

Energy in a Changing Climate

Unproven technologies a poor power option

A closer look at the carbon price Treasury modelling released last week reveals some worrying analysis about our future electricity supply.

Two scenarios were modelled, one called 'medium' and the other 'ambitious'. The medium (or 'core') scenario, if adopted worldwide, aims to stabilise greenhouse gas concentration levels at 550 ppm, the ambitious (or 'high price') scenario at 450 ppm.

At Copenhagen in 2009, the global community agreed any temperature increase needed to be held to below 2 degrees Celsius above pre-industrial levels. This was further ratified at Cancun late last year. Treasury agrees that to have a 50 per cent chance of achieving the 2 degree global goal we need to stabilise at 450 ppm so we need to implement the 'ambitious' plan not the 'medium' plan. Yet much of the media reporting has been around the medium outcomes in 2050, not the ambitious ones.

To discuss what is worrying about Australia's future electricity sector plans, we need to consider what the world and Australia is planning for 2050 in the so called 'ambitious' scenario.

According to Treasury, global electricity sector technologies in 2050 will comprise 36 per cent renewables (mainly hydro, wind, solar and biomass), 32 per cent nuclear, 26 per cent carbon capture and storage (CCS) and 6% fossil fuels (without CCS).

Because the Treasury modelling did not include nuclear for Australia, our mix is somewhat different from the global mix. Fifty-one per cent of our electricity in 2050 will come from renewables, 26 per cent from gas using CCS, 18 per cent from gas and oil without CCS and 5 percent from coal with CCS. This mix still requires us to purchase 25 per cent of our emissions abatement from overseas to achieve our 80 per cent reduction target.

Note that the 40 per cent renewables discussed by Julia Gillard on ABC1's Q&A program was from the medium or core plan, not the ambitious plan. Perhaps as implied by the name, Treasury (and the Prime Minister) already consider the ambitious plan unachievable.

We need to drill down further into the Australia technology mix to assess just how ambitious this plan might be.

The 51 per cent of electricity from renewables comprises 21 per cent hot rock geothermal, 18 per cent wind, 5 per cent solar, 4 per cent hydro and 3 per cent biomass.

The difficulties become apparent when we realise that hot rock geothermal and CCS are still unproved technologies on a commercial scale. So the ambitious plan calls for almost half of our electricity in 2050 to come from, as yet, unproved technologies. Ambitious indeed!

In case anyone is thinking that 2050 is a long way away and there is plenty of time to prove up these technologies or get new breakthroughs, it's worth looking at what electricity-generating technologies were around four decades ago.

By 1972, we had several proven electricity technologies using coal, wood, oil, gas, nuclear, hydro, conventional geothermal (using naturally occurring reservoirs of very hot water or steam), wind, solar photovoltaic and tidal power. These are all now considered mature technologies with possible incremental improvements yet to come.

Forty years ago, there was a small demonstration hot rock geothermal plant in the US and a concentrated solar-steam electricity plant in Italy. After 40 years of development, these two technologies are still not delivering cost-effective power on a large scale anywhere in the world.

At that time, no one seriously considered carbon capture and storage for power plants; the technology is still less than 10 years old. If we haven't managed to prove up commercial-scale electricity generation from hot rocks or solar thermal after 40 years, what makes us so confident about CCS?

Given the above brief history, is it wise contingency planning to expect that half our electricity in 2050 will be coming from unproven technologies? Past history may suggest that the proven technologies we have today may be all we can rely on.

The invisible elephant in the room of this Treasury report is the one low-emission technology that has been proven for more than 40 years and is still undergoing significant further improvement: nuclear energy. If it's good enough for most of the rest of the world, why not Australia?

Without nuclear power, we will be taking a big gamble on technology development and increasing our electricity costs unnecessarily. The Treasury modelling shows that under the 'high price' scenario described above, the average wholesale electricity price in Australia could rise to almost \$200 a megawatt hour in today's dollar terms. The US Department of Energy predicts new advanced nuclear plants will be running at around half that cost by 2016.

We have an electricity plan for 2050 that unnecessarily relies on unproven technology while paying a substantial premium for the pleasure. Other countries, including China, do not. Surely we can do better than this?

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