





#### Renewables in the Australian National Electricity Market – current status, future prospects

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# Outline

- Introduction to the Australian National Electricity Market
- Key NEM developments and trends
- Where next for the NEM?
- Integrating renewables into the NEM
  - Large-scale wind
  - Distributed (residential) PV
- 100% Renewables scenarios for the NEM
- Concluding thoughts



# Australian NEM

Generation capacity, by region and fuel 30 June 2012



#### Table 1.1 National Electricity Market at a glance







#### **NEM institutional**, market arrangements



(adapted from Outhred, 2007)





### **Recent trends**

- Falling demand, stabilising demand growth
- Investment shifting to gas and renewables
- Falling emissions, emissions intensity
- Falling wholesale prices, until the carbon price
- Significantly increasing retail prices
- Wind and PV





#### Figure 1.1a National Electricity Market electricity consumption



(AER, State of the energy market, 2012) Figure 1.1b











#### NEM investment moved markedly to gas, wind

Figure 10.2: Investment in electricity capacity since 2000 (MW)



Note: Includes capacity installed, under construction or in advanced planning. At the end of June 2011, 15 projects with a total capacity of 2760 MW were under construction, and 5700 MW of capacity was at an advanced planning stage. An additional 174 projects with a total potential capacity of over 43 GW are proposed.

Source: esaa (2012a).



# NEM generation trends following







Weekly spot electricity prices

R





- New South Wales

- Victoria

South Australia

Tasmania



## Retail price increases locked in.. with more to come?

New South Wales household electricity bill 2007-08 and 2012-13



**Electricity network revenues** 



(AER, State of the Energy Market, 2012)

Current regulatory period



# Affordability is always key, hence prices matter

...and can change faster than physical infrastructure

Figure 2

Electricity and gas retail price index (real)-Australian capital cities



Note: Consumer price index electricity and gas series, deflated by the consumer price index for all groups.







### Australian wind market



Renewables in Australia





## Australian PV Market (APVA, 2012)





# **Current PV**

(Clean Energy Regulator, 2013)

#### Cumulative Installation by state:

State	InstalledCapacity (kW)	#systems
ACT	30,000	12,010
NSW	536,000	227,663
NT	7,000	2,064
QLD	771,000	304,781
SA	354,000	139,568
TAS	34,000	13,474
VIC	436,000	177,851
WA	284,000	134,067
Grand Total	2,452,000	1,011,478







## What happens next?

- Back to the future?
- Trend as destiny?
- If you follow forecasts?
- If politics is the key?
- If you listen to the market?
- If policy is your guide?
- If you think climate change needs to be addressed?





# History repeats?

- Trends away from underlying developments may be shortlived and will see reversion to mean given time
- Evident recent shift to gas and renewable generation in NEM might be slowed, stopped or even reversed
  - Increasing gas prices with LNG exports from East Coast from 2015
  - Repeal of carbon pricing?
  - Reduction in Renewable Energy Target?
  - Moves to restrict deployment of residential PV?





#### Trend as destiny... given current policy context







# If following forecasts?

#### Then take care eg. 2010 demand forecast

Figure 4-3—Comparison of NEM-wide medium economic growth energy projections (GWh)







#### Followed by 2011 demand forecast ...









#### Followed by 2012 demand forecast ...



