$45-60/MWh for nuclear power in Australia.



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Why did the Review come up with such favourable nuclear economics estimates? Other low-carbon baseload energy options like coal/gas with geosequestration or renewable biomass technology seem to have come a clear second from the nuclear Review's economic costing. Is it possible that the Switkowski Review low-balled nuclear costs so as to discredit other low-carbon energy options?

Biomass technology uses left-overs from agricultural crops like sugar-cane as its fuel. This process already contributes nearly 1 per cent of Australia's electricity needs and costs range between \$30-100 per MWh according to the federal government's own [2004 Energy White Paper](#). Wind turbines are the cheapest of all carbon-free energy options, starting at about \$55 per MWh. Natural gas power (known as combined-cycle gas turbines) at \$35-40/MWh produces 60 per cent less greenhouse gases than coal-fired power and is the main reason why greenhouse emissions have fallen 14 per cent in the UK since 1990. Geosequestration captures carbon dioxide at smoke stacks of coal or natural gas power

plants and pumps it deep underground into stable geologic reservoirs. Costs range between \$50-90 per MWh according to the Switkowski Review. Although large scale geosequestration projects are still decades away, this long term option is far less risky than nuclear reactors. Finally, neither do natural gas nor other low-carbon energy options carry those hideously uneconomic long-term problems of managing and storing nuclear waste or decommissioning nuclear reactor sites.

In the time it takes to build the first expensive nuclear reactor (up to 15 years), Australia could have boosted the proportion of natural gas power and increased its Mandatory Renewable Energy Target (covering biomass, wind, solar and geothermal energy), which at 2% is one of the lowest in the western world. In the meantime, development and deployment of geosequestration technology could be rolled out on a large scale over the next 20 years, not to mention the obvious strategy of targeting energy efficiency.

Accurate cost estimates are essential if we are to make a credible assessment of whether nuclear energy should play a role in Australia's future. However, given overseas experience it is easy to see why a [recent review by \*The Economist\*](#) magazine concluded nuclear economics to be 'dodgy'. The Prime Minister knows that if the public had the choice between economically favourable low-carbon energy policy options that don't carry the huge risks involved with nuclear reactors, the choice would be simple and the energy debate would be over. By presenting nuclear economics as 'lower cost' than other low-carbon energy options, the Switkowski report can help keep nuclear power in the debate – in line with the Prime Minister's known preference for nuclear energy.

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