

DATE: September
2009

Watermark

Conference of Leaders of Religious Institutes (NSW)

Coal: a dirty word?

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Introduction

In the fight against global warming and climate change, renewable energy technology is our biggest weapon. Australians are famed for their ingenuity and known for their love of the land. These two characteristics may go some way to explaining why many Australians have embraced renewable energy technology and helped to advance the science behind it.

Australia, with our naturally sunny climate and vast areas of open land, has ideal conditions for some of the most effective forms of renewable energy technology. Parliament has just recently voted to pass a Renewable Energy Target (RET). This is a great step forward as it will mean that at least 20% of Australia's electricity will come from renewable energies by the year 2020. This will mean a boost for green jobs and a serious growth in sustainable technologies.

In addition to renewable energies, the Australian Government is looking at other ways to make our electricity production more environmentally friendly. One of these possible options is clean coal technology. Last year the Government promised \$1.15 billion to be spent on renewable technology in the coming four years. \$500 million of that money will be spent on clean coal research. Some wonder if this investment is a waste of time and money, given that renewable energies such as wind and solar power have already proven their merit.

While the arguments about clean coal rage, we may ask, what exactly *is* clean coal? The phrase itself conjures up images of soapy baths of coal left to soak until sparkling. But the reality of the word "clean" in this context is something else entirely.

In this issue of *Watermark* we will explain exactly what clean coal means and outline some of the basic arguments for and against this developing concept.

Between a rock and a hard place

In our times, when we hear the word 'carbon' it probably stirs images of towers spewing out black plumes of smoke. But there are, and always have been, natural sources of carbon dioxide (CO²) on our planet. Luckily, just as there are natural sources of carbon, there are also natural carbon sinks which, prior to the Industrial Revolution, kept our planet's CO² levels balanced. Carbon sinks are simply parts of our environment that naturally soak up CO². For example our forests and oceans are natural carbon sinks. However, through deforestation and warming oceans, our planet's ability to soak up the CO² we produce has been compromised. Since the Industrial Revolution our carbon sources have increased dramatically and, rather than our carbon sinks expanding to meet this need, they have instead been diminished.

In order to restore the balance, we can decrease our carbon sources, and/or increase our carbon sinks and stores. There are many projects underway throughout the world attempting to do one of these two things. The main technology that falls under the clean coal umbrella is that of carbon capture and storage (CCS). Through experiments in CCS, scientists are hoping to boost our planet's ability to soak up CO², by creating new stores. This is not as simple as planting new trees (although this is one very important strategy being employed) but rather involves complex processes to liquefy CO² and bury it underground.

There are several CCS demonstration projects being conducted across Australia, where emissions from large power generators are chemically changed into a fluid form, transported to a storage site and injected into the earth. This is a very simple way of explaining the complex processes that this technology, known as geosequestration, involves. Sites have to be carefully chosen so that it will be unlikely that the CO² will leak or escape in the future. For example, some projects are using depleted natural gas fields, which have the right geological conditions to trap the CO² underground.

Some scientists are also experimenting with technology designed to increase our oceans' ability to store CO².

This technology is more problematic than geosequestration though, and will probably not become a major method of storing emissions.

In Australia's case, CCS has become such a favourable idea because of our high domestic demand for coal power and because coal is our most profitable export – making up 30% of our international trade. However, some economists warn that continuing to rely on coal as an export commodity is dangerous given its falling value. This is especially so considering that our biggest buyers (Japan and Europe) have committed themselves to significant emissions reductions by 2020. As nations around the world are turning to green technologies to power their economies we might ask: would CCS be enough to save a coal-fired Australian economy?

Our planet's natural CO² sinks are not permanent. For example trees that absorb CO² as they grow eventually fall or burn, releasing all of that CO² back into the atmosphere. The oceans, too, have a natural 1000-year cycle of CO² absorption and release. One obstacle against CCS development is the fear that sequestered CO² will eventually make its way, like naturally absorbed CO², back into the atmosphere. If this were to occur, future generations would be forced to revisit our current problems, and perhaps on a greater scale.

In addition to this uncertainty, one of the main obstacles for CCS and clean coal technology, is that it requires the support of complex economic systems to operate successfully. CCS is an expensive process, and will only be commercially viable if companies see no alternative but to use and invest in the technology. Given the difficulties the Government have faced in passing their Carbon Pollution Reduction Scheme (CPRS) bill – which would help CCS become more economically viable by putting a price on CO² emissions – it is a wonder whether there will be an economic climate right for CCS in Australia anytime soon.

Scientifically speaking, CCS has the potential to play a role in reducing Australia's future CO² emissions. The question is simply: can clean coal technology be developed and implemented soon enough to meet our need for urgent change?

The good, the bad, and the unknown...

Some politicians and scientists feel that clean coal technology is the way of the future, while others feel that coal is the technology of yesteryear. Either way, if clean coal is something that the Australian Government is determined to invest in, we should have a look at its pros and cons.

The good

So what is it about clean coal technology that makes some people excited?

- ☑ It is an option: Some people advocate for the development of clean coal simply because it *is* an option. And, in our position, we can't afford to rule anything out.
- ☑ Availability: Coal is available in all parts of the world, making it more of an equitable energy source.
- ☑ Infrastructure: Countries that have been using coal for centuries already have their infrastructure based around coal-burning.
- ☑ Cost: Coal is cheap to mine, though the added logistics of CCS would raise the costs.

The bad

Why do some protest so strongly to developing clean coal technology?

- ✗ It is still being developed: One objection to the funding of clean coal research is that it detracts from spending on renewable energy technologies, whose processes and results are proven.
- ✗ Risk: There are many risks involved in CO² storage, as CO² that is stored is not necessarily guaranteed to remain underground. Sites of carbon sequestration would have to be very carefully managed to avoid CO² seeping from the ground and back out into the atmosphere.
- ✗ It is a short-term solution: Clean coal is only possible when coal is still available. While it is abundant now, coal is a non-renewable resource and supplies will eventually dry up.
- ✗ The human/habitat impact: Even if we were

able to reduce the impact of coal mining on global warming, its impact on humans and the landscape are still less than ideal. As demand for coal rises, mining techniques become more dangerous and more harmful to the natural environment. The Mountaintop Removal techniques used in the United States of America have caused irreversible destruction of vast areas of natural forest and have devastated local communities.

- ✗ Added costs: Sites for carbon sequestration have to be chosen very carefully, and these sites have not always been found to be close to the source of the emissions. This means that additional emissions are created through the transportation of the carbon to its sequestration site.

The unknown

Perhaps the biggest problem with clean coal technology is not the "bad" but the "unknown"...

- ? Implementation time: Despite all of the funding being provided for CCS research, we still cannot be sure when such technology could be successfully integrated into our economy. This is a serious worry as the clock continues to tick towards our deadline for achieving emissions reductions.
- ? Leakage: The long-term effects of CCS are unknown. While sequestration sites would be chosen carefully in order to prevent the CO² escaping into the atmosphere, we cannot guarantee that they would remain safely buried into the future. Some environmental programs have run into problems where their carbon sinks have suddenly turned into carbon sources (such as reforested areas burning down). If CCS were to become a major strategy to reduce emissions and such a reversal happened, future generations would be faced with the sudden release of millions of tonnes of CO² into the atmosphere. While this is merely a 'worst case' hypothetical, it is a chilling one.

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Conclusion

In our environmentally-conscious day, the word 'coal' has come to be something of a dirty word. Can technologies such as CCS make coal clean again? It's hard to say. The trouble with clean coal technology as a functioning, commercially viable process is that it is still in its infancy. While the technology is available and the scientists are willing, we do not seem to have the right economic environment in which to introduce this expensive system. In addition to that, the long term impacts of CCS are not proven, making a large-scale investment in it something of a gamble. For a technology that, to some politicians, represents the ticket to a clean future, CCS holds a lot of uncertainties.

For those who wish for our country to "say no to coal", the idea of clean coal may leave a sour taste in the mouth. But clean coal technology is not, in and of itself, a bad thing. As long as there are still some elements of our society that rely on the burning of fossil fuels, it is reasonable to explore options which will make that process cleaner and greener.

Australia should play its part in funding and developing these technologies, but not to the detriment of renewable energy technologies. The next five to ten years are a crucial time in which we need to dramatically reduce our CO₂ emissions. Sadly, it would take the majority, if not all, of this window of time for clean coal technology to become economically and commercially viable in Australia – meaning that its benefits would not be seen until after the our vital window for action has come and gone.

We do not wish to discourage our politicians from invoking the creative or pioneering spirit of the characteristic Australian. Rather, we encourage our leaders to value those technologies that have proven their strength in markets across the world. We ask them to, with pride and gratitude, take advantage of the natural gifts of our Australian landscape, and harness the power with which they could provide us everyday. The majority of our efforts should be directed towards those technologies that, with the right funding and government support, can help us to achieve our emissions reduction targets *within* the next five to ten years. As we have stressed in past issues of **Watermark**, urgency is the key issue when it comes to climate change action, and unfortunately clean coal is running behind the clock.

Clean coal is not necessarily a bad thing; it is just not the right solution to our problem.

Links and Ways to Help!

For some more information about CCS

<http://www.greenfacts.org/en/co2-capture-storage/index.htm>

Read more about the Renewable Energy Target (RET)

<http://www.climatechange.gov.au/renewabletarget/index.html>

Nature Conservation Council of NSW

<http://www.nccnsw.org.au>

Australian Conservation Foundation

<http://www.acfonline.org.au>

Climate Action Network Australia

<http://www.cana.net.au>

CLRI(NSW) Website

<http://www.clrinsw.org>

Many of the facts included in this issue of **Watermark** were taken from the very helpful book *Climate Change: What you can do about it* by Paul Holper and Simon Torok. This resource was published in 2008 and provides easy-to-read information for anyone interested in climate change and what they can do about it.

We also recommend Ben McNeil's new book *The Clean Industrial Revolution*, an easy-to-understand look at how Australia's economy could be revolutionised through green technologies.