Renew WA's Energy

Recent power blackouts during heat waves in NSW have been undisputedly attributed to failure of coal and gas generators and the imminent closure of the 50 year old Hazelwood plant in Victoria will make matters worse. Claims that renewable electricity caused blackouts in SA have been proved false. The actual causes were tornadoes toppling electricity pylons, incorrect computer settings, tripping of the interconnector line and the failure of gas generators to compensate for this catastrophic event.

Meanwhile as our climate becomes more unpredictable with floods and wildfires, our national commitment under the Paris Accord to reduce economy-wide total carbon emissions by 28% for the whole economy seems to be ignored. The Coalition government claims that renewable electricity is unreliable and would increase electricity bills. Their solution to looming power shortages and the need to reduce emissions is to build new 'clean coal', which would ensure emissions remain at about 80% of current levels for more than 30 years.

WA research and education group 'Sustainable Energy Now' (SEN) has been modelling energy scenarios using their new open source SIREN Toolbox modelling software. SIREN is designed to model and cost renewable electricity grids, including the standby energy storage and fuelled generation required. It can be used anywhere in the world using NASA wind and solar intensity data going back more than 10 years.

SEN has modelled phasing out of the 25 to 50 year old coal generators on WA's SWIS grid and replacing them with wind and solar PV, retaining existing gas. Technology costs were assumed to be the same as power purchase agreements (PPA's) already struck for commercial wind and tracking PV in Australia during 2016: $75/MWh for wind and $69/MWh for solar PV. These are conservative estimates – a PV installation in Dubai currently under construction will sell power for $40/ MWh.

So how will this new clean energy effect SWIS electricity prices? Wholesale prices will rise $7 to $105/MWh, which equates to less than 1c/kWh. The average householder will pay less than $50 per year more for their electricity. Compare this to replacement with 'clean coal' generators. Wholesale prices would increase to $124/MWh and electricity prices would rise by 2c/kWh, double the cost of the wind and solar option. And CO2 emissions would remain stuck at 84% of current levels.

Replacing coal with wind and solar would reduce carbon emissions to 35% of current levels, saving 8 million tonnes - 3 tonnes per head per year - for a cost of less than $28/ t CO2 abated. Besides energy efficiency measures, this is the cheapest way to reduce WA's emissions.

Claims that the variability of wind and solar cannot be managed and that standby generation will be prohibitively expensive are nonsense. SEN research indicates that the fast ramping turbine capacity already installed on the SWIS will be adequate for this purpose. It is currently used for load following, a function that the slow ramping inflexible coal generators are incapable of. Increasingly cheap batteries will decrease the cost of standby generation even further.

The 75% of coal generators older than 30 years could be replaced with wind and solar within several years. On top of clean energy, the State would have a jobs and investment bonanza. According to SEN's modelling using data from Greenpeace in Germany and SKM in Australia, there would be over $7 billion in private investment and over 10,000 new jobs created. There would be 1,400 more

permanent jobs than in current coal mining and generation. Manufacturing of wind turbine towers and blades and solar framing could be established in the Collie region, e.g. at Kemerton, employing all displaced workers and thousands more.

At least three recent polls prove that voters want renewable energy. A majority are willing to spend up to $100 / year more for clear electricity (Newspoll, Oct 2016); 71% think the federal government is not doing enough to ensure affordable, reliable and clean electricity (Essential Poll, Feb 2017); 74% think renewable energy better than coal or gas for WA (TWF survey 2017). Most politicians appear blind to these realities, as little attention has been paid to renewable energy in the coming State election. It's time for governments to lead the inevitable change to renewable energy.

Additional information

Ben Rose is an energy analyst working with Sustainable Energy Now. He invented the Powerbalance app in the SIREN Toolbox, which can create balanced costed renewable energy grid scenarios.

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Details about SEN and its people are available at http://www.sen.asn.au/advocacy_sub

Papers and presentations with the references used for article can be found on: sen.asn.au/modelling_findings

Expertise of SEN's technical team can be found here: http://www.sen.asn.au/expertise

Briefing notes on the coal transition can be downloaded here: http://www.sen.asn.au/briefing_notes

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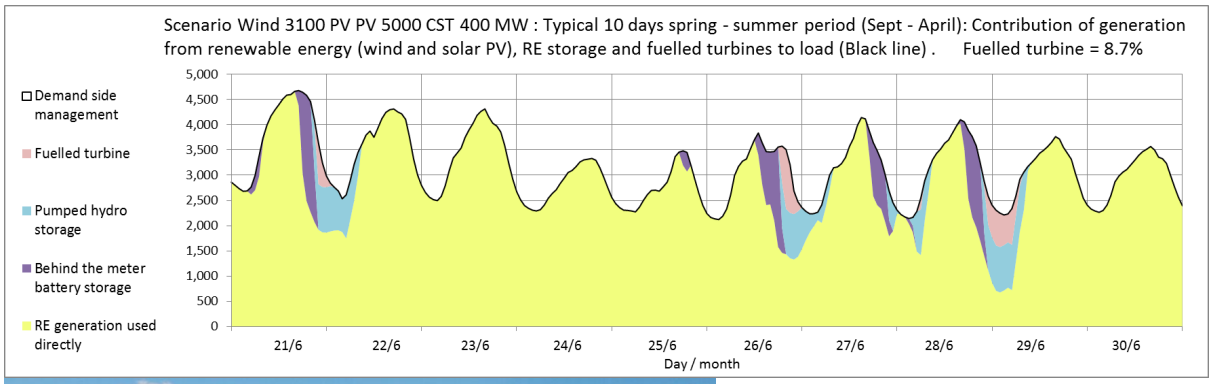
See over page some images that may be of use.


Scenario Wind 3100 PV PV 5000 CST 400 MW : Typical 10 days spring - summer period (Sept - April): Contribution of generation from renewable energy (wind and solar PV), RE storage and fuelled turbines to load (Black line) . Fuelled turbine = 8.7%
Demand side management
Fuelled turbine
Pumped hydro storage
Behind the meter battery storage
RE generation used directly
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
21/6
22/6
23/6
24/6
25/6
26/6
27/6
28/6
29/6
30/6
Day / month