



***NSW's Electricity Future 2020 (and beyond):
What will it look like and how do we get there?***

Jim Snow, Director

Future Electricity Needs:

Underlying drivers and scenarios, likely developments in generation and infrastructure and related policy implications

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Alternative Paper Title

“We Are Not in the Business of Picking Winners?”

Economics will deliver the right results with some pain and a lot of gain,

but

Policy *chaos* to try and avoid the painful aspects is delivering us lots more pain than we need, is hitting the most disadvantaged, and maximising our greenhouse production?

Frankly energy policy is a serious mess in Australia and a nightmare for investors and funders alike?

Last years paper – how did it fair?

- **Predicted major price increases in power prices due to network cost escalation driven by load factor decline, aging networks and (potentially) demand response**
 - Separate issue to increases in energy costs and greenhouse imposts
 - Now had the AER Determination for NSW, SA and QLD – increases were some 90% in NSW and similarly seeing large increases in other Jurisdictions
 - IPART increases in NSW from 20% to 42% in retail prices by 2012/13 (ex-greenhouse)
- **Energy prices would increase due to CPRS and RET imposts**
 - NEM prices have slumped as CPRS debacle unfolded and coal rules once again,
 - Causing major impacts on power generation options (covered later in this paper)
 - RET in total turmoil as policy also bombs badly on multiple fronts
 - ***“We are not in the business of picking winners” (Wong) – she was certainly right there***



Last years paper – how did it fair?

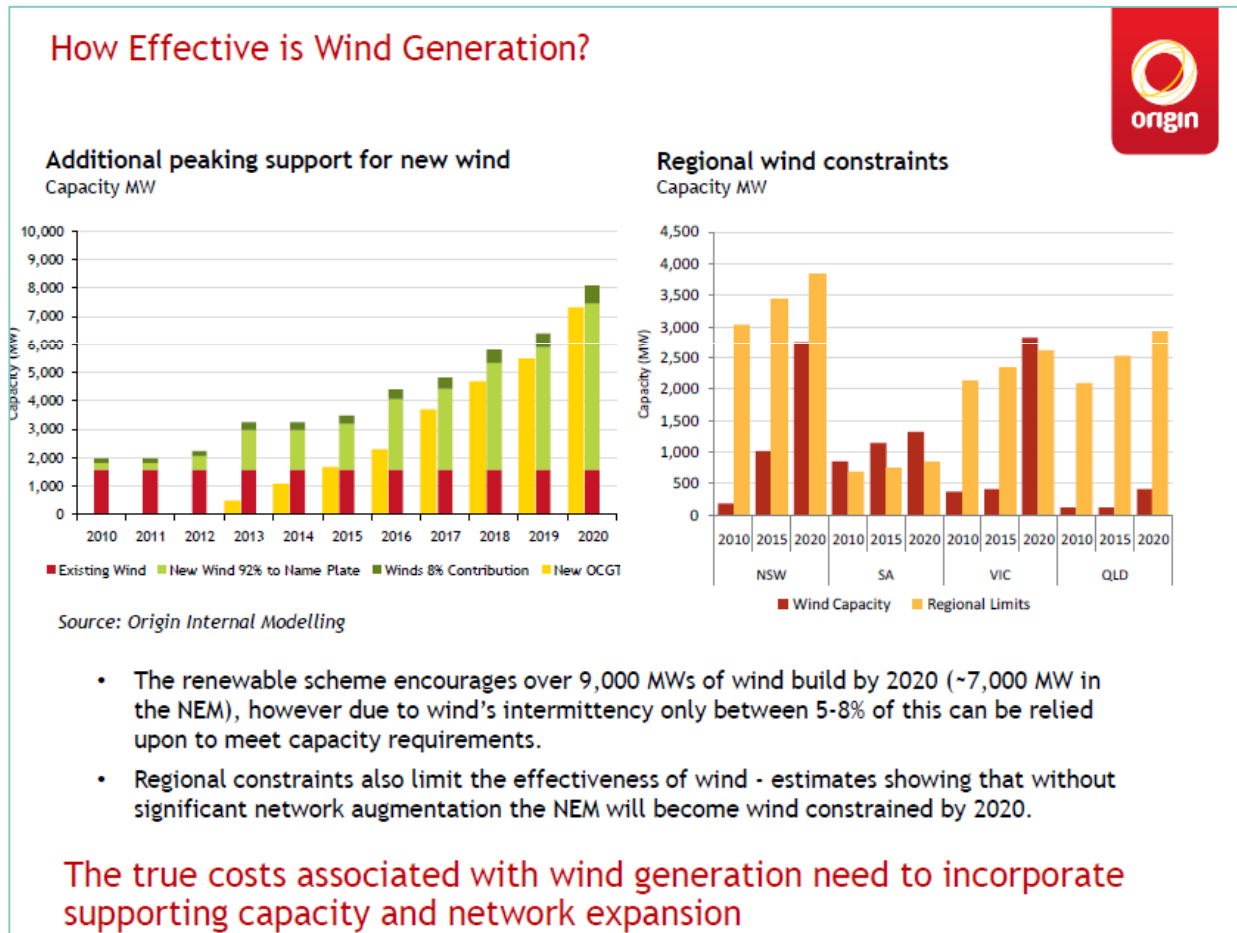
- **Gas would be limited for power generation and had pricing issues going forward to be competitive**

- Santos has canned its Shaw River Power Station – cites CPRS because gas prices are just not competitive enough without it for pure gas plant
- Origin says similar things as does AGL
- Alinta woes with WA gas price reset – contracts with price reset mark to market clauses are dead for third party funded power – must have reasonable price escalators for long periods or not bankable
- Large independents can do it though if they have the cash and good gas portfolio management - Origin, AGL, maybe TRU (EA, CE)
- ESG though has announced MOU with ERM – 20 years, 20 PJ
- LNG price links on East Coast must be now getting very weak – global prices, production issues from CSG (pollution), new tax issues, delays seem inevitable – much as canvassed last year but probably becoming clearer now – may see some changes at producer end, and
- Funnily enough we may end up awash in cheap gas for power but not right now



Last years paper – how did it fair?

- Wind generation would grow but would require significant gas peaking to mid merit plant be built as well – not able to count on it for meeting peak and will become constrained off at times by Market Operator – this is as growing concern



Last years paper – how did it fair?

■ Funding Issues and Opportunities

- It all looked so easy – but as predicted the Banks and Investors are the real rulers here
- Some rollovers of Brown Coal finance – short term, more equity and much higher rates
- But Origin predicts 10 years before any new base load sans policy on CO2



■ AMI – watching brief

- This is an enabling technology for pricing options for customers
- Forecast that network pricing would have to evolve (price to retailers not customers) and become more dynamic to be cost reflective – unwind subsidies and increase options to avoid high bills
- This journey is in progress with all the associated pain and “policy intervention?”
- Now Victoria has gone on hold but the benefits are there and it should progress – lets not see this stumble



Major Drivers of Change in the Energy Industry

- **Electricity Price Impacts/Load Factor Decline**
 - Price Impacts maybe starting to really bite – along with other household costs rising we may see demand elasticity's cause major concerns
 - Air Conditioning is a sleeper issue – we have not seen high enough temperatures in NSW to trigger the response – we did in Victoria and it showed we should have serious concerns?
 - But NEM prices have cratered under weight of coal bidding and killed off new power projects by the dozen?
- **Carbon Policy Chaos**
 - Did the “greens” miscalculate here?
 - Coal is now king again – and for how long and what greenhouse impact?
 - Renewables subsidy programs a real mess – crazy stuff
- **Gas and Coal Fuel (for power) Markets**
 - Interesting options here?

Demand for Electricity?

- Demand for electricity “energy” dropping - but what about peak demand?

- AEMO in 2009 downgraded the energy forecasts for 2009/10 by 4.3% for NSW (and for all other states at various levels) to 75,470 GWh
- They also downgraded the forecast for peak demand for NSW (at the 10% POE) by 1.3 % in the winter and summer – with the summer load being 15,375 MW
- This yielded a projected system load factor of 56% (right on prediction)
- The reasons given for this were:

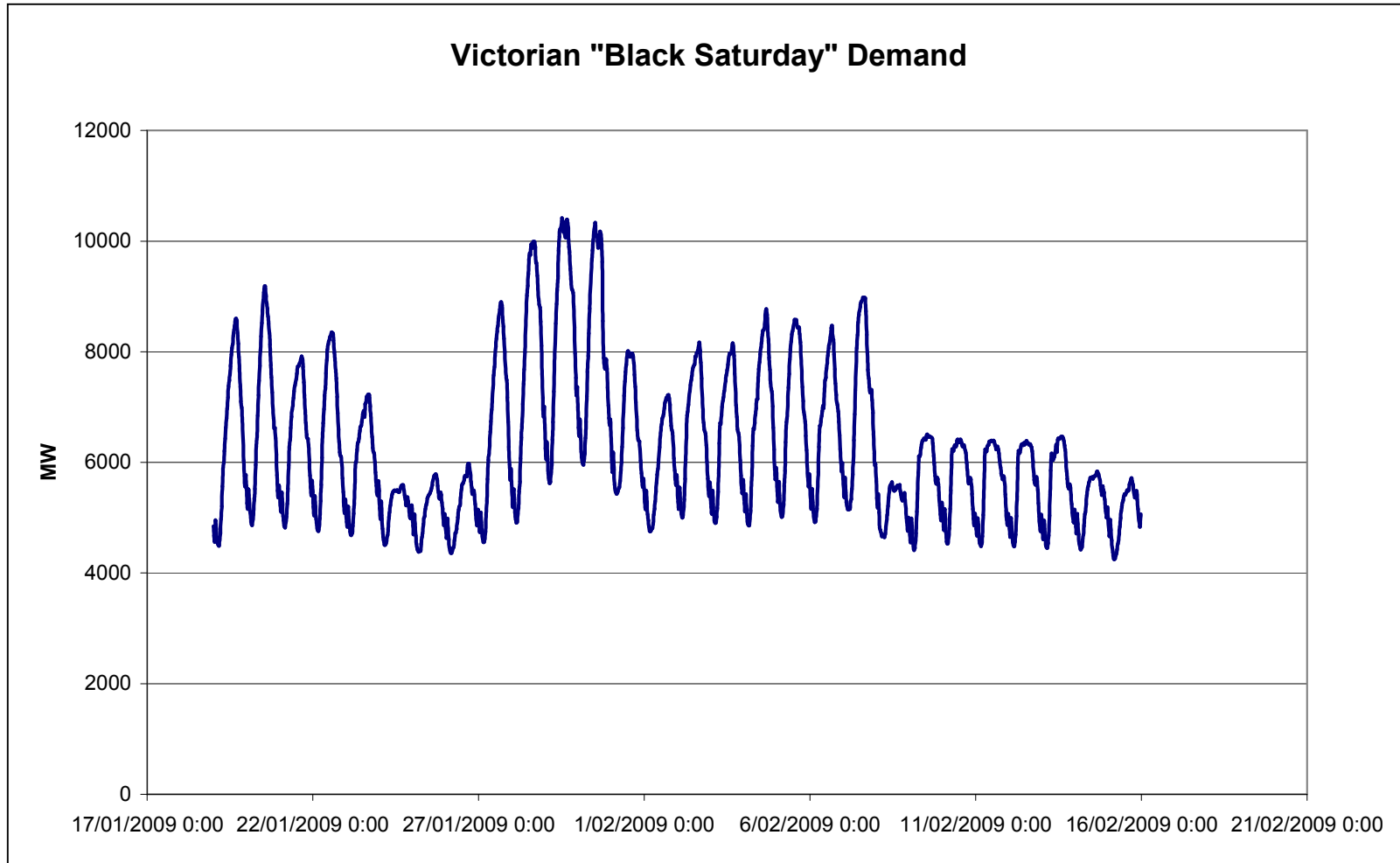
“The changes to the projections are largely due to the impact of the global financial crisis which has resulted in an economic downturn, reducing demand for energy.”

- But is this really true – at the same time we have had major price increases and a more temperate climate – low thermal shocks – no one in ten year events
- And the generality is not supported by observed customer behaviour in terms of major thermal events

Demand for Electricity?

- **Peak Demand has reached a point where it is extremely weather sensitive and hence there is an issue with being able to rely on old temperature and demand correlations and assumptions**
 - Behaviour may be changing rapidly in terms of the use of air conditioners, particularly with escalating electricity prices and the associated power bills
 - Customers may control their consumption more closely and hence use both less energy and “peak” demand in mild thermal events, in order to save money
 - This is very rational economic behaviour and economics says this is what should be expected – demand elasticity
 - But when we have a major thermal event e.g. a 45 degree day or successive high temperature days then we may see major uplift in demand – inelastic demand
 - This is exactly what was observed in Victoria around Black Saturday Feb 2009
 - In fact the system overloaded and peak demand was not met – which means the data point available is not even reliable?
 - Again this is rational economic behaviour – the benefit to customers started to exceed the perceived costs and so demand increased accordingly

Victoria's Black Saturday Period (46.4 °C)



Demand for Electricity?

- This is exacerbated by the technology traits – such as the lack of diversity as we outlined last year
- On really hot days units are started up on mass and peak together – well proven occurrence now
- The really disturbing issue here is the lack of public research and analysis being undertaken to evaluate what may well be a huge latent risk in NSW of system failure on really hot days
- The “energy department” of NSW seems to be/have non-existent data or analysis – there is one page now under Industry and Investment on the net unless I am missing something here?, and
- The AEMO is focused on (very important) NEM matters and not looking in any depth at forecast issues and demand drivers like these correlations – the GFC explanation is probably based on “industry feedback”?
- Networks are starting to show concern which is encouraging but at the policy level NSW seems to need to look at this issue a lot more closely

Electricity Prices – Bargain?



Forward prices have been dropping and you can pick the policy impacts



NSW Distribution and Retail Increases

- AER

NSW DNSP's	ARR		
	2008/09	2013/14	
EnergyAustralia	1,153.00	2,332.90	102%
Integral Energy	652.80	1,060.10	62%
Country Energy	732.30	1,418.60	94%
Total for NSW	2,538.10	4,811.60	90%

- IPART Media Release 28 April, 2010 – without CPRS:

“from July 1, 2010, average annual prices will now increase by 7 percent for Integral Energy customers rising to a total of 20 percent by 2012/13; 10 percent for EnergyAustralia customers, rising to a total of 36 percent by 2012/13; and 13 percent for Country Energy customers, rising to a total of 42 percent by 2012/13”

Electricity (NEM) Energy Prices

- **The main driver of electricity prices in recent times has been the generation mix and associated expectation of this mix**
 - Lat years paper looked at the major impacts a greenhouse impost is expected to have on the generation mix and how this is what really impacts the end prices – type of fuel and plant being built
 - And we can see how prices are impacted by this mix in the last charts
 - Now coal is king again for a while and the price is being dragged down accordingly
 - Great for business but counter to greenhouse aspirations and really impacts any base load plant developments

“Without a carbon price coal remains the most economical fuel for power stations”
Origin Energy, APPEA Conference 18 May 2010

 - The issue here is that new base load plant development is on hold – not just lower emission developments but ALL developments, and
 - The prime cause of this is greenhouse policy risks - bankers and investors are wisely very very cautious,

Electricity Prices



The future is getting further away – coal plants having reprieve but what about growth?

Greenhouse & Energy Policy Chaos

- **To any observer the Greenhouse Policy and associated Energy Policy landscape is reaching the realms of Banana Republic status – and I maybe unkind here to the Republics?**
 - The ETS was the right call from an economics perspective
 - Design issues for an ETS may have been debatable but a market based system that allots the cost of carbon on a supply and demand basis will yield the cost of such programs more efficiently than alternatives that rely on subsidy
 - Mandated standards have their place but the task is well beyond the arguments we can have over that approach, and
 - A tax based approach can be effective but again lets not get into this argument as it was fought through by Professor Garnaut
 - And if we needed any proof, even though we have text books on this and Nobel Laureates to back them, Australia seems to be revelling in the ability to demonstrate just how right the Laureates (and Garnaut) were?

Greenhouse & Energy Policy Chaos

■ Where does one start?

- Insulation would be a good place – enough spent here to have bought out a brown coal generator and shut it down or replaced it with a new gas one or connect up geothermal, or, or...and even then what a great success that has been for the Government of the day – lots spent and negative sentiment?
- Solar PV – the NSW scheme for example will add some 25 MW at a marginal cost of carbon of some \$1200/tonne – what a bargain for the NSW voters?
- The National scheme which gave away units proved oddly very popular and fully exposed the real cost of the subsidy – they ended that in a hurry?
- The RET subsidy scheme (again not picking winners is the mantra as after all we have a market based subsidy scheme?) is another scheme in major damage control because
- The separate subsidy of Solar products crashed the REC prices (oops - guess we did pick some “winners”) – and the fix is even more interesting – two REC streams?
- We could go on about green training, and other items but it is just too painful

Greenhouse & Energy Policy Chaos

- **The upshot though is far more serious – energy policy for a nation like ours is in serious disarray – and now with new taxes to help out as well?**
 - There is no direction on greenhouse gas mitigation - the risks are sovereign driven and not bankable
 - The only possible new generation at scale is a wind and gas peaking mix acting as a quasi base load – now that will be cheap when it starts to bite?
 - This is still however based on a RET that has shown it is wide open to the same policy risks – policy back flips abound and mean you can't bank this either
 - Gas pricing is looking for uplift from LNG aspirations, and
 - For short term mark to market price terms domestically (to cover price risks), but
 - We may end up with gas available at reasonable prices and terms if the supply grows enough due to the perception of LNG economics and these economics prove elusive or technically challenging to meet
 - But in the end major infrastructure will have to be built to service power so again investors and bankers will make these calls and policy risks are now a very negative issue for Australia

Greenhouse & Energy Policy Chaos

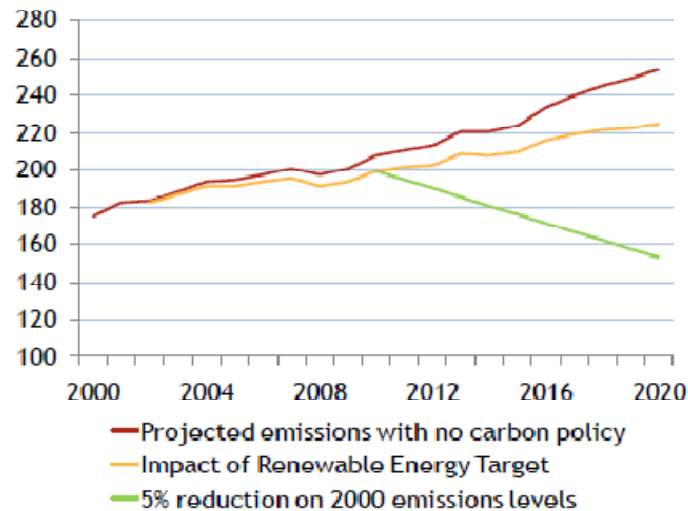
- Existing coal plants are driving down price expectations in the the short term futures market,
- Price levels that are required to bank a greener power plant, in fact any new plant at all that wants to base load
- The pool of real builders is now very small
- Retailers are in the key position to develop if their Balance Sheets are strong (and are – as outlined last year`) - third parties must become retailers to develop or partner up
- Barriers to entry are stifling innovation and developments in the space – and these barriers are mainly policy based
- Greenhouse emissions are set to climb which is quite the opposite of what is being professed by all major parties as their stated policy ambitions, and
- The Senate has set us on this path – not green enough for the Greens, not supported by the rest – but it was about a lot more than pricing greenhouse – it is about the long term power mix and supply balance, and energy prices to consumers
- It could have been so very different for Australia, a major success story but now we are in total limbo until after the next elections – and even then.....

Integrated Energy Retailer Statements?

The Federal Government's policy response to climate change had been following a dual pathway of a mandated Renewable Energy Target combined with a Carbon Pollution Reduction Scheme



Australian electricity sector emissions
Mt/CO₂e

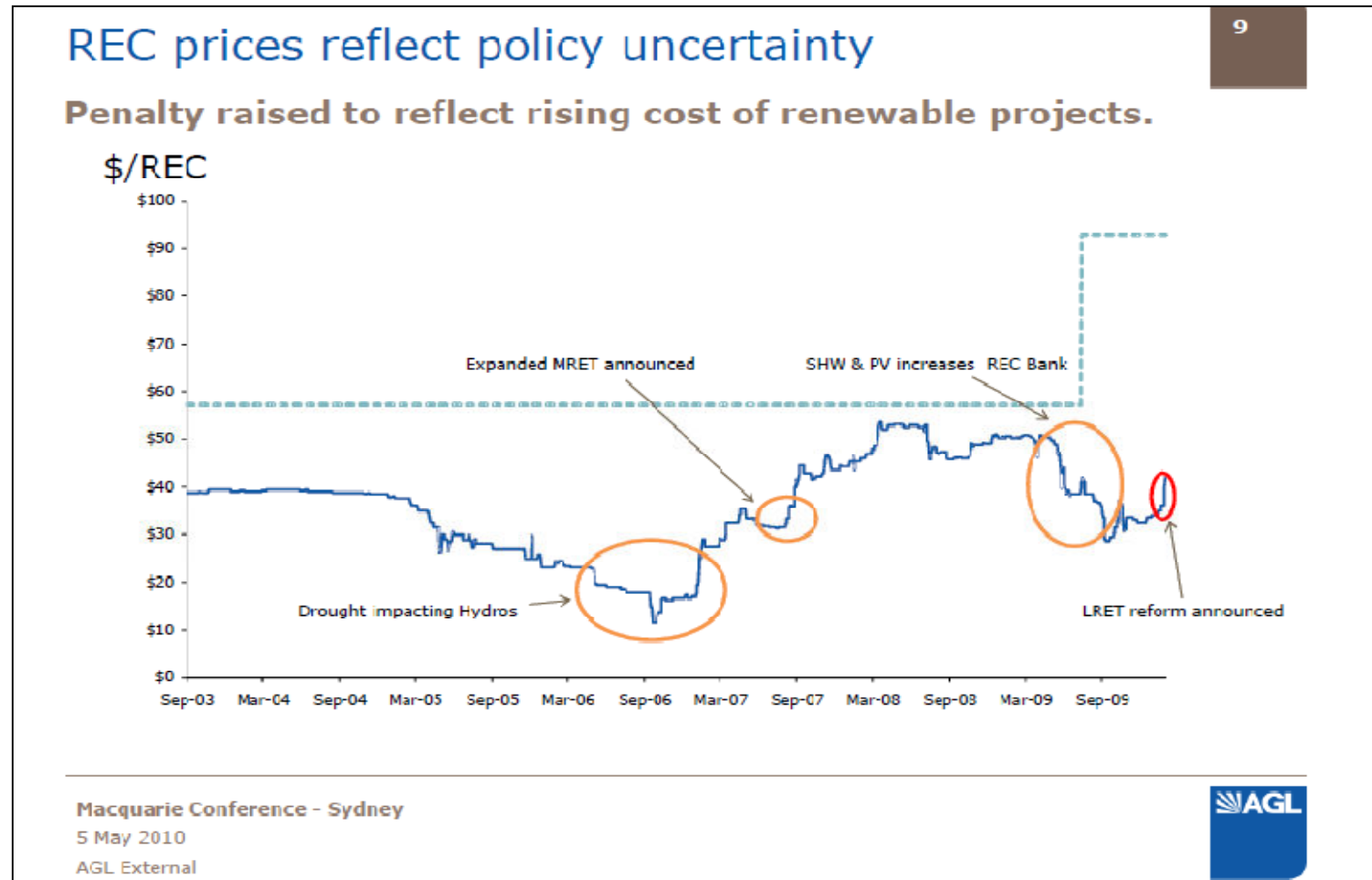


Source: Origin

- In the absence of carbon policy, emissions are projected to grow to 45% above 2000 levels by 2020
- The RET is projected to reduce emission growth to 28% by 2020
- In the absence of a direct price on carbon, meeting the balance of emissions reduction will be a significant challenge relying on mechanisms such as:
 - energy efficiency measures
 - substitution of gas for coal fired generation
 - a further increase in the RET
- Gas fired generation is well placed to provide both peaking capacity and lower emissions base load capacity

Although the introduction of the Carbon Pollution Reduction Scheme has now been delayed, both political parties remain committed to reducing emissions to 5% below 2000 levels by 2020

Integrated Energy Retailer Statements?

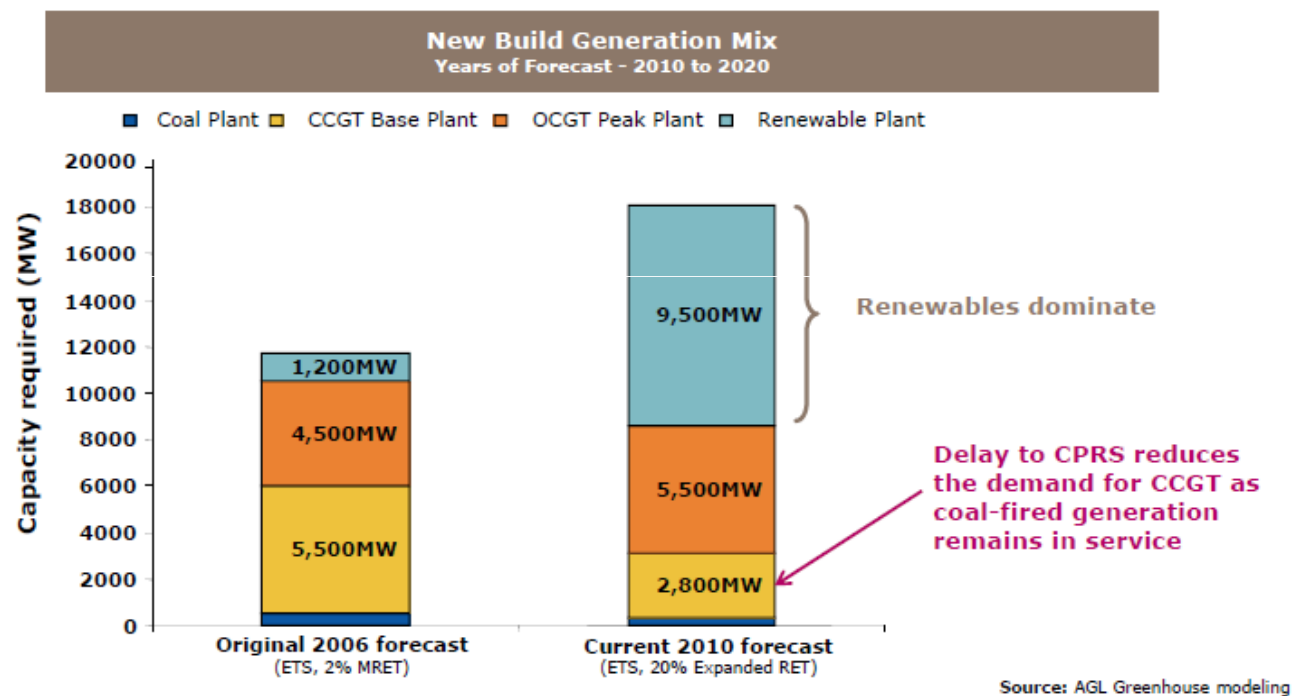


The answer to a subsidy that is not working is..... more subsidy

Integrated Energy Retailer Statements

Impact of Renewable Policy Setting

Fundamental changes required to generation mix.



Macquarie Conference - Sydney
5 May 2010
AGL External



Integrated Energy Retailer Statements – Origin/AGL

The renewable scheme encourages over 9,000 MWs of wind build by 2020 (~7,000 MW in the NEM), however due to wind's intermittency only between 5-8% of this can be relied upon to meet capacity requirements.

Regional constraints also limit the effectiveness of wind - estimates showing that without significant network augmentation the NEM will become wind constrained by 2020.

The true costs associated with wind generation need to incorporate supporting capacity and network expansion

The RET will change the pattern of investment in gas production, storage and transmission

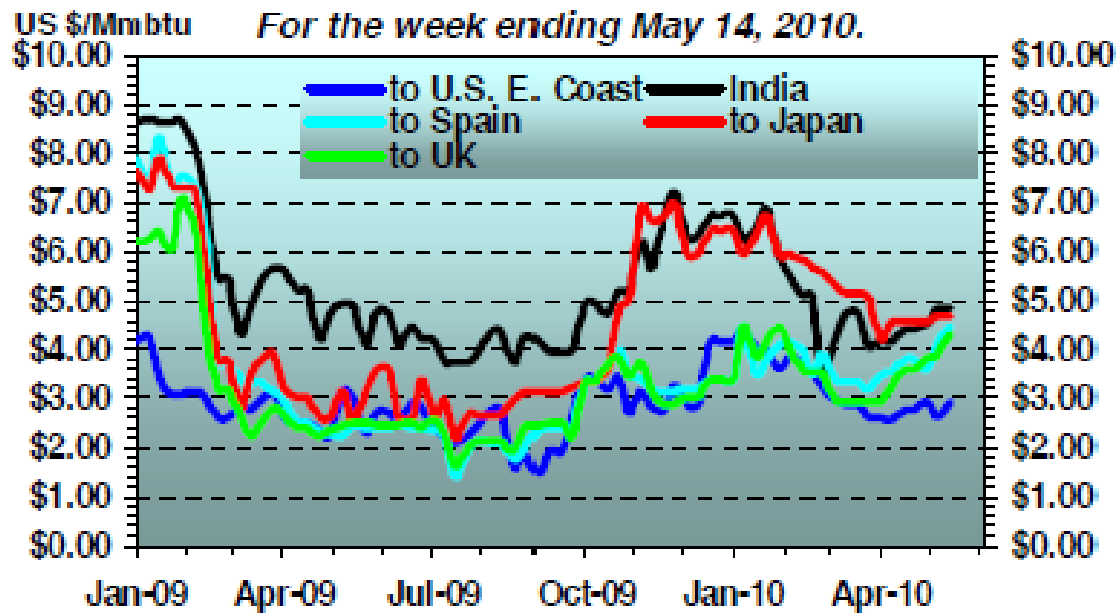
Origin estimates that an additional 500TJ of MDQ is required in Victoria

- > Significant progress with renewable policies
 - » Legislation scheduled for May/June 2010
 - » Requires up to \$30 billion of investment
- > Delay to CPRS will impact future generation mix

Gas to LNG – at what netback?

LNG Netbacks from Qatar

<u>U.S. E. Coast</u>	<u>India</u>	<u>Spain</u>	<u>Japan</u>	<u>UK</u>
\$2.91	\$4.85	\$4.50	\$4.69	\$4.30



Source: FirstEnergy Capital Corp., Waterborne Energy Inc.

CSG has lots of hurdles yet – power deals may look very good – maybe with power netback arrangements?

Pricing Reform

- **Do not want to lose sight of the need for fundamental pricing reform for networks**
 - Pricing needs to be more cost reflective and hence dynamic
 - This pricing is to Retailers not Customers – much the same way as the NEM, but
 - In reality it is far less onerous as price will change only a few times a year to signal peak demand – hot weather events that will most likely overlap with NEM signals anyway
 - AMI is a foundation stone for this as it will allow the Retailers to develop products that hedge these risks with customers
 - This form of pricing also allows the direct costing of demand side measures to avoid these charges
 - They also unwind subsidies as the tragedy of policy failures and price averaging is the least able have to pay more than their fair share – it is inequitable
 - Above all it develops greater optionality for customers and the industry and AMI is cost effective in its own right from multiple cost savings – as well as

Conclusions

Managed to get through this without even mentioning sale of energy assets in NSW?

- Energy and Greenhouse Policy will drive the investment scenario
- Lack of policy, policy inconsistency or policy failure will do the same
- Short term the latter will predominate as short term reform pain is “avoided”, and
- This will act to effectively exclude new entrants and lessen competition
- Existing coal will cement itself as hard as it can – through pricing (Hazelwood),
- This is rational and not anti-competitive as such – needs volume sales locked away – and black coal facing potential dilemmas on coal prices so needs to also control its destiny
- New generation will have to be able to weather policy matters – low greenhouse emission coal (IGCC, CCS, maybe super critical black with green additions), cheap gas if available, geothermal if cost effective

Conclusions

- Wind and gas mix set to flourish but again new entrants will struggle with the policy risks – Retailers driving this development so we will most likely see
- Heavy vertical integration – dominant players across the supply chain margin driven – and this is the case now really
- But might also see some of the smaller retailers get taken out by Generators to start building the hedge integration provides (happening as well)
- Electricity prices in the NEM will inevitably bounce – either the effect of no new base load starting to bite, the effect of the wind and gas combination starting to bite or combinations of both – but this will take quite some time
- The change agent now is.....policy....good policy that convinces banks and investors the sector can build new base load via new entrants
- Policy that can yield competition, reduce greenhouse cost effectively, grow sustainable jobs, produce innovation and this looks like....
- Well that's for another paper but it has to adhere to good economic principles and not based on "*picking winners*"

Oakley Greenwood – paper on our site tomorrow

Melbourne

Alan Rattray

Energy trading and risk management
Strategy advice
Analysis

Lance Hoch

Gas and electricity network and retail
Demand side expertise including energy efficiency
Climate change impact analysis

Brisbane

Jim Snow

Business Strategy
Gas industry experience
Energy project development
Network regulation
Energy Marketing
Demand side
Industry Restructuring

Wellington, NZ

Andrew Shelley

Regulatory economics
Model development
Competition matters

Adelaide

Greg Thorpe

Market policy, market design and regulation
Market analysis and market modelling
Climate change impact analysis
Transmission / Generation interactions
Gas/electricity interactions

Jim Snow

Phone: 32637612, Mob: 0417775893

jsnow@oakleygreenwood.com.au

www.oakleygreenwood.com.au