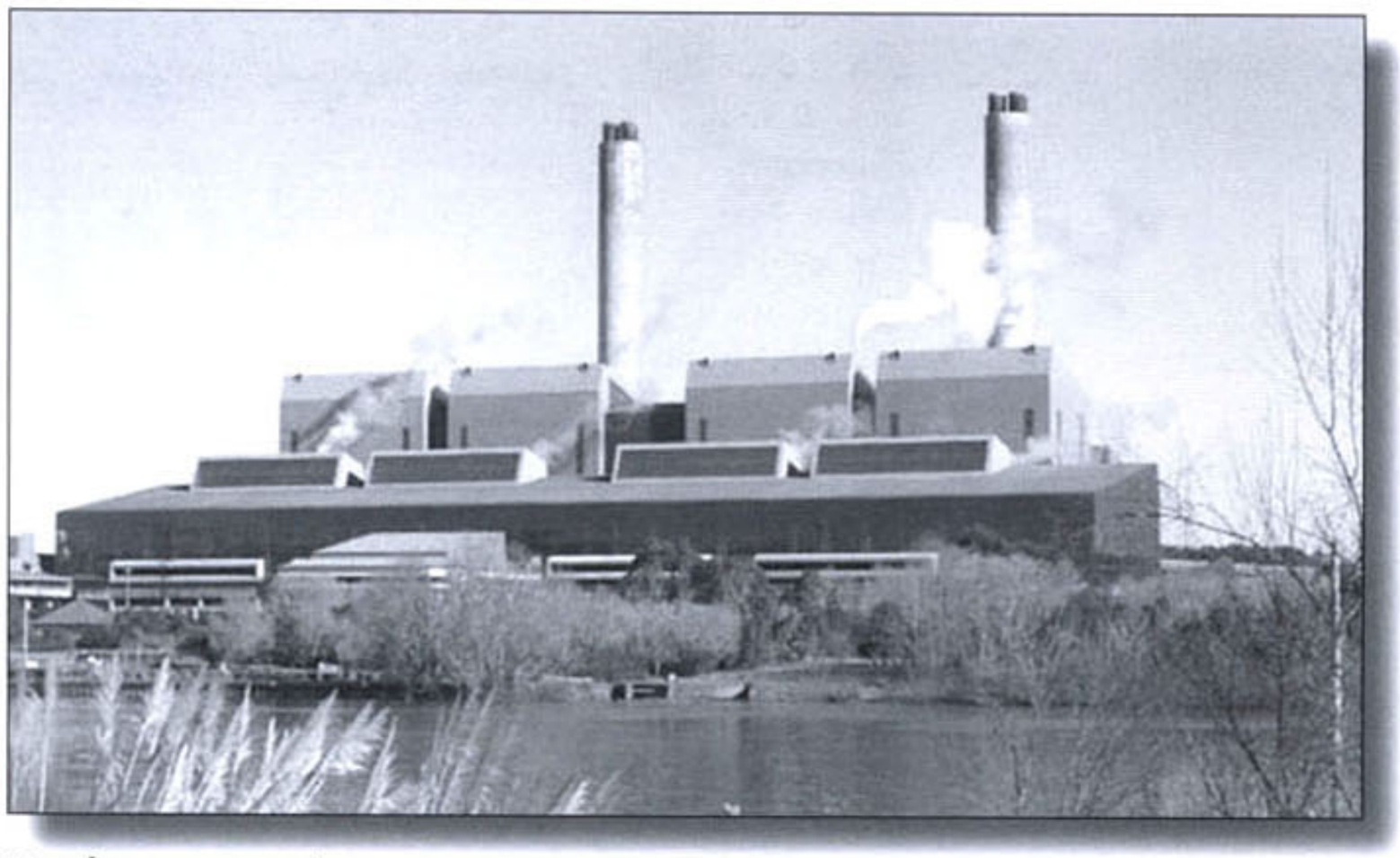
# A MODEST PROPOSAL

## Ron Smith discusses New Zealand nuclear attitudes and the prospects for nuclear power.



**Huntly power station**

In this article I shall make some general observations about New Zealand's attitudes to things nuclear and then make some more specific points on why we should consider nuclear power for New Zealand: what I call 'A Modest Proposal'.

New Zealand is famously (or notoriously) anti-nuclear. For many it is a matter of national pride and the stance is seen to bestow a sense of moral virtue (superiority) and the satisfaction of 'standing up to the big guy'. Anti-nuclearism may be the closest thing we have to a state religion, with the 1987 Act our sacred text and David Lange as our first saint. This gives rise to a certain rigidity in our policy responses, which means that the things we say and the stands we take may not always be in our best interests.

The reality is that our anti-nuclear policy is naïve and frequently contrary to our other interests; our simplistic and ignorant comments on nuclear matters tend to make us look foolish in more sophisticated circles. This applies not just to activist groups and fringe political organisations but also to our political leaders and public servants and those who represent us abroad. There are many examples of this. Early in her prime ministership, Jenny Shipley paid an official visit to Japan. Before she set off, it was announced that she would certainly be raising with the Japanese New Zealand's concerns about its nuclear industry. Now, this is a nuclear industry that has no adverse effect on New Zealand and its people whatsoever but which is crucial to the energy security of what is a major trading partner. Japan's 55 power reactors also represent 70 million tons of oil it does not burn.

In a similar way, our present Prime Minister has publicly farewelled protest ships aiming to intercept ships servicing the Japanese nuclear industry, which occasionally pass through the Tasman, despite the fact that there is absolutely no evidence of any danger from these shipments. In this she may have been following the advice of her sometime Minister of Science, Pete Hodgson, who pronounced on these matters whilst still a shadow spokesman. Of the 1992 shipment of plutonium oxide from Europe to Japan, he said: 'if the ship sank passing by New Zealand, New Zealand would have to be evacuated . . . the alternative would be death'.[1]

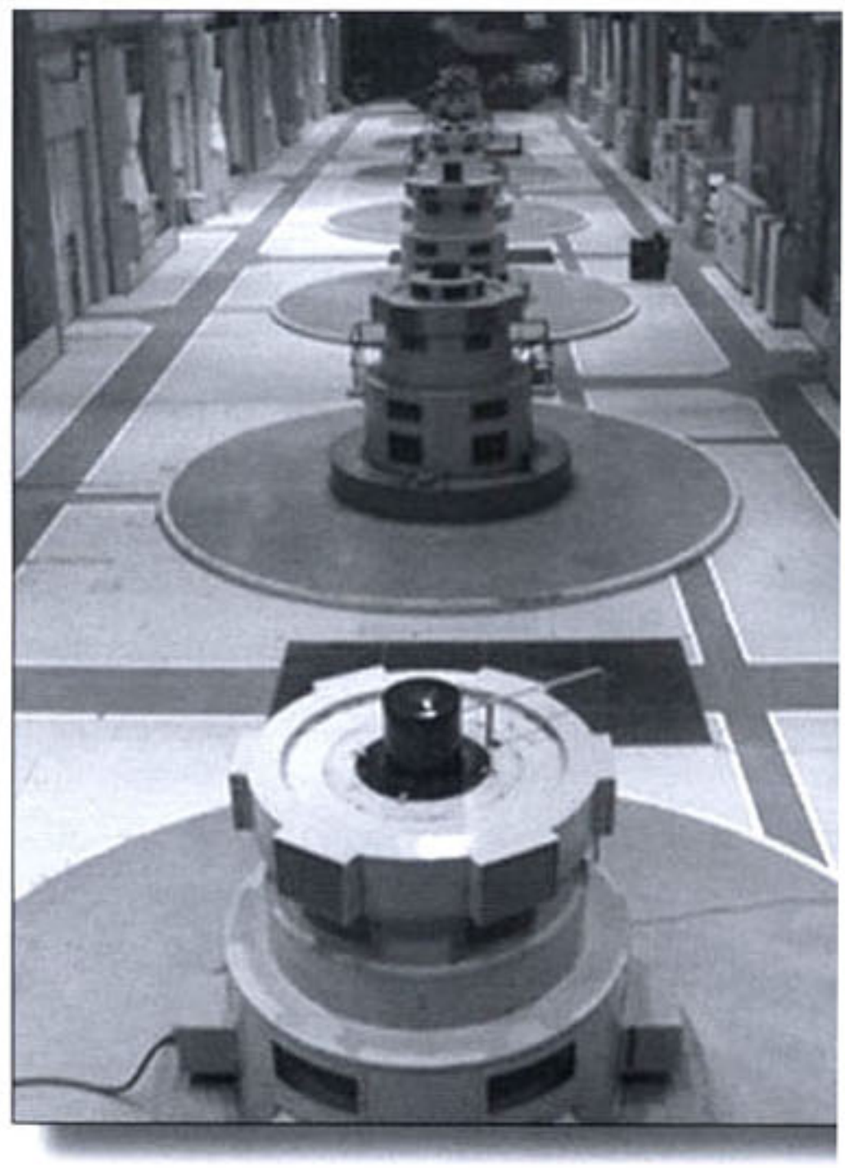
In fact there would have been no perceptible effect. If Hodgson (or anyone else) had asked the then director of our radiological laboratory (Andrew McEwan), he would have been told that it was 'highly improbable that there would be any leakage of material and if there was it would sink to the ocean floor because of its density'.[2] The fact that Hodgson did not publicly retract his comments and subsequently became Minister of Energy speaks volumes for the level of public debate about these matters. New Zealand's attitude is also reflected in the fact that, despite a continuing issue with safety of the ships that occasionally pass through the Tasman, its permanent representatives repeatedly decline opportunities to look over the ships and see the safety and security provisions for themselves. They apparently respond that they have all the information they need.

### Not nuclear-free

New Zealand is not nuclear free. There are nuclear materials in our rocks, soils, waters and air. We, ourselves, are radioactive and we are subjected to radiation from above and below all through our lives. None of this can be legislated away. In addition, our hospitals, universities and industrial enterprises use radioactive isotopes and radiation-producing devices and many of our homes contain isotopes in fire-alarms. The accumulated nuclear waste from some of these activities is stored in a repository in Christchurch. We have our own nuclear waste 'dump' (albeit a small one) right here in 'nuclear free' New Zealand. Nuclear materials also pass though our ports in the shape of containers of 'yellow cake' (uranium oxide). Some, or all, of these activities could be prohibited, but there would be a considerable cost in doing so, and it would not make any sense.

The proclamation of a 'nuclear free' New Zealand in the 1987 Act, and else-where, is vacuous gesture-politics. In this it follows the 1985 South Pacific Nuclear Free Zone Treaty (The Treaty of Rarotonga). Australia, which is also a party to the treaty, even

**Water turbines at Manapouri**



*Dr Ron Smith is the director of international relations and security in the University of Waikato's Department of Political Science and Public Policy.*

has a nuclear reactor, which is, incidentally, the source of many of our medical isotopes, as well the source of semi-conductor material of the kind that goes into our computers. Other treaties of a like kind, such as those covering South and Central America and Africa, as well as South-east Asia, are nuclear *weapon* free zone treaties.[3] It is clear from the preamble to the Rarotonga Treaty that the. principal concern in that case, too, was with nuclear weapons. It is a great pity that the treaty title does not reflect that.

## Nuclear ships

We have a law banning nuclear propelled ships from our territorial waters, at the same time as we have a commission of inquiry report which concludes that the grounds on which this ban is based are entirely erroneous. This would be absurd enough, even if it were not also the case that the continued existence of the law is manifestly contrary to our economic and political interests. It has been a block to closer trade relations with the United States and it might also become an impediment to our seaborne trade more generally. One likely development from increasing oil prices is a renaissance in civilian maritime nuclear transportation. We, of course, would be blocked from that.

Whatever grounds there may have seemed to be in 1987 for an absolute prohibition on the entry of ships, wholly or partly dependent on nuclear power (as provided for in Section 11 of the Act), were effectively demolished by the report of the Special Committee on Nuclear Propulsion of 1992 (the Somers Report). The report, which had been commissioned by the government of the day, concluded that there was a negligible risk from such ships:

> The likelihood of any damaging emission or discharge of radioactive material from nuclear powered vessels, if in New Zealand ports, is so remote that it cannot give rise to any rational apprehension.[4]

In the light of this it seems simply perverse to maintain a ban on something which is evidently harmless. This would be the case whatever the political consequences of doing so might be. If it turned out that the effect of maintaining such a ban was adversely to effect relations with the world's remaining super-power and a major trading partner, this would provide an additional and cogent reason for seriously addressing the matter. The fact that we are evidently unable to do so speaks volumes for the extent to which adherence to anti-nuclear dogma seems to cripple the thought processes of otherwise rational persons. Nowhere is this more evident than in the debate (or lack thereof) on the possible contribution that civilian nuclear power might make to our energy future.

> New Zealand's stance on matters nuclear is a source of great satisfaction to many of its citizens, but it does not always serve our interests very well. This applies not merely to the positions we take on issues like nuclear propulsion and the international trade in civilian nuclear materials; it is also limiting the options we are presently considering in regard to the generation of electrical power in an age of climate change.

## Energy future

The Draft New Zealand Energy Efficiency and Conservation Strategy (December 2006) deals with the issue by ignoring it altogether. The ostensible object of the exercise was to achieve 'the best outcomes for the environment, the economy and society' and to reduce greenhouse emissions through the use of energy technologies that are both economically competitive and reliable. The strategy was to produce 'A reliable and resilient system delivering New Zealand sustainable low-emissions energy'. There is then a total disconnect. The one technology that clearly embraces all three of these things gets not a single mention in the 70 pages that follow. Instead there is a persistent advocacy of 'renewables' which are in varying degrees *unreliable* and/or much more expensive.

Nuclear power is mentioned in a report by the Royal Society of New Zealand published a few months earlier (August 2006).[5] In a short paragraph which is an astonishing reflection on the extent to which a dominant prejudice can afflict even a trained scientist, the report rejects nuclear power on a sequence of spurious grounds and self-servingly selected data. The paragraph is short enough to quote in its entirety.

> Some countries in Europe and the US are looking back to nuclear power as a source of carbon-free electricity. New nuclear power stations are being built in Finland, India, Japan and China. However, nuclear power is ruled out in NZ for several reasons. The expense of nuclear power depends on government support and exchange rates; one collection of estimates gives a cost of around l0NZc/kWh. At that price, nuclear power is substantially more expensive than our abundant renewable resources. Other difficulties make nuclear power unattractive. The scale of our electricity system poses problems. Currently available nuclear plants are similar in size to Huntly, leading to difficulties when generating plant needs to be shut down for maintenance. We have no experience with the technology and would have to import both equipment and personnel to run a plant. The uranium ores discovered in New Zealand in the 1950s are very low grade so nuclear fuel would have to be imported and world market prices paid. Nuclear power has demonstrated poor reliability; UK plants have only managed lifetime load factors of 60%, against an expected load factor of 85%. Globally, the low social acceptance of nuclear power is due [to] its high end-of-life cost, safety record, waste disposal and inherent connections with nuclear weapons proliferation. These factors also apply in New Zealand.

The astonishing thing about this statement is that almost every claim in it is downright wrong, or casually misleading. Many of the specific points are addressed in paragraphs to come but the essential character of the Royal Society discussion can be illustrated by reference to the first assertion, that nuclear power is too expensive at NZ10c/kilowatt. As will be seen below, there are a considerable number of sources for data of this kind, including the European Commission and the OECD, as well as prestigious institutions such as Harvard and MIT. The Royal Society ignores all these, settling instead for the highest value in a range of figures produced by a research group at the University of Greenwich. (For those who care about these things, Greenwich is 83rd on the pecking order of British universities.)

## Modest proposal

In early 2006 Australian Prime Minister John Howard, expressed the opinion that Australia 'would be foolish' not to adopt nuclear power. The proposition here is more modest than that. It is simply that, in relation to New Zealand, we would be very foolish not to *consider* it. It is widely recognised that we have problems in energy security and economic supply, especially if we wish to reduce our greenhouse emissions. On the face of it, nuclear power offers the lowest greenhouse footprint of all the competing technologies, with the highest degree

of siting flexibility and the least degree of environmental disturbance. It is the safest of all the major energy technologies and the most reliable. It is also cost competitive with coal and gas and significantly cheaper than wind and solar power.

Finally, we need to recognise that many of the supposed 'problems' associated with nuclear power are exaggerated or non-existent. There is one major exception to this latter claim and this concerns the proliferation danger. Civilian nuclear power operations entail certain sensitive technologies (around enrichment and reprocessing) which may also be utilised in the production of nuclear weapons. Control of this problem requires institutions and mechanisms and persistent vigilance. In the light of the importance of nuclear power in the context of global warming (if on no other grounds), it cannot be done by attempting to abolish nuclear operations altogether.

The general proposition that we should be seriously considering nuclear power right now is no more than the duty that was urged upon us in a recent report by the World Energy Council. *Energy and Climate Change* (June 2007) concludes with the statement that 'all governments should give serious consideration to the potential of nuclear power for reducing greenhouse gas emissions'. It is also no more than the conclusion of our own Royal Commission on Nuclear Power Generation in New Zealand in 1978. The commissioners concluded that the technology was not required at that time, but they expected that it would be necessary towards the end of the cen-tury, and that planning should begin by the late 1980s, or early 1990s. Of course, none of this planning took place. To the contrary, New Zealand was persuaded to adopt anti-nuclearism as a matter of national identity.

## Sad fact

It is a sad fact of 2007 that our political leaders, and this applies to all parties, are afraid to even discuss these things. They have adopted the same attitude to new knowledge as the Cardinals of the Catholic Church did to Galileo's discoveries. They refused to look through his telescope because they were afraid of what they might see. In this case, it was the moons of Jupiter, the existence of which inevitably cast doubt on the official dogma that everything in the heavens revolved around earth.

I note that the new Parliamentary Commissioner for the Environment, Jan Wright, is following in the same tradition. She was reported in June 2007 to have noted that there had been 'sporadic calls' to consider nuclear power generation for New Zealand,

**Table 1. Comparative electricity generation costs**

| | Basic cost | With backup | With carbon charge* |
|---|---|---|---|
| Nuclear | 2.3 | n/a | n/a |
| Gas (CCGT) | 2.2 | n/a | 3.4 |
| Coal | 2.5 | n/a | 5.0 |
| Wind | 3.7 | 5.4 | n/a |

* 30BP per ton of carbon dioxide

**Table 2. Deaths due to industrial accidents 1970–92[6]**

| | Deaths |
|---|---|
| Oil | 10,273 |
| Coal | 6,418 |
| Hydro | 4,015 |
| LPG | 2,292 |
| Natural Gas | 1,200 |
| Nuclear | 31 |

but 'she did not believe that New Zealand would have to look towards nuclear power as energy demands rose'. The sweeping dismissal by the commissioner also points to a serious problem that we have, of a lack of contestability in public policy in this and associated areas. There are virtually no independent sources of critical analysis over a wide area of security and energy policies and the situation is made worse by a general inability (or unwillingness) of the media to get their heads around these issues.

The 1978 Royal Commission on Nuclear Power Generation noted this as well, expressing 'disappointment about the participation of the news media', which they said was 'intermittent and unsophisticated' and 'inclined to give prominence to the views of some witnesses rather than to the better balanced evidence of more knowledgeable people'. The situation has not improved. If anything, the media's propensity not to let the facts get in the way of a good story has only increased.

The rest of this discussion is devoted to some specific matters of fact bearing on the proposition that New Zealand should, at least, consider the part that nuclear power might play in its energy future. It will also constitute a specific refutation of many of the claims made by the Royal Society of New Zealand in the paragraph cited earlier.

## Nuclear costs

Comparative electricity generation costs are available from a variety of sources. Those in Table 1 are taken from a recent study by the UK Royal Academy of Engineering (2004), which looked at future costs and took in significant external factors, such as the possibility of carbon charges and the need for back-up capacity in the case of intermittent sources. Similar figures are available from the OECD/IEA and the European Commission, as well as MIT and the University of Chicago.

On the matter of safety, there is a long-term study by a Swiss research institute, the Paul Scherrer Institute, which compares the record of the various energy technologies over a 22-year period. The results are summarised in Table 2. These show that civilian nuclear power is orders of magnitude safer than the other major energy technologies. The 31 deaths noted in the 'nuclear' column are the deaths of recovery workers following the Chernobyl accident in 1986. According to the 2005 report of the United Nations 'Chernobyl Panel' (made up of 100 experts drawn from such agencies as WHO, IAEA, UNEP), total deaths from Chernobyl now stand at 59 (including nine, largely avoidable, deaths of children from thyroid cancer). The panel also noted that there had been no detectable rise in the incidence of leukaemia, or in birth defects. To the total number of fatalities in the civilian nuclear industry, over the nearly 40 years since 1970, can be added two deaths which occurred in a special fuel fabrication plant in Japan.

In many ways the incident at Chernobyl shows how safe the civilian nuclear industry is. What happened there in 1986 was the worst that can be imagined for a nuclear power reactor and it killed far fewer than the many serious accidents that have occurred in the various competing technologies, as Table 2 shows. Of course, radioactive fallout from the Chernobyl event was detected over a very wide area that contained as many as half a billion people. Since 1986 there have been persistent claims that there will be many deaths through this cause. This matter was addressed in a major report by the World Health Organisation's International Agency for Research on Cancer (IARC) in April 2006. Their conclusion was that there might be as many as 16,000 excess deaths attributable to Chernobyl but that this would be undetectable against a 'background' of 120 million cancer deaths from other causes over an 80-year period from 1986. More generally, the consequences of the Chernobyl accident can be compared with, for example, living in London, living with a smoker, or being overweight, all of which carry a greater mortality risk.[7]

## Greenhouse footprint

Nuclear power plants have it in common with coal- and gas-fired facilities that they are very suitable for base-load power supply (that is, continuous operation over long periods). Indeed, in the case of nuclear plants this is the best way to operate them. In this mode they are capable of load factors of over 90 per cent.[8] This compares with 25–33 per cent for wind power and 15–20 per cent for solar sources. However, nuclear power generation has a crucial advantage: it has the lowest greenhouse footprint of all the energy technologies (see Chart 1). This is why the executive secretary of the United Nations Framework Convention on Climate Change, Yvo de Boer, said in June 2007 that there was no credible scenario for reducing emissions that did not include nuclear power.

Nuclear power is also much less vulnerable to fuel supply problems, since the quantities of material required are orders of magnitude smaller than is the case with competing technologies. For example, if New Zealand's largest power station (the 1000-megawatt Huntly plant) was run continuously for a year, it would consume 2.3 million tons of coal. A light water reactor of similar capacity would require 20 tons of fuel. It is also instructive to note the quantities of waste produced in each case (Table 3). The corresponding wastes from a nuclear plant are: high level waste 20 tons, operational waste 50–200 cubic metres. The relatively modest quantities of waste material in the case of nuclear power operations are the reason why, contrary to persistent myth, there is no significant problem in the safe disposal of waste materials.[9]

## Nuclear advantages

A persistent problem with New Zealand electrical power supply is that the major (and growing) demand is in the north of the North Island (around Auckland) and the major sources are in varying degrees south of that. Indeed, major hydroelectric sources are precisely at the other end of a very long country. This has enormous implications in regard to reticulation, in terms of both monetary and environmental costs. The enormous virtue of nuclear power is that, with far fewer limitations, plants can be situated where they are wanted. To be specific, we could put a nuclear plant in the Kaipara Harbour, more or less where those investigating nuclear power for New Zealand in the 1970s planned to put it. This is 30 kilometres north-west of Auckland. Such a development would obviate the need for further lines of pylons crossing the Waikato.

An investment in nuclear power would also generate choices. We do not have to disfigure our hills and mountains with windmills, or add further to the long lines of giant pylons that cross the country. We could also take a fresh look at the way we use the water in our lakes and rivers. It may be that some of this would be better used for tourist amenity purposes or for the further development of our very profitable dairy industry. At the moment we cannot really consider either of these things because we so desperately need the water for power. Given that nuclear power is also the safest, and most environmentally friendly, of the major technologies and likely to be much cheaper than the wildly-hyped 'renewables', should we not, at least, look? [11]

**Chart 1. Greenhouse gas production emission from electricity**

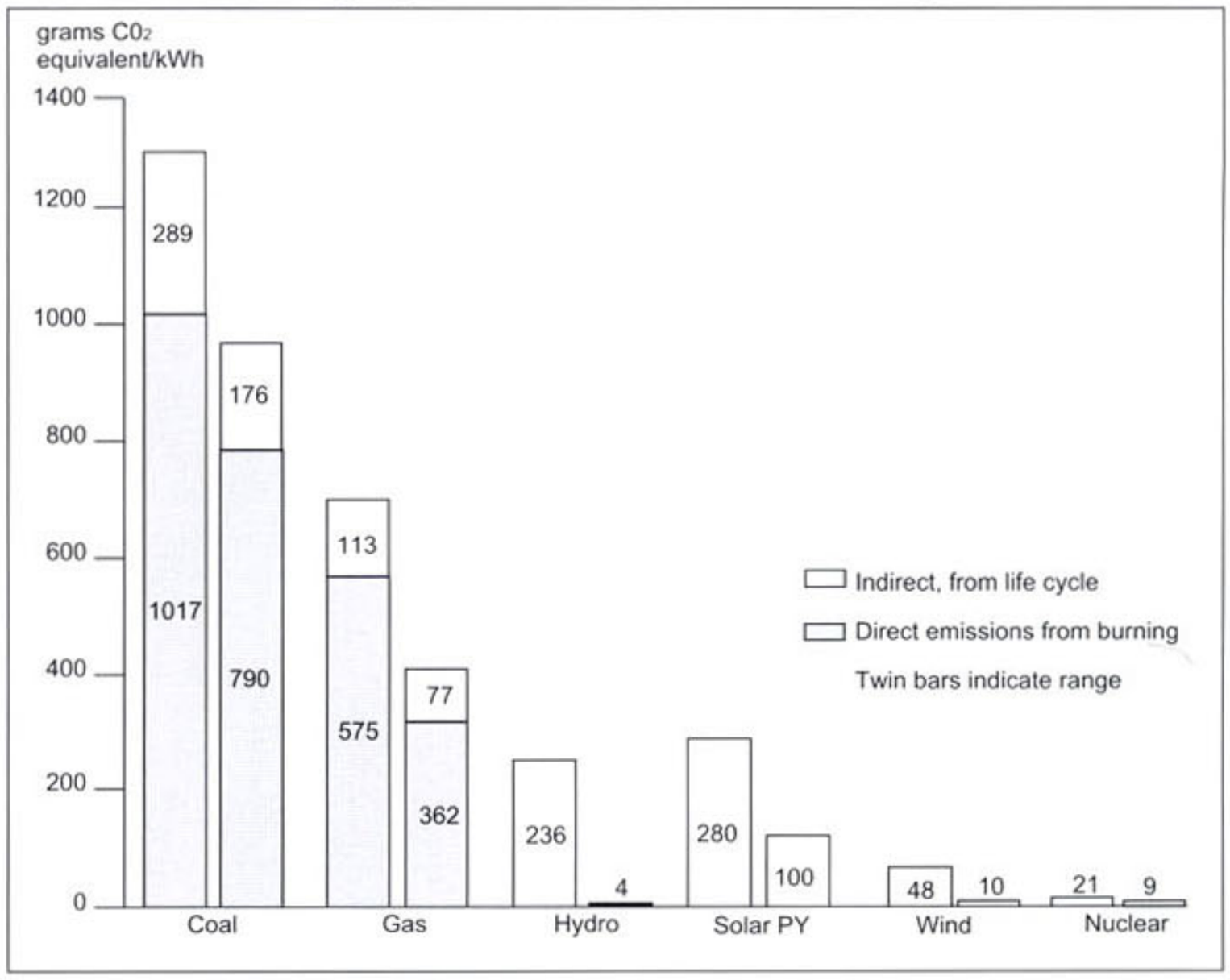



**Table 3. Wastes from a 1000mW coal-fired plant**

| (From an annual combustion of 2.3 million tons of coal ) | |
|---|---|
| Carbon dioxide | 6.5 million tons |
| Sulphur dioxide | 44,000 tons |
| Nitrous oxides | 22,000 tons |
| Ash | 320,000 tons |
| Heavy metals | 400 tons |

## NOTES

1. *Press* (Christchurch), 4 Dec 1992.
2. Andrew McEwan, *Nuclear New Zealand: Sorting Fact from Fiction* (Christchurch, 2004), p.187.
3. The original treaty was the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean 1967 (Treaty of Tlatelolco). Subsequent treaties are Rarotonga (1985), Pelabinda (1995), Bangkok (1995). All but Rarotonga are nuclear weapon free treaties.
4. Somers Report, p.173. The general conclusion of this report (that nuclear propulsion was a negligible danger) was anticipated, *before* the 1987 Act was adopted, in a paper from the (then) director of the New Zealand National Radiological Laboratory, Dr Andrew McEwen. This expert opinion was also ignored. McEwen, pp.85–7.
5. '2020: Energy Opportunities, Report of the Energy Panel of The Royal Society of New Zealand', Book 1, Overview.
6. These figures may be normalised to take account of the *proportion* of electrical power derived from each source. The corresponding figures for deaths per million megawatts of electricity production per year are: coal 342, gas 85, hydro 883, nuclear 8.
7. J.T. Smith, 'Are Passive Smoking, Air Pollution and Obesity a Greater Mortality Risk Than Major Radiation Incidents?', Centre for Ecology and Hydrology, UK Health Protection Agency, Apr 2007.
8. The 60 per cent load factor cited in the Royal Society comments cited earlier refer only to the case of British Magnox reactors and are based on historical data.
9. This was the subject of a detailed treatment by this author in the September/October 2003 issue of *NZIR* (vol 28, no 5, p.21).