

SHOULD AUSTRALIA GO NUCLEAR?

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CURRENT APPROACH

Australia's energy and climate change strategy is based upon expected contributions from four sources:

- **energy conservation and productivity** (we must learn to live with reduced energy demand),
- accelerated deployment of **renewable energy** such as wind and solar power,
- a gradual substitution of coal by **gas**, and
- the presumed success of clean coal technologies and associated **carbon capture and storage**.

There can be no question as to the merit of each component in this approach. Many countries are pursuing a similar mix but with the added element of **nuclear power** which has near zero emissions, is safe, and offers the promise of lowest cost in a future world of carbon taxes.

GLOBAL STATUS OF NUCLEAR POWER

- 14% of global electricity is already produced from nuclear power at 440 reactors in 31 countries
- Two thirds of the world's population get some of their electricity from nuclear reactors; and most of the other one third aspire to a similar position
- Countries which had paused in their deployment of nuclear power – Sweden, UK, Italy, USA – are reactivating their programs while others such as Germany and Spain have reopened debate
- The EU currently gets 31% of their electricity from nuclear power
- Neighbouring countries most affected by the fallout from the Chernobyl reactor fire in 1986 – Ukraine, Russia, Finland – are increasing their nuclear networks and others like Poland and Belarus are about to start down this path
- The UK – a beacon of climate change leadership – is committed to accelerate its nuclear build program, replacing its current fleet of 19 reactors as its chief energy adviser forecasts 35-40% share of electricity generation in the 2030s – double current levels.
- The US cannot meet its climate change goals without more nuclear power according to President Obama
- The countries with the most ambitious nuclear outlooks are China, India, and Russia. The most dynamic developer of uranium resources and market leader in production is now Kazakhstan. Some of these countries present interesting geopolitical challenges and opportunities for Australia
- Of the 50 plus reactors currently under construction, 24 are in China

With the exception of Italy which is the world's largest net importer of electricity (10% nuclear electricity from France and Switzerland), no economy of Australia's size or larger is without nuclear power (ie 14 countries).

Within the G20 economies - which include the 19 countries and the EU making up 85% of global GDP - everyone has a civilian nuclear program, or anticipates introducing nuclear power except Australia.

Indeed, Australia now stands alone among the world's top 28 economies in excluding consideration of nuclear power in our long term energy and climate change strategy. (Denmark is the largest economy without (direct) nuclear power in their planning but it does not exist as an independent electricity entity)

ADVANTAGES OF NUCLEAR POWER

Many countries confronting the challenge of adding new and clean energy capacity have concluded that nuclear power must be in the mix because:

- Nuclear technology is well established, available off-the-shelf today, and not dependent upon heroic assumptions of cost or technology breakthroughs in the future
- Nuclear electricity is truly baseload, optimised for 24/7 operation, and connects into national electricity grids just as gas or coal fired power does
- Whole of life (ie from uranium mining to reactor decommissioning and long term storage of spent fuel) greenhouse gas emissions are very low and similar to solar and wind.
- Generating costs are already comparable to coal and gas in much of the world, and will be in Australia with moderate carbon costs (\$A15-40 per tonne of CO₂/year). Nuclear power has high upfront capital costs but low whole-of-life generating costs. It should be our lowest cost option in the 2020s.
- The nuclear power industry in most countries fully funds its lifecycle costs including waste management and decommissioning.

BUT NO NUCLEAR FOR AUSTRALIA?

- Australian household demand for energy is increasing not reducing,
- Outside of hydroelectric power, renewables such as wind and solar contribute less than 2% to current energy generation,
- CCS yet to be demonstrated as a scalable, cost effective and safe process.
- and we cannot rely on adjacent economies for backup should our energy strategies prove inadequate

We may be the only developed economy whose electricity generation and emissions reduction strategy is based upon such fragile foundations.

Yet connecting the dots between now and 2050 for electricity should be clear.

The widespread use of coal makes way for gas as the primary fuel in Australia (just as in California), after which nuclear power becomes the load bearing girder for baseload electricity generation (including that required to power an electric vehicle and hydrogen economy) by mid century.

Yes, use of fossil fuels will persist but carbon capture and storage technology must become ubiquitous.

And renewable energy mainly in the form of wind and solar and geothermal will make important, if subordinate, contributions.

However, government policy at present does not support nuclear power for Australia. In my opinion and that of other countries around the world, this eliminates a critical element of a successful clean energy strategy.

Yes, it's important to acknowledge the reservations voiced by Australians not yet convinced of the merits of a domestic nuclear industry:

- Management challenge of long lived radioactive waste – no national repository operational anywhere in the world
- Costs of nuclear power and project management especially of first installations; rising capital intensity (Finnish reactor costs x2 original estimate and behind schedule)
- Timeliness – first reactors at least 10 years away. Nuclear cannot be a solution for 2020 if that is your planning horizon.
- Location of reactors – NIMBY (In Australia, 50 reactors require 12-25 sites plus one national repository for spent fuel rods available by 2070)
- Risk of another catastrophic accident – eg Chernobyl
- Sovereign risk – lack of bipartisan support
- Proliferation, terrorism
- Access to water (but use of seawater makes nuclear better than coal/gas)

Despite similar concerns, two thirds of the world's population lives with nuclear power, and this proportion is growing.

That is, many countries have on balance supported increasing deployment of nuclear energy – but not yet Australia.

As President Obama's announcement on the US nuclear industry last month confirmed,

- whether you are worried by climate change,
- pragmatic in accepting the need to move beyond fossil fuels,
- recognise the appeal of a balanced energy strategy,
- or supportive of a new growth industry,

Nuclear power ticks many of the boxes.

From a negative position four years ago, public opinion is shifting in favour of nuclear energy for Australia. Our political leaders can't be far behind.

Thank you.