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1 Power vacuum

<http://www.theaustralian.news.com.au/story/0,,25831032-28737,00.html>

Tony Barass | July 25, 2009 Article from: The Australian

THE year is 2030 and the picture from space is clear: a robust strip of development that has become known as the Brisbane-Sydney corridor stretches from the northern reaches of Queensland's Sunshine Coast down to the southern Illawarra in NSW.

In the two decades since 2010, burgeoning regional cities such as the Gold Coast, Coffs Harbour, Port Macquarie, Newcastle and Wollongong have blended into the expanding boundaries of Sydney and Brisbane to create an almost continuous 1000km coastal sliver where many of Australia's now 30 million people live, work and play.

Farther south around Melbourne, the Victorian mortgage belts have continued to leach unabated into the bush, a suburban creep familiar in Adelaide, too.

Across in the west, after yet another five-year mining boom, three million people call themselves Perth residents, while north to the Northern Territory -- long considered nothing more than a charming outback holiday destination -- Darwin has morphed into a strategic stronghold, Asia-savvy and home to Australia's military and border security operations.

The demands on infrastructure remain extraordinary. State and territory governments struggle to keep up with the need of a mobile, sophisticated society whose high disposable incomes lead to rising consumption of services, goods and housing.

And, of course, energy.

While population projections are rarely pinpoint accurate, one thing is certain: Australia's energy needs will become dramatic and urgent as we head towards 2030. By then we'll be using more than 30 per cent more energy than we do now. So what will be our primary energy source in an era when many worry about carbon fuel and global warming?

On Thursday, federal Resources and Energy Minister Martin Ferguson flew to Perth to witness the signing of an agreement between Canada's Mega Uranium and a Japanese-backed consortium that aims to kick-start a uranium mine at Lake Maitland, 1000km northwest of Perth. BHP hopes to open Yeelirrie, about 100km west of Lake Maitland, with the backing of West Australian Premier Colin Barnett, who overturned Labor predecessor Alan Carpenter's strong opposition to uranium mining within months of winning office last year.

Also on Thursday, BHP said it would step up uranium exports to China from its Olympic Dam operation in South Australia, a copper, gold and silver mine that produces uranium as a by-product.

Although federal Environment Minister Peter Garrett's much publicised approval of expansion plans for the country's smallest mine, at Beverley in SA, has caused some derision, it signals that, regardless of past political biases, it's all systems go for uranium mining and exploration.

The 10,000 tonnes of uranium oxide we export each year, enriched in nuclear converters and processing plants in the US, Britain, Russia and Japan, heads to the 450 reactors worldwide.

Demand is strong from France, which gleans more than 70 per cent of its domestic electricity from nuclear energy, the US (19 per cent), South Korea (35 per cent), Finland (29 per cent), Sweden (46 per cent) and Britain and Canada (both 15 per cent). The debate over uranium mining has been fought and won. Australia has one of the world's largest deposits of uranium and the expertise to safely mine it. That said, mining is a dangerous business. Five workers have died at BHP iron ore sites in the Pilbara in the past year.

But the use of nuclear power as a domestic energy source is very much another issue.

In these green-aware times, the Rudd Labor government remains careful to be seen to encourage all aspects of clean energy, such as tidal and wave power and wind and solar, but just can't bring itself, publicly at least, to consider nuclear energy. The political realities dictate that gas and, in particular, coal remain our primary sources of electricity.

This week Rio Tinto urged Kevin Rudd to consider the nuclear option, which sparked the federal Coalition opposition to call for uranium to be used to generate domestic electricity. All this activity has given the nuclear industry a sniff of what might be.

Former Telstra boss Ziggy Switkowski, a nuclear physicist whose 2006 report for the Howard government on the possibilities of nuclear energy recalibrated official thinking on the issue, this week outlined another vision for discussion: the creation of "non-threatening" mini-reactors in remote parts of the country that could power desalination plants, smelters or mining towns up to 100,000 people. This would allow concerned Australians to watch the experiment, then consider whether nuclear energy was a cleaner, more cost-efficient and, most important, safer alternative.

Switkowski, chairman of the Australian Nuclear Science and Technology Organisation, believes public opinion is shifting as more people focus on the environment. While acknowledging that many people are still gun-shy after the horrors of the Chernobyl disaster in the former Soviet Union, his antennae are detecting a softening of a once very hardened attitude against nuclear energy.

Australians generally supported nuclear energy as a viable alternative to coal but were less enthusiastic about embracing nuclear reactors, he told a Perth conference on Wednesday.

"We need to have a debate about the facts, we need to have an agreed national strategy about greenhouse gas reductions, we need to create a regulatory regime to oversee the nuclear power industry and we need to have bipartisan (political) support," he said.

But even putting aside the politics of such a monumental decision to introduce nuclear energy, the hurdles are high and many over a very long road.

Costs, reliability, efficiency compared with coal and the greener natural gas, location of reactors, their safe and secure operation, the enrichment process of uranium oxide to U235 fuel and the vexed question of disposing high-level waste in the form of spent fuel rods -- which can be radioactive for millennia -- are some of many concerns.

According to research done by the University of Wollongong with the University of Chicago, figures show that coal remains the cheapest source of electricity, closely followed by nuclear, then wind, gas, tidal, geothermal and solar. The equation used by scientists is dollar divided by kilowatts used over an hour.

But there are plenty of variables when it comes to comparing coal with nuclear, such as the availability of fuel, capital costs of building the plants and reactors, insurance costs (which are much higher for nuclear reactors), operating and maintenance, government taxes and the fuel needed to operate the plant or reactor: the coal, the gas, the uranium. Location is also a factor. We've got plenty of space to build reactors, but with isolation comes big monetary costs associated with transmission of the energy created, the transportation of the water to create the steam that powers the turbines, and the movement and proper working conditions of those who will operate them.

Those costs obviously have not been factored into any potential penalties that may arise when world leaders sit down in Copenhagen in December to consider various emissions targets and carbon trading schemes.

Some experts argue that evolving technologies, such as so-called clean coal and carbon sequestration, may well cancel out various advantages one form of energy generation may enjoy over the other, but the nuclear industry continues to trumpet its safety record since Chernobyl and Three Mile Island in the US.

It also argues that regardless of technological advances, burning fossil fuels will never come close to the low-level emissions achieved through the nuclear option. In this politically aware electorate, that is a very big plus.

The nuclear power industry also points to the new generation of reactors, such as the "breeders" being considered across the US and throughout the EU, which can create more fissile material -- material that creates energy through chain reactions -- than it consumes. This dramatically cuts what goes into the reactor and what comes out.

The coal industry is fighting back, claiming that developments and efficiencies have ensured that carbon capture and storage is a safe, green and long-term alternative to nuclear power.

It needs to do something. NSW and Victoria remain the leading polluters through coal-fired power stations in the Hunter and Latrobe valleys, which spew out more than 120 million tonnes of greenhouse gases every year. Those in Queensland, including Stanwell, Gladstone and Swanbank, produce about 40 million tonnes while Western Australia and SA emit about 15 million tonnes.

That said, the Australian coal industry is a leading employer along the eastern seaboard and it also happens to be heavily unionised; not a good dog to kick, particularly if you happen to be a Labor administration on both state and federal levels.

Despite the uncertainties facing the coal industry, it can take some comfort that any gains by the nuclear power industry will be punctuated by one pivotal question above any other: What to do with the waste, which can still be radioactive well into the next millennium? This is, and always has been, the nuclear industry's achilles heel.

There is one repository for the small amount of low-level waste at the country's only research reactor, Sydney's Lucas Heights. ANSTO wants Garrett to expand its capacity as it waits for the Rudd government to consider a central commonwealth waste dump. Three sites near Katherine and Alice Springs were identified by the Howard government. A decision of some sort is expected by 2011.

Overseas, the Swedish government, which relies heavily on nuclear energy, has decided to create a dump more than 500m down into a layer of bedrock near Oesthammar, 200km north of Stockholm. The highly radioactive waste is expected to stay there for the next 100,000 years.

But in the US the issue has become a serious social and environmental problem. President Barack Obama has decided that Nevada's Yucca Mountain, targeted more than 22 years ago as the country's primary nuclear waste dump, is off the drawing board. He has withdrawn budget

funding for the site -- violently opposed by locals and politicians for two decades and aggressively fought through the US courts -- and has asked Americans for a serious debate on the alternatives to solve the country's nuclear waste problems.

This would be the defining issue of any public acceptance of nuclear energy in Australia.

Jorg Imberger, from the University of Western Australia's Centre for Water Research and WA's Scientist of the Year last year, believes the start-up costs of a nuclear reactor would be 20 per cent more expensive than a new coal-fired station that produces more than 1000 megawatts of power, but that's not taking into account any carbon penalty post-Copenhagen.

While a strong supporter of geothermal power and other renewable options, he believes they are not technologically ready or commercially viable to be introduced as alternatives to our traditional energy sources. Nuclear energy is.

According to Imberger's calculations, if WA went nuclear, the small amount of high-level radioactive waste -- after 1000 years it would be less than 14 Olympic swimming pools 2.5m deep -- could be easily accommodated in stable, remote geological sites across the state. He believes the next generation of power plants are producing less waste and risk. And he says that, by 2030, fusion, the same process as the sun's heat and which creates no waste -- will be used in the generation of energy.

With the issue of uranium mining in Australia dead and buried, so to speak, the next phase of the debate about our nuclear future is about to begin. And Copenhagen will be the starter's gun.

2 Chain reaction

<http://www.theaustralian.news.com.au/story/0,,25831033-17301,00.html>

Dennis Shanahan | July 25, 2009

Article from: The Australian

The nuclear debate is unstoppable, writes political editor Dennis Shanahan.

Climate Change Minister Penny Wong has declared there's no room for nuclear energy in Australia and the Coalition is running from a Labor scare campaign of putting a nuclear reactor in your back yard.

Australian Greens leader Bob Brown talks about only the "future technologies" of renewable energies, such as wind, solar and thermal power, but refuses to accept the possibility of future clean coal and nuclear technologies.

But the simple facts -- in a world where both sides of politics in Australia have accepted the inevitability of an emissions trading scheme designed to cut greenhouse emissions -- are unavoidable.

First, the economic argument, free of moral imperatives and political hysteria. If Australia agrees to an emissions scheme, which is designed to put a higher price on carbon-based fuels, the price of coal-fired electricity will go up. That's a given.

Now, given the Coalition has blinked politically on an emissions scheme, it's no longer an if about the scheme's introduction. Senate numbers dictate that even if the Nationals as a body split from the Coalition, if the independents and some Liberals cross the Senate floor to vote against it, the bill will pass into law, probably before November. The shadow cabinet's decision yesterday assures that outcome, no matter how messy it will be politically.

It also means the price of carbon -- and that means the price of electricity and cost of living -- will rise. At some stage the price of coal -- with the extra burden of an emissions scheme -- will hit \$80 a tonne. When that happens nuclear energy becomes economically viable.

And consider this: when Al Gore, father of climate change scares and stepfather of an emissions trading scheme, stood next to Kevin Rudd in Sydney last week and was asked about the low greenhouse gas emission alternative of nuclear energy, his strongest argument against it was one of cost. But he conceded it had to be part of the power mix in the short to medium term.

For Australia, with reserves of coal and uranium, it seems to be a moot point as to whether we should be supporting one export industry over the other. Indeed, the economic argument right now is that coal should be king; it's cheap and abundant.

The irony of putting a higher price on coal is that the environmentalists bring nuclear into play as a viable economic alternative. And that's the political argument as well. Anything that is an economic alternative becomes a political alternative, and that's the reality for whomever is in government in 2015.

August

1 A new age of cheap energy approaches

<http://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/6100536/A-new-age-of-cheap-energy-approaches.html>

A drop in fuel bills is a timely, if temporary, respite from economic gloom, says George Trefgarne.

By George Trefgarne Published: 5:20PM BST 27 Aug 2009

We have all become so used to reading that the end of the world is nigh that we tend to close our eyes and stick our fingers in our ears when there is evidence to the contrary. So you have probably missed one of the biggest pieces of good economic news to emerge recently: energy prices are coming down, in some cases to record lows. Furthermore, even if prices start to recover, they are not likely to return to the ridiculous levels of 2008 any day soon.

Stay with me before you raise an eyebrow to stratospheric heights. This is excellent news, of great import. The trend for gas and electricity bills is downwards; diesel is back at the same price as regular gasoline; the world is practically choking on gas, and is potentially awash with oil.

The main international gas price has this week fallen to a record low, due to a surplus of new resources from North America. Even the stubbornly high oil price has dropped. On Tuesday next week, the main energy suppliers are going to have to explain to the energy regulator why they have not passed this on to consumers. The answer, they tell me, is that they are about to do so, just as soon as they have worked through old gas bought at last year's higher wholesale prices.

There are three really big, but unfashionable conclusions to be drawn from this development. First, bruised and battered consumers are about to receive a welcome tonic alongside the potent dose of reduced mortgage rates which have filtered, spasmodically, into the economic system. We should soon begin to see those pesky direct debits fall, by several hundred pounds a year.

Even the price of oil should come down as the market realises just how much spare production capacity there is, left idle by Opec cutting production and by new projects coming on stream. In other words, there is going to be a second economic stimulus, perhaps as large as the trillions of dollars injected into the banking system by governments and central banks worldwide.

Second, if consumers are the winners, the big losers will be all those dictators and bullies who spent the Noughties strutting about on the world stage, their egos and their state coffers puffed up by oil and gas revenues. Top of the list: Vladimir Putin, Prime Minister of Russia. Note: he

has not invaded anywhere this August. Even his friends in Iran are feeling the pinch.

And third – this is the conclusion I know everybody will find hardest to swallow – an era of cheap and abundant energy will be a much-needed tribute to the unfashionable virtues of markets, free trade, capitalism and the performance of an industry at which Britain excels, oil and gas.

How come prices have fallen so much? To understand why, you need to get up to speed on the exciting phenomenon of so-called tight gas. This, after coal, could perhaps be the world's most prolific energy source. Hitherto, we have relied on conventional deposits of gas. But tight gas is locked into difficult rock formations, such as shale, and in the past couple of years the industry has found low-cost ways of fragmenting those rocks in order to get at the gas, particularly in America. The result is that US gas reserves have effectively doubled, almost unnoticed; and the same technology can be readily applied in Canada, Australia, Asia and even parts of Europe.

As we go into the autumn, US gas storage units are almost full to bursting. Facilities once designed to import are being turned around for export. When it comes to gas, America is the new Russia. And for the rest of the world, tight gas equals one thing: freedom.

How has this amazing development come about? Well, my friends, it is the market at work. The high prices of the past decade incentivised a scramble for new technology and projects which are now producing.

A proper global market for natural gas is also rapidly emerging. But unlike the oil market, it has no Opec cartel to dominate it. Previously, gas was only moved about by pipelines and customers had to accept what they were given. But the world pipeline system is being augmented by Liquefied Natural Gas, or LNG, which comes in frozen on ships. The difference is absolutely crucial because LNG cargoes can be redirected, and that means they can be traded. Indeed, the average cargo is probably traded tens, if not hundreds, of times and can change course frequently before it reaches its destination.

So, if some nasty character at the end of a pipeline starts to turn it off, the customer can at last say: "Hah. I will simply get my gas from somewhere else, where they have democracy and the rule of law."

As a maritime nation, which has long existed on imports, Britain is especially well placed to benefit from LNG and enormous terminals are currently being built or upgraded at Milford Haven and at the Isle of Grain in the Thames estuary. Each winter that Putin turns off the gas to the Ukraine, which effectively starves those further down the pipe in Germany, more lovely LNG ships will arrive to soften the blow.

Putin's largest energy company, Gazprom, has revealed the cost of his aggressive foreign policy, which was premised on using Russian oil and gas to revive its superpower ambitions. Gazprom is groaning in debt; its revenues are down after it cut off Ukraine in January; and it has had to reduce its dividend by 80 per cent. The fluster about energy security – partly got up in this country by Liam Fox, the usually sensible Conservative defence spokesman – is overdone.

A more relevant concern is whether what is left of the Royal Navy can protect the nascent LNG system from being interrupted by khat-chewing Somali pirates and the like.

Yippee, I hear you cry. But before you gratuitously turn up the central heating, I am afraid British households are not going to benefit as much as they should from lower energy prices. The North Sea is running out fast and there has been a lamentable lack of preparation. In particular, there is inadequate storage for imports (although more is being built). The gas price here has consequently only halved, as opposed to collapsing entirely, as it has in America.

The panic about climate change is also adding to bills. According to Ofgem, about 10 per cent, or £80, will effectively be added to a typical bill this year to pay for green initiatives. That is

despite the fact gas produces a fraction of the carbon emissions of coal or oil. In December, governments will meet in Copenhagen to panic some more and you can guess whether that shindig will add to household bills or not. Politicians of all parties are determined to push up energy bills, even in a recession.

In this regard, the Conservatives are as bad as Labour – David Cameron is committed to reduce carbon emissions by a staggering 80 per cent, whatever the cost.

Still, that is for the distant future. Next time your gas bill flops through the letterbox, you should be able to smile and say for this relief, many thanks.

September

1. How cutting carbon emissions leads to wasting energy

<http://www.theaustralian.news.com.au/business/story/0,,26100892-30538,00.html>

Richard Denniss | *September 21, 2009*

Article from: The Australian

ECONOMISTS can and do get it wrong. The lead-up to the sub-prime mortgage crisis being an obvious case in point. While some economists and regulators were convinced all was well, many people were alarmed at a system that enabled people to buy expensive houses with loans that were beyond their means of repaying. It just didn't pass the common sense test.

But have we learned our lesson about relying on complex economics that nobody really understands? In the context of climate change legislation, it would appear not.

Consider the following. If the government's Carbon Pollution Reduction Scheme is introduced, it will actually be cheaper for the coal industry to burn the natural gas that is produced by coal mines than to use that same gas to generate electricity.

That's right. Rather than capture what is known as waste coal mine gas, which is a form of natural gas, and use it to generate electricity across Australia, once the CPRS comes in it will be more efficient to set it alight.

Never mind that the world demand for natural gas is rising. Never mind that the gas wasted in this way could be used to reduce the amount of coal burned elsewhere in Australia. And never mind that there are a lot more skilled jobs in building and maintaining waste gas-fired generators than there are in literally watching the gas go up in smoke. If the intent of the government's legislation is to be believed, they know what's best and that, it seems, is supposed to be the end of the issue.

But what if the economists Climate Change Minister Penny Wong is listening to are wrong? Isn't it at least possible that using this waste natural gas is better than burning it?

The irony is that for the past decade the answer has been a resounding yes. Well before anybody had even heard of a CPRS, private companies began building and operating gas-fired electricity generators. In fact, there are 215 megawatts of these generators now in operation. Together they help to reduce Australia's greenhouse gas emissions by more than 6.5 million tonnes each year, which is greater than the annual abatement the government hopes to achieve with its \$4billion ceiling insulation initiative.

The problem is that it costs a bit more to turn gas into electricity than it does to simply set fire to it. While the electricity that is generated can be sold into the grid, without some form of government assistance it can't compete with the very low price of power generated from burning coal.

And there's the rub: while the existing NSW scheme makes using the gas viable, the proposed CPRS does not.

In response to pressure the government recently announced some changes to the renewable energy target designed to reduce the harm that the CPRS will do to the owners of waste coal gas electricity generators, but in doing so they ensured that no new waste gas generators will be built.

What better example of the lack of transformation that the CPRS will generate could there be? The government is willing to provide some compensation to existing waste gas generators, but its policy will prevent new ones from being built.

The CPRS has been criticised from all directions. Of course the government argues that if nobody likes it they must have the balance right. But of course it might also be the case that nobody likes it because it doesn't really work. The government's whole strategy for selling the scheme to the public seems to be to confuse people into supporting it. In arguing that their scheme is the most effective way to tackle climate change they have placed the burden of proof on their critics.

But it is the government that should be able to answer simple questions about its scheme. Simple questions such as:

* If the CPRS is a step in the right direction why will it destroy \$350 million worth of planned projects to convert waste natural gas into electricity?

* If the CPRS delivers least cost abatement why is it cheaper to burn the natural gas that comes out of coal mines than turn it into power?

* If the government is interested in creating green jobs why does its scheme encourage coal mines to import emissions credits from other countries rather than invest in the onsite conversion of waste gas into useable electricity?

Australian firms are at the cutting edge of this industry, with their technology and skills in demand throughout Asia where this gas exists in abundance and is being converted to fuel for communities in dire need of energy. Already they are employing hundreds of people turning natural gas, that would otherwise be wasted, into electricity.

It's an efficient use of a natural resource and it means that less coal needs to be burned elsewhere. Most important of all, however, is the fact that it is the existing policy framework, not the CPRS, that makes the expansion of this industry viable.

Australia needs a comprehensive national approach to tackling climate change, but that does not mean we need the CPRS as it is proposed. It is the government's fault that the proposal is so flawed and it is the government's job to fix it.

Unfortunately, rather than listen to her critics, Wong has sought to silence them. And rather than explain her scheme to the public she has sought to confuse them.

If the Minister is proud of her scheme she should explain why she thinks burning waste natural gas is better than using it. And if she isn't proud of it, she should fix it.

Richard Denniss is executive director of The Australia Institute www.tai.org.au

2 Aussie nuclear researchers join forces

STEPHEN JOHNSON

Sydney Morning Herald September 22, 2009

<http://news.smh.com.au/breaking-news-national/aussie-nuclear-researchers-join-forces-20090922-q07w.html>

Australia's nuclear science centre and a major university have joined forces to develop nuclear power that produces no radioactive waste.

The Australian Nuclear Science and Technology Organisation (ANSTO) - which runs Sydney's Lucas Heights reactor - and Canberra's Australian National University (ANU) will aim to develop a waste-free energy solution through so-called fusion power.

But the research will also explore uranium-based nuclear power, which Labor campaigned against at the last election.

Science Minister Kim Carr, who signed the partnership, was reluctant to back the research goal of clean nuclear energy.

"We are agnostic about particular fields of research that our scholars pursue," Senator Carr told AAP on Tuesday.

"It's not a question about taking an open mind or a closed mind."

The researchers are working on nuclear fusion harnessing the energy of water-derived chemical elements hydrogen and deuterium.

Unlike existing nuclear fission power stations overseas, it does not rely on uranium and produces no radioactive waste.

But Senator Carr said the government was still committed to ensuring Australia's coal industry and renewable solar, wind and geo-thermal sectors had a future.

ANU's dean of science Aidan Byrne conceded nuclear-fusion power was at least several decades away.

"It's possibly even further away than clean coal," Professor Byrne told AAP.

"It would be many years yet before we can rely on fusion power as an energy source."

While Labor is opposed to nuclear power, some coalition MPs and Australian Workers' Union national secretary Paul Howes are urging the government to reconsider the policy.

ANU students will have access to the Lucas Heights reactor for nuclear physics, engineering and materials science research.

The government gave ANU's National Plasma Fusion Research Facility a \$7 million funding boost in the May budget.

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