



Australian Government

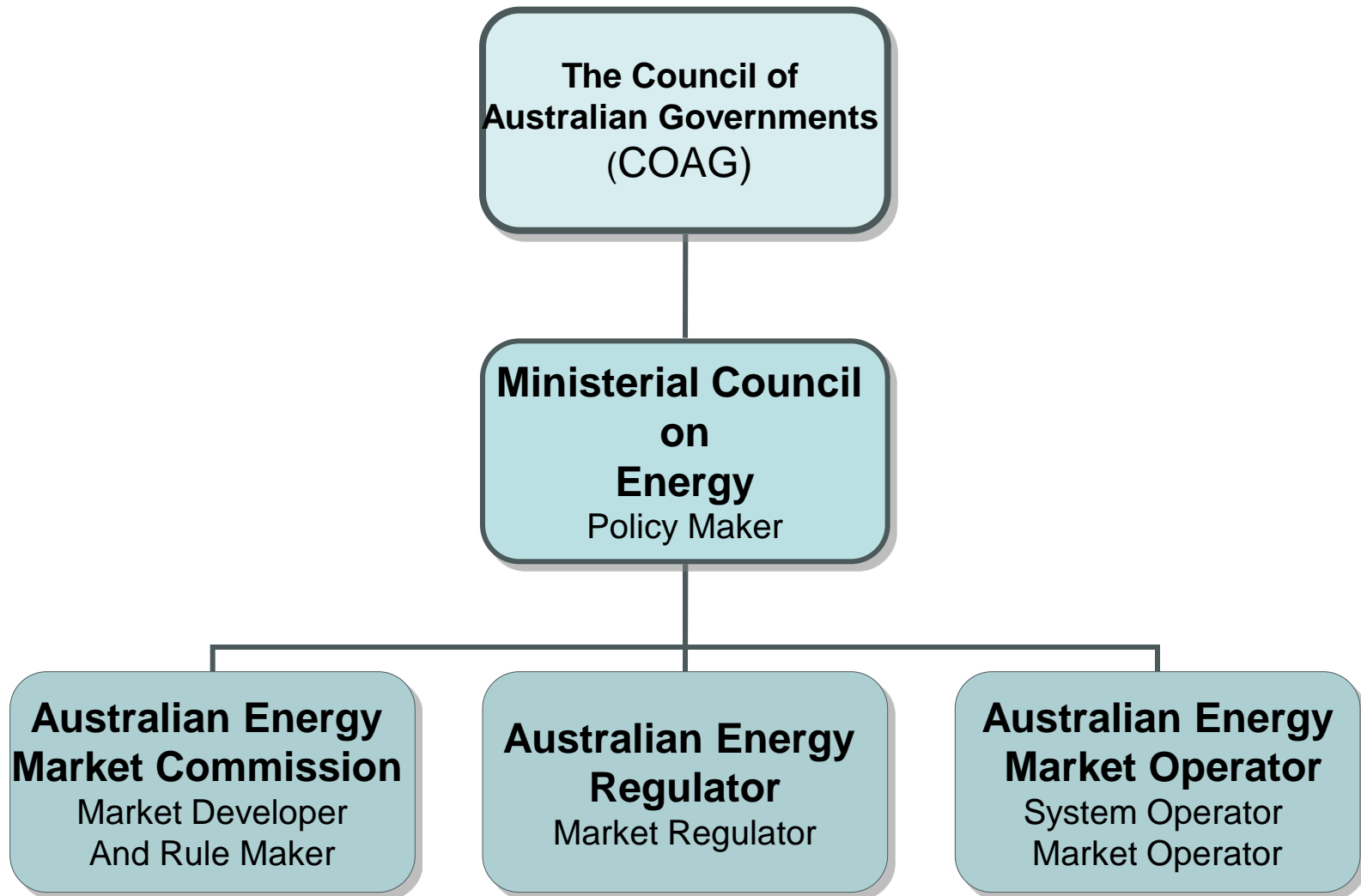
Department of Resources, Energy and Tourism

# Wind Energy in Australia

Ann Boon

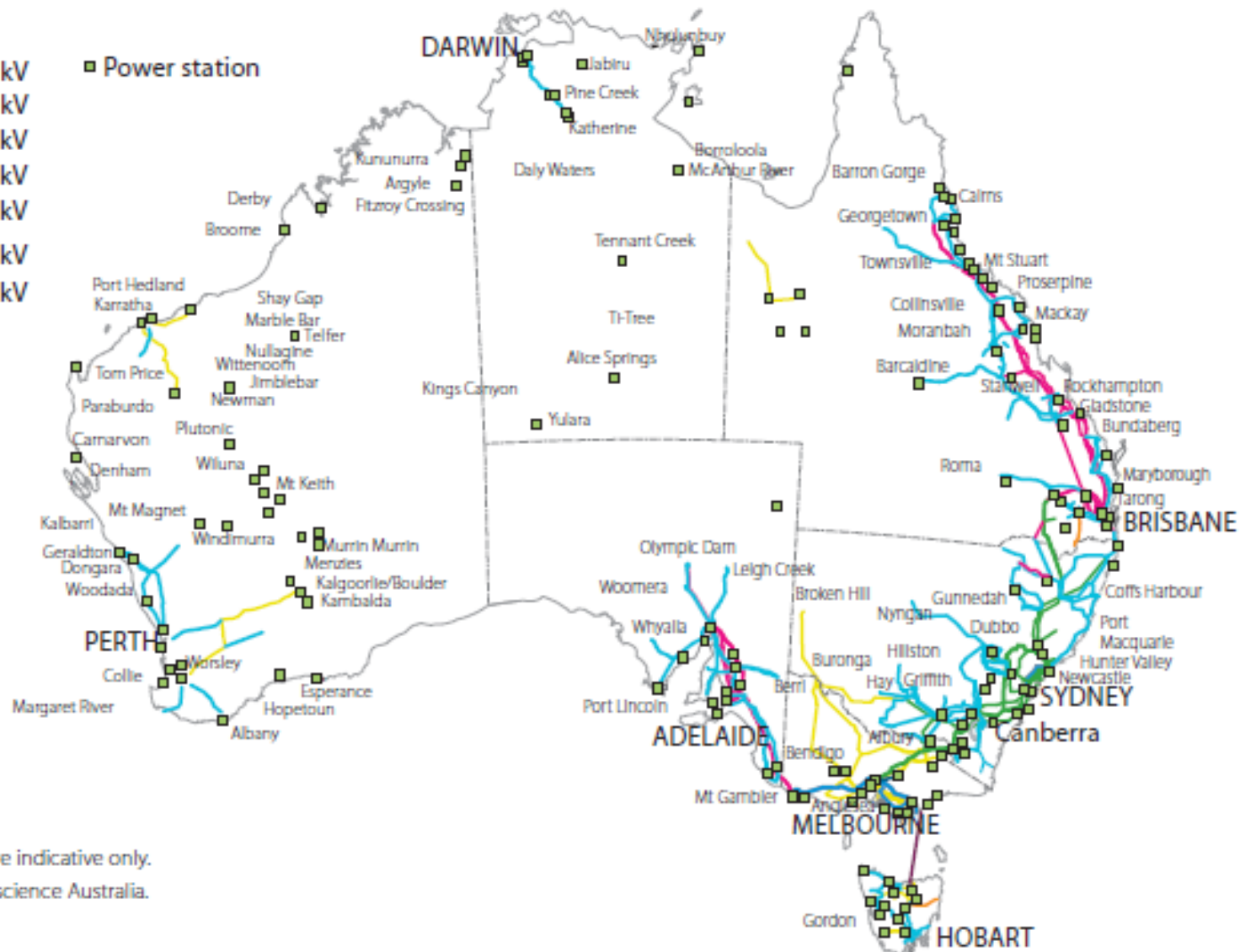
Manager, International CCS

# Energy Market Institutions



- 500 kV
- 400 kV
- 330 kV
- 275 kV
- 220 kV
- 132 kV
- 110 kV

■ Power station





Locations are indicative only.  
Source: Geoscience Australia.



# National Electricity Market

Participating jurisdictions	Qld, NSW, Vic, SA, Tas, ACT
NEM regions	Qld, NSW, Vic, SA, Tas
Registered capacity	47 418 MW
Number of registered generators	268
Number of customers	8.8 million
NEM turnover 2008–09	\$9.4 billion
Total energy generated 2008–09	208 TWh
National maximum winter demand 2008–09 (11 June 2009)	32 094 MW <sup>1</sup>
National maximum summer demand 2008–09 (29 January 2009)	35 551 MW



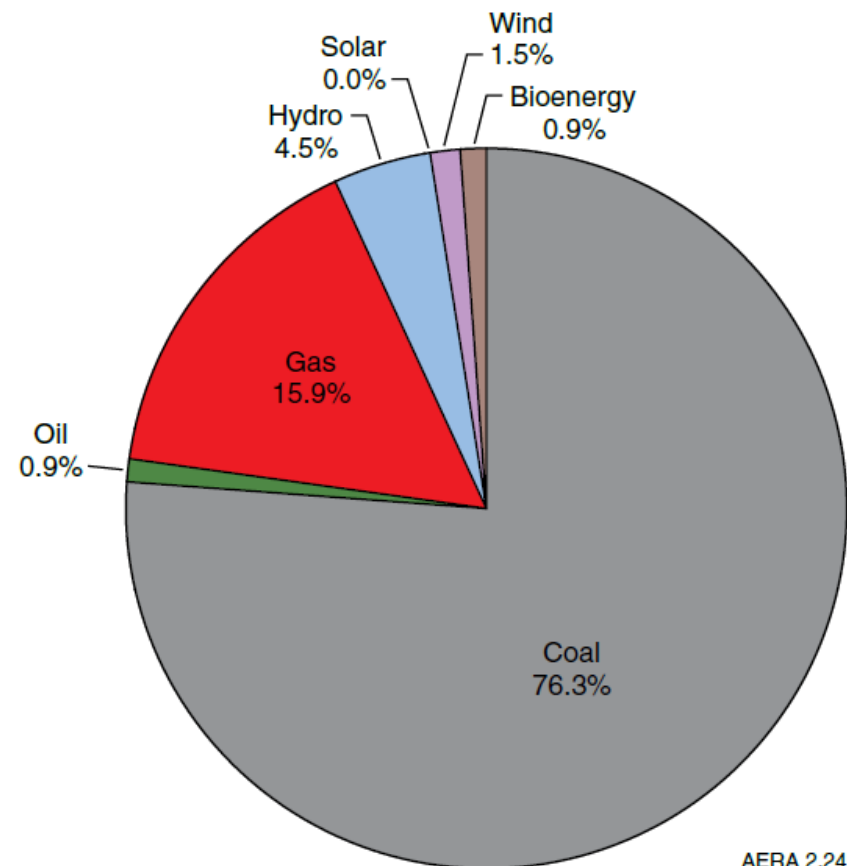
# Energy in Australia

## Energy Production 2007-08

	Production	Share	Average annual growth 1999-00 to 2007-08
	PJ	%	%
<b>Non-renewables</b>	<b>17 070</b>	<b>98.3</b>	<b>2.7</b>
Black coal	8722	50.2	4.0
Brown coal	709	4.1	0.7
Crude oil, LPG, condensate	1059	6.1	-4.3
Gas	1833	10.6	4.2
Uranium	4747	27.3	2.5
<b>Renewables</b>	<b>290</b>	<b>1.7</b>	<b>1.1</b>
Hydro	43	0.3	-4.2
Wind	14	0.1	69.5
Bioenergy	226	1.3	0.3
Solar	7	0.0	13.0
Geothermal	0	0.0	-
<b>Total</b>	<b>17 360</b>	<b>100.0</b>	<b>2.7</b>

Source: ABARE 2009a

## Electricity Generation 2007-08

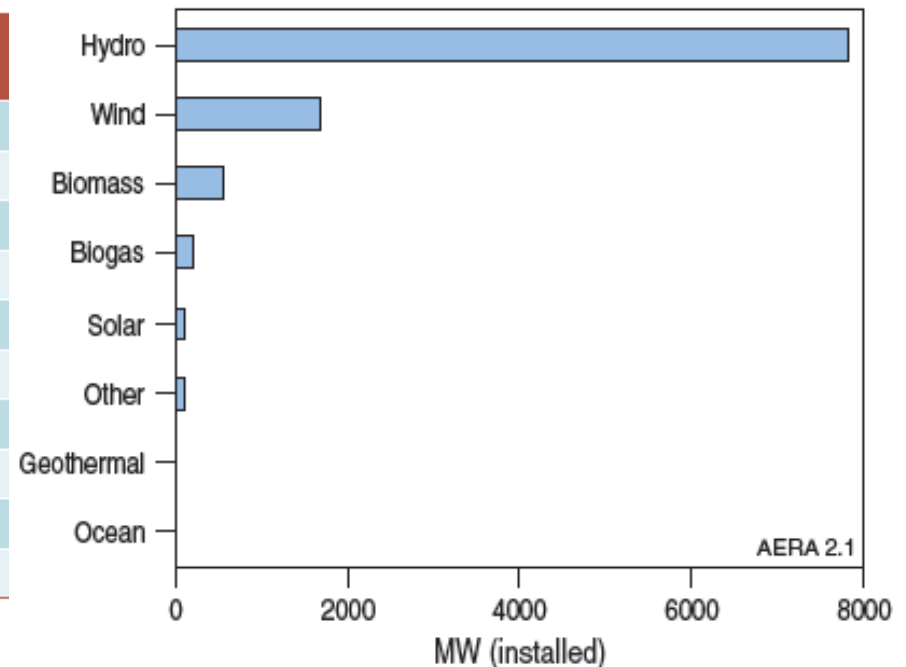


AERA 2.24

# Renewable electricity generation capacity in Australia

Resource	Capacity (MW)
Geothermal	0.1
Hydro	7806
Wind	1703
Solar	105
Ocean	1
Biogas	226
Bagasse	464
Wood waste	73
Other a	104
<b>Total</b>	<b>10 484</b>

a Other biomass and biodiesel



Source: AERA, 2010

# Renewable Energy Target (RET)

- 20 per cent of Australia's electricity supply is to come from renewable sources by 2020.
- This equates to around 45,000GWh of new renewable energy generation by 2020.
- The scheme commenced on 1 January 2010.

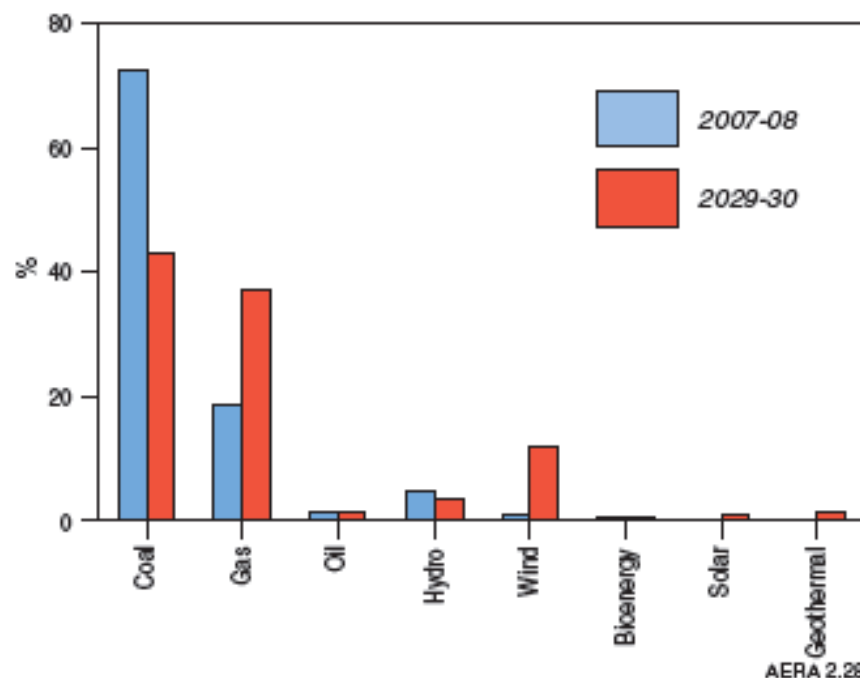


# Outlook for renewable electricity generation in Australia by fuel - 2030

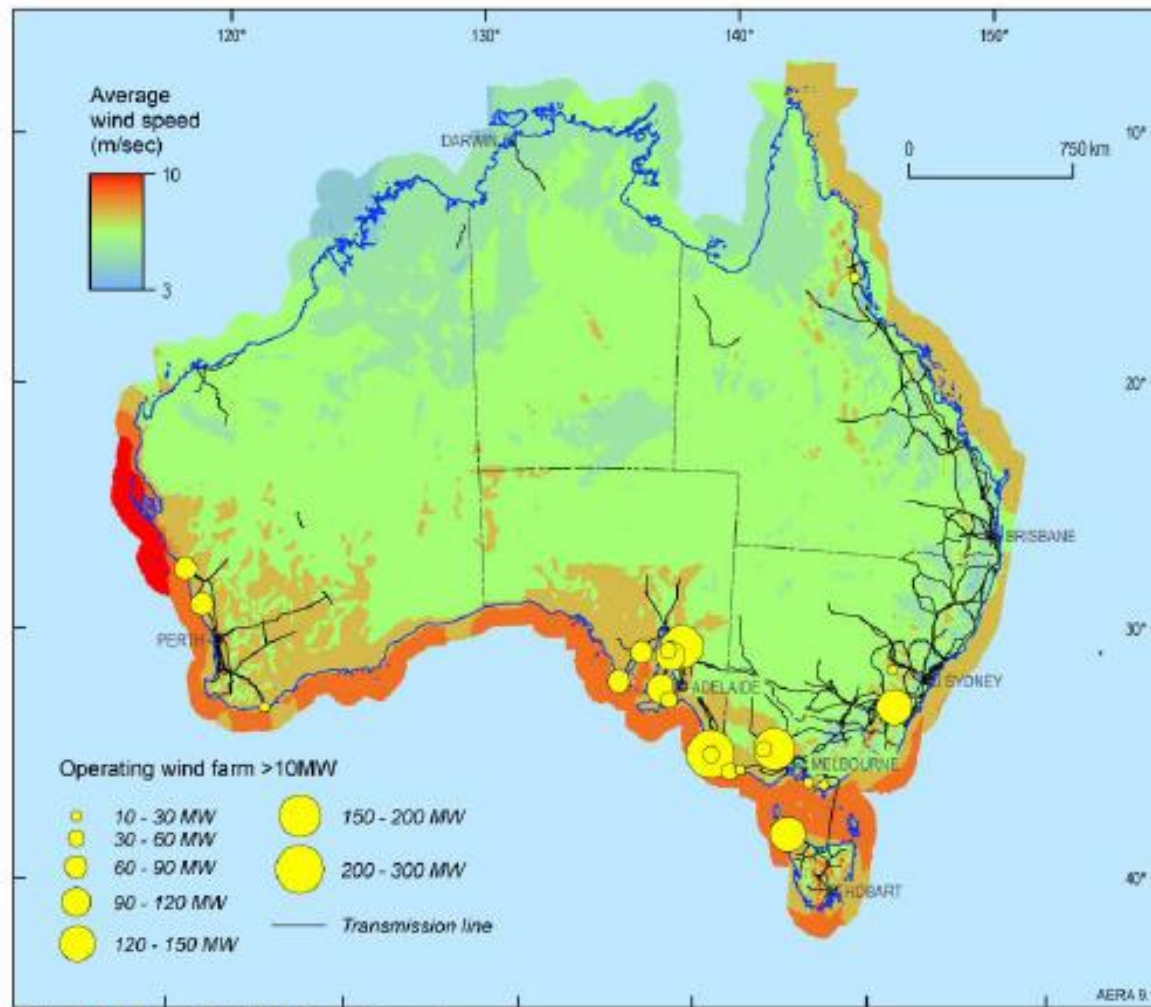
	2029-30	2029-30	Average annual growth 2007-08 to 2029-30
	TWh	%	%
<b>Non-renewables</b>	<b>297</b>	<b>81.1</b>	<b>1.2</b>
Coal	157	42.8	-0.6
Gas	135	36.8	5.0
Oil	5	1.5	0.0
<b>Renewables</b>	<b>69</b>	<b>18.9</b>	<b>6.2</b>
Hydro	13	3.5	0.2
Wind	44	12.1	11.6
Bioenergy	3	0.7	2.3
Solar	4	1.0	17.4
Geothermal	6	1.5	18.4
<b>Total</b>	<b>366</b>	<b>100.0</b>	<b>1.8</b>

Source: ABARE (AERA Report)

## Electricity Generation 2007-08 and 2029-2030



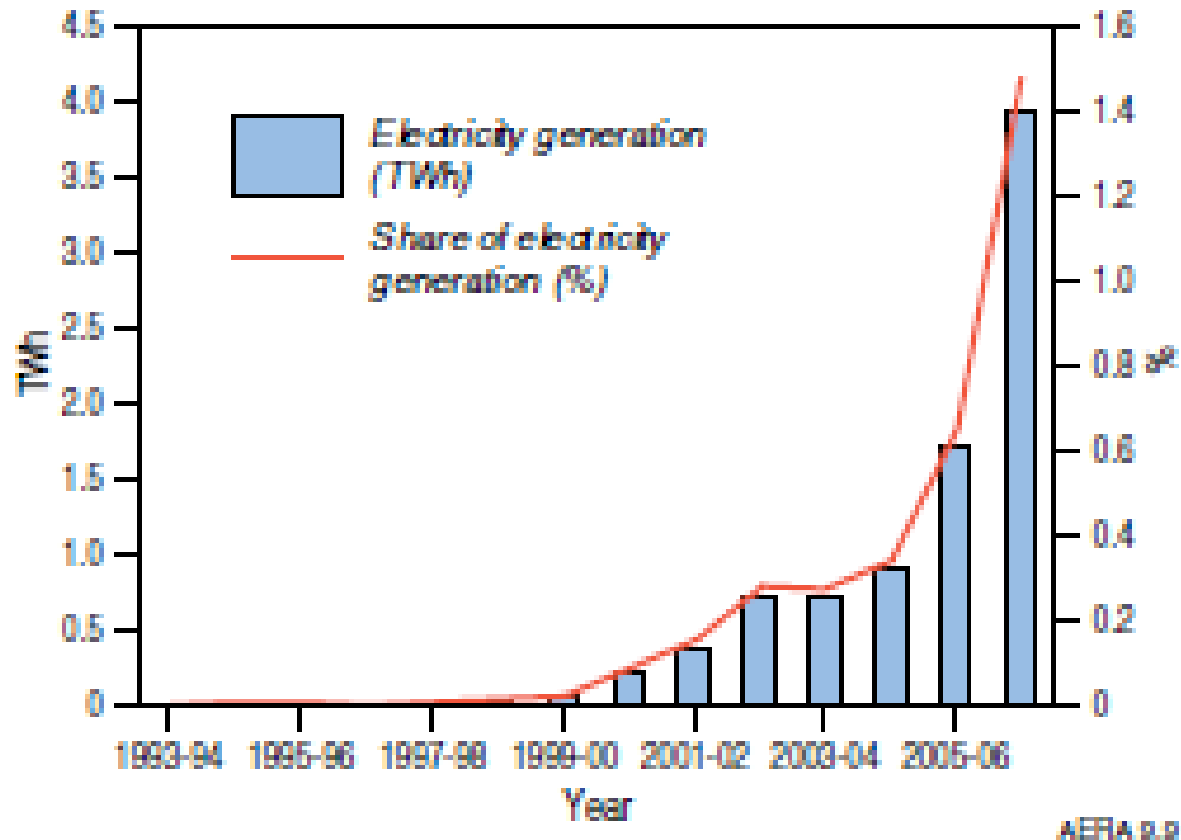
# Australia's wind resources



**Figure 9.1** Australia's wind resources

Source: Windlab Systems Pty Ltd, DEWHA Renewable Energy Atlas (wind map data); Geoscience Australia

# Growth in Wind Generation



**Figure 9.9** Australia's wind electricity generation

Source: IEA 2009; ABARE 2009a

# Recently Developed Wind Projects

Project	Company	State	Start up	Capacity
Cape Bridgewater	Pacific Hydro	VIC	2008	58 MW
Capital Wind Farm	Renewable Power Ventures	NSW	2009	141 MW
Cathedral Rocks	Roaring40s/Hydro Tasmania & Acciona Energy	SA	2005	66 MW
Cullerin Range Wind Farm	Origin Energy	NSW	2009	30 MW
Emu Downs	Transfield Services Infrastructure Ltd & Griffin Energy	WA	2006	79.2 MW
Hallett 1	AGL	SA	2007	94.5 MW
Lake Bonney 1	Babcock and Brown Wind Partners	SA	2005	80.5 MW
Lake Bonney 2	Babcock and Brown Wind Partners	SA	2008	159 MW
Mount Millar	Transfield Services Infrastructure Ltd	SA	2006	70 MW
Portland stage 3	Pacific Hydro	VIC	2009	44 MW
Snowtown	Wind Prospect and Trust Power	SA	2007	98.7 MW
Walkaway	Babcock and Brown Wind Partners/Alinta Ltd	WA	2005	90 MW
Wattle Point	ANZ Energy Infrastructure Trust/Wind Farm Developments	SA	2005	91 MW
Waubra	Acciona Energia/ANZ Energy Infrastructure Trust	VIC	2009	192 MW
Wonthaggi	Wind Power Pty Ltd	VIC	2005	12 MW
Woolnorth	Roaring40s/Hydro Tasmania	TAS	2007	140.25 MW
Yambuk	Pacific Hydro Ltd	VIC	2007	30 MW



Source: Geoscience Australia 2009

# Approach to Renewable Energy Integration

- New climate change policies are expected to structurally change Australia's energy markets.
- The Ministerial Council on Energy is addressing barriers to the integration of renewable energy in the National Electricity Market
- The \$14 million Wind Energy Forecasting Capability initiative
  - Forecasting system went live in 2008

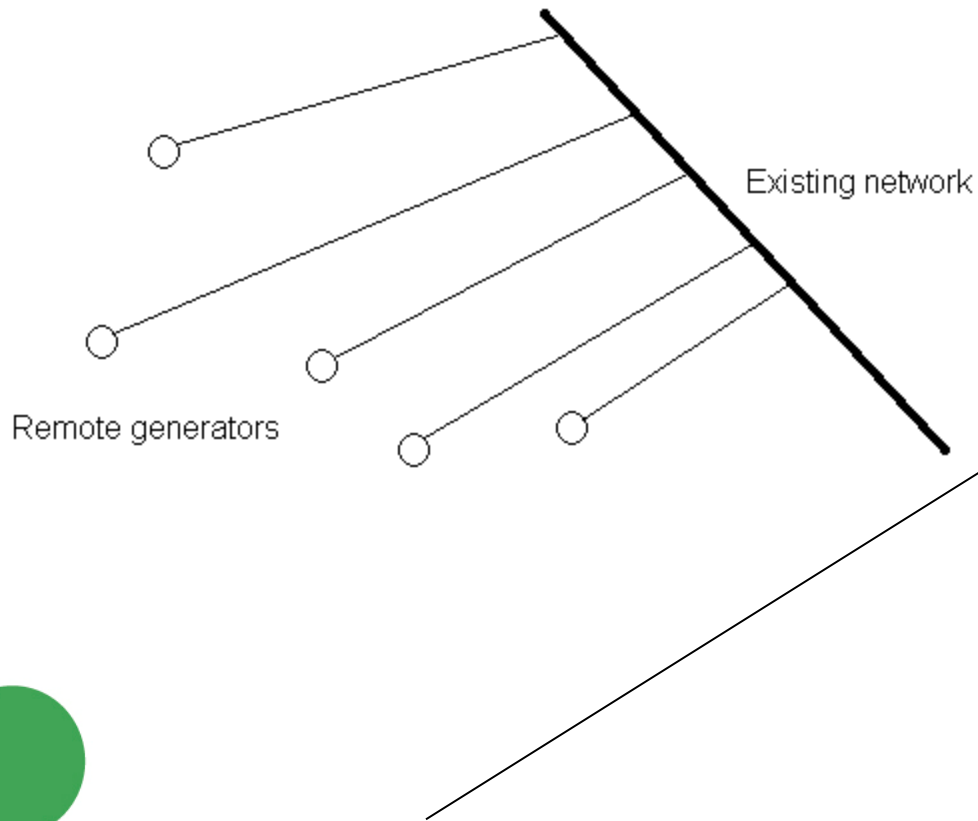


# Climate Change Review

- The Government requested that the Australian Energy Market Commission review existing energy market frameworks in light of climate change policies
  - AEMC found that the existing energy market frameworks are generally well positioned to respond to external events
  - Some modifications to improve market outcomes are required
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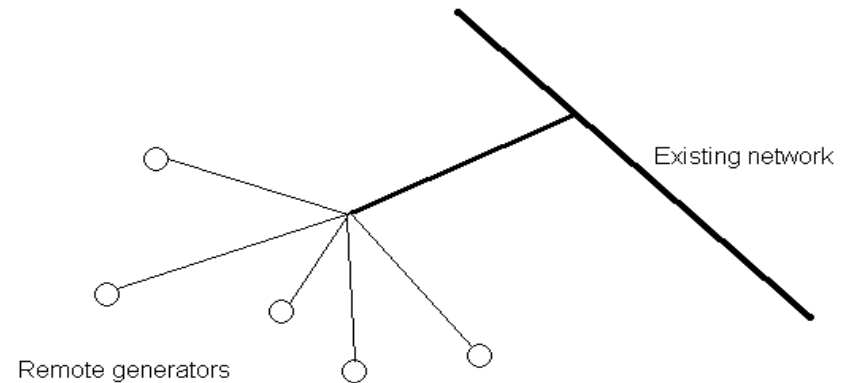
# Scale Efficient Network Extensions

Current connection arrangements



**Current Connection Schematic**

## A SENE Schematic



# Community Engagement

## National Wind Farm Guidelines





**Thank you**

**More information available at:**

**[www.ret.gov.au](http://www.ret.gov.au)**

