Submission

No 9

INQUIRY INTO THE ECONOMICS OF ENERGY GENERATION

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Theme:

Summary

Response to Inquiry into the economics of energy generation

Quote from IBM

> *"As a result of inefficiencies in this system, the world's creation and distribution of electric power is wasteful. With little or no intelligence to balance loads or monitor power flows, enough electricity is lost annually to power India, Germany and Canada for an entire year. If the U.S. grid alone were just 5% more efficient, it would be like permanently eliminating the fuel and greenhouse gas emissions from 53 million cars. Billions of dollars are wasted generating energy that never reaches a single light bulb."*
>
> http://www.ibm.com/smarterplanet/global/files/us__en_us__energy__smarterplanet_energy.pdf

80% of power generated in Australia is never used, it is wasted (See Appendix 1). To the man in the street, this means that 4/5th of their power bill covers the cost of unused generation and 4/5th of carbon emissions resulted from generating power that is never used. To Governments it means that NSW has Generating capacity 5 times more than we need. The economics of energy generations is seriously eroded by the wasted generation and there needs to be a focus on smarter generation not more generation.

It begs the question why Government's carbon policy is focused on punishing consumers to reduce the 20% of energy that is actually used whilst totally ignoring the 80% of energy wasted by the sector and its associated emissions. Why are consumers being targeted, when the significant waste, inefficiencies and emissions appear to be the domain of the energy providers not the consumers? It is the energy providers who have the capital and are in the position to tackle this waste; however it is just easier for them to pass on the cost to consumers. Fix this issue and we can halve the cost of energy and halve the emissions. This will create jobs and grow GDP in NSW. Halving energy costs could save a $1b from NSW annual budget that could be put back into schools, hospitals and roads.

Economic Cost of Market reforms that have not adapted to changing Government objectives

The energy market reforms in the early 1990s were in response to a different set of economic issues to the demands placed on the industry from the early 2000's. In that the industry has had to substantially increase electricity prices over the last decade demonstrates that these reforms have impaired the industry's ability to adapt to changing environmental objectives in an efficient and cost effective manner.

The market reforms of the 1990s broke up the previously vertically integrated state based utilities into separate competitive generation, retail, transmission and distribution operations. The industry is no longer in a position to coordinate and achieve vertical efficiencies across multiple operations, hampering efforts to meet Government's environmental targets.

WA Premier Colin Barnett stated in an interview with Sky News 29th September 2011 that he was considering restitching the power network together stating that the split up of generators, retail and distribution has increased costs.

Solar Energy has been an unmitigated waste of tax payers' money

Advocators for solar power forget to tell the public that solar energy only works during the day and not at night time. Power output is based on the maximum production of the midday sun in north Australia. The further south the solar panels are installed the less output. The power output diminishes as the sun sets and gradually increases as the sun rises. As peak load is from 7:30pm to 9:30pm solar panels are ineffective during winter and have a limited benefit during summer due to their diminished output so late in the day.

Home solar panels generate most of their energy during off peak time. They are feeding energy into the network when the wholesale price is as low as 2c per KWH, yet we are paying home owners 20c to 40c per KWH for energy that is not needed. Then at night, these residents have to be supplied by coal based generators. There are no emission savings.

The Federal Government has had to ease its conditions for its large scale solar program. Solar projects have struggled to secure contracts with retailers, who have taken advantage of a supply glut created by the high take-up of solar rooftop panels to meet their 20% green energy quota. The key project the Moree Solar Farm where the NSW Government has provided grants over $60m cannot get any retailer to buy their power for when the plant is in operation and the company failed to meet the December deadline for Federal Government grants. The NSW Government is investing $300m into another solar power station at Nyngan. The Moree Solar Farm in theory is supposed to avoid almost 75,000 tonnes of carbon dioxide emissions annually, however the cold reality is that there will be little reduction in carbon emissions. The fact is that coal power stations operate 24x7. There are tricks to throttle generation, but it is an attempt to minimise emissions not stop them, hence the claims solar power is cutting carbon emissions is dubious and unsupported.

There has been a total lack of due diligence in solar projects and a total failure to scrutinise the delivery of promised outcomes such as reducing carbon emissions. In their current form they are unsustainable projects doomed to failure as there only justification for existence is to meet a poorly thought out piece of legislation requiring 20% of energy production to be green energy. Due to the significant problems caused by this legislation there has to be a high expectation that it will be repealed in the near future due to public pressure.

Rule of 20% of Energy Generated has to be green energy exasperates energy waste.

Due to the unreliable and inconsistent nature of Green Energy such as solar and wind, they are an ineffective replacement of coal based energy production. When the Government set a target for 20% of energy generation to be green energy, the industry could not reduce coal based generation without causing blackouts. They had no choice but to add green power generation to the current coal based generation. This has increased energy production by up to 26%, which is not used and not required. Considering 80% of power generated is already not used, increasing production by 26% is share lunacy that has not reduced carbon emissions and has burdened the community with unnecessary energy costs. Again there has been a lack of scrutiny and a total failure to put in measures to ensure that this legislation was achieving what it was intended to do.

Original Position	The Plan	What actually happened
10,000 MW Coal based	8,000 MW Coal Based 2,000 MW Green Based (20%)	10,000 MW Coal Based 2,600 MW Green Based (20%)
	10,000 MW	12,600 MW

Government legislation such as 20% green energy, the Solar Panel Rebates and requiring home solar power be fed directly into the grid is contributing to the shambolic mess that the energy sector is in. It has led to increased carbon emissions and increased costs and is a significant burden on the State Government budget for no benefit. There has to be an urgent review of this legislation to ensure that it is achieving the results that were intended and consideration should be given to more cost effective alternatives.

Green Energy Generation Targets have increased Carbon Emissions

If one calculates the Carbon Emissions per kilo watt hour on their home electricity bill from 2005 and compare it to the same calculation for a bill today, the carbon emissions per Kilo Watt Hour has increased 17% in the last 5 years. Why? Surely with all the green energy generation added to the system the carbon emissions should have reduced, not increased.

Green Energy Generation threat to infrastructure

Due to the uncontrolled nature of Wind and solar energy the unexpected surges of energy threaten to overload the grid and surges can damage personal property and in worst case lead to house fires and even death. The Federal Government Estimates committee hearing was told that 4 per cent of solar panels inspected by the Climate Change Department were found to be unsafe, and up to 20 per cent were found to have a defect. Below are some of the issues that have been raised in regards to the threat to the grid.

1. In a letter to the NSW pricing regulator Ausgrid warns that in areas with a high concentration of solar cells, voltage levels can rise and this can have "consequences for appliances and equipment in customers' homes". It can also cause solar systems to switch off.
2. In Queensland, some new applications for rooftop solar systems have been rejected and Energex now urges customers to check that a solar PV system can be installed without threatening the operation of the network.
3. In Western Australia, Horizon Power has set limits on how much renewable energy can be installed in a system without affecting the power supply. Horizon is rejecting applications for new renewables installations in Exmouth and Carnarvon, and accepting them only from households, schools and not-for-profit organisations in Broome and Leonora.

Wind farms have a similar impact to the grid where across the world measures have to be put in place to mitigate surges and brown outs due to intermittent production. Furthermore after the spectacular TV images of the Scottish Wind Turbine bursting into flames last year, the NSW Government has to consider what risk these turbines have to generating bush fires and the potential loss of property and lives from such an incident.

Coal Seam Gas

CSG has only a 20 year life span and is not a sustainable long term alternative for power generation and should not be a focus for Government Investment. It is a short term solution with little benefit to counter the significant public backlash to this technology. With current floods overflowing containment dams and spreading toxins across faming land and into rivers and the seas, this is an issue that is only going to get more media attention for greater environmental controls and at the end of the day, NSW really does not need it as a source of energy.

Hydro Electric Schemes

This is the most effective form of clean energy currently available. Energy can be switched into the grid in less than a minute. During off peak, water can be pumped back up into the dam and during peak reused for generation providing a natural form of energy storage. Over sixty years ago Bradfield designed plans to build a Snowy Mountains type scheme on the NSW QLD border. When considering the millions of dollars spent compensating communities for drought and flood in Northern and North West NSW, the logic of having a Dam that prevents flood, provides water in drought, is a source of clean energy and has the capability to store energy is undisputable.

Alternative forms of Generation Hampered by transmission Loss over a distance

Canada is the only other developed nation that is similar to Australia with a small population spread out over a large area of often inhospitable land. Generation practices that occur in other countries do not necessarily fit Australia's circumstances due to transmission distances. Not only is there a cost of building transmission lines there is transmission loss. Approximately 5% of energy transmitted from the Snowy mountain scheme is lost by the time it reaches Sydney. The distance from the point of generation can make some generation technologies ineffective such as tidal generator in Northern Territory was deemed non-commercial due to its distance from consumers.

To achieve efficiencies in the industry more consideration should be considered for micro generation and storage in local communities and closer to demand. This avoids transmission loss and also the expense of upgrading transmission facilities.

Storage should be the focus of Government Investment rather than new Generating plants.

The reason 80% of power generated is never used is simply no one needed it when it was generated. Storage of energy is the best solution to matching supply with demand and cutting waste. Rather than building new generators, store off peak energy and release it during peak load. The best example of this is pumping water back up the dam during off peak that is available during peak load. There are other options including battery storage and converting energy into a fuel like methanol or hydrogen that can be converted back into electricity during peak load.

Instead of home solar panels pushing unwanted energy into the grid threatening infrastructure, why not charge batteries at the home and run the home off the battery during peak load.

Another practical storage method is solar water, where the water is heated during the day and does not requiring peak load energy to heat water at night. If a proper cost benefit analysis had been done on solar rebates, it would have indicated that it was more effective to give rebates on solar hot water systems rather than solar generators.

If the State Government diverted investment from solar power stations and wind farms and instead put it into funding storage mechanisms the State Government would get a greater return on its investment. NSW could increase its generation of Energy with little investment in infrastructure.

The only way the current investment in solar and wind technology can be saved is in using them for creating stored energy. They are uncommercial and uneconomical as power stations pumping money into the grid.

Long Term Energy Security

A recent Federal Government report identified a problem with long term petroleum security in Australia. Diesel generators are still the major energy provider to small communities in remote areas. Any Electricity Generation modules need to consider fuel security. In converting energy and carbon emissions into fuel, the Government would be able to generate a new source of fuel to protect long term fuel security.

The enquiry should also consider that if 80% of power generated is not used, then 4/5th of a limited natural resource in coal is being wasted. In targeting such inefficiencies, the NSW Government can insure that the states coal reserves will last for a significant longer term than currently.

Commercial considerations and lack of incentives

Energy generators are individual commercial operations, each with management responsible to shareholders to meet revenue and profit targets. If a coal powered generator could wind down energy generation at times that Solar Power was fed into the Grid, why would they sacrifice shareholder revenue and profits to do so. If they were regulated to do so, then the coal generators would have to charge more for providing peak load to cover lost earnings. There is little incentive for power generators to increase efficiencies and little reason for them to pass those savings on to consumers. Generators have either a regulated protection such as solar or wind, or have established market dominance such as coal power stations. The NSW Government needs to encourage new competitors into the market who will bring innovation, introduce a new range of products and services and who will generate price competition.

Carbon neutral coal power stations are better than renewable power stations

Renewable energy has failed to deliver a sustainable and reliable alternative to coal power stations. It is expensive, inconsistent, and not available for peak load and will only be able to replace a small component of coal generating capacity. For far less investment, we could neutralise the carbon emissions of coal power stations and convert it into other resources. In Scotland, they take sewerage output and use it fuel power stations. There is so much we can do to improve coal power stations; it makes more economic sense than chasing renewable pipe dreams.

Conclusion

The purpose of this paper is to challenge long term held canards about power generation. Instead of being driven by emotional claims, there needs to be greater scrutiny and higher levels of transparency in relation to tax payer's investment into green energy generation.

If the focus of Government has been to reduce carbon emissions and manage limitations in capacity, it seems only common sense that the Government will get a greater return on investment targeting the 80% of wasted generation rather than marginalising its electorate with unrealistic demands and outlandish energy prices for their actual use of 20% of the energy generated. The question is why we need more generating plants when we are already generating something like 5 times the energy required. Whilst current Government initiatives are to achieve 10% reduction in

carbon emissions at significant cost to the community, smarter alternatives could reduce carbon emissions by 50% and halve people's energy bills.

It is my hope that this paper will influence a change of Government policy and redirect investment from the current dubious projects to areas that will achieve real results and unburden consumers from soaring energy costs.

Recommendations

I would urge the Government to

- Urgently review investment into Solar, Wind and CSG and to consider diverting that investment into more practical solutions.
- Change its focus from making consumers more efficient to making the industry more efficient where most of the carbon emissions occur.
- Have a condition for selling the remaining power stations, to ensure we bring new competitors and new innovation into the sector.
- To implement an independent body to coordinate and manage the sector from generation to use to tackle the 80% of energy waste.
- To implement legislation and provide grants to new innovations that would support neutralising carbon emissions of coal power stations

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Appendix 1

There is little information on energy waste from the point of generation to the point of use; it has not been a focus of the industry or Government. The below diagram depicts energy waste or rejected energy in the USA from the Lawrence Livermore National Laboratory. As the highlighted area shows 38.19 Quads of electricity is generated in the USA and around 26.10 Quads of electricity is rejected or wasted. This calculates to 68% of power generation that is never used in the USA.

I have found no such information available for Australia. With Australia having a greater dependence on coal power stations and fewer alternatives and considering distances and smaller population, it is not unrealistic to assume that up to 80% of power generated is never used in Australia. Whether it is debated that this figure should be 80% or 70% or 60% it is still an extraordinary level of wasted energy.