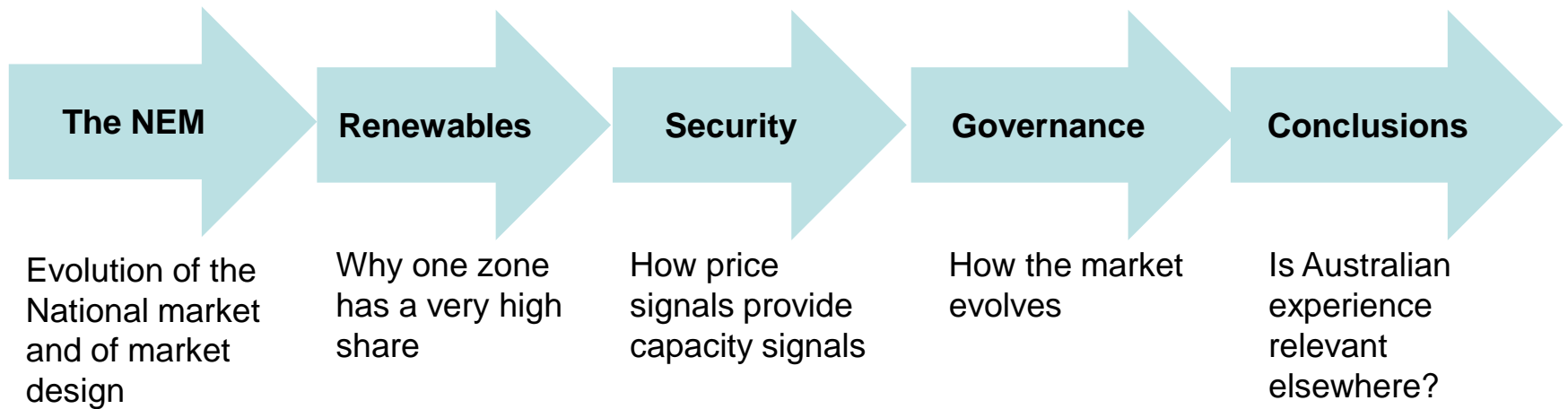

Security and efficiency in regional power markets: some Australian experience

*Linnfall Consulting
April 2016*



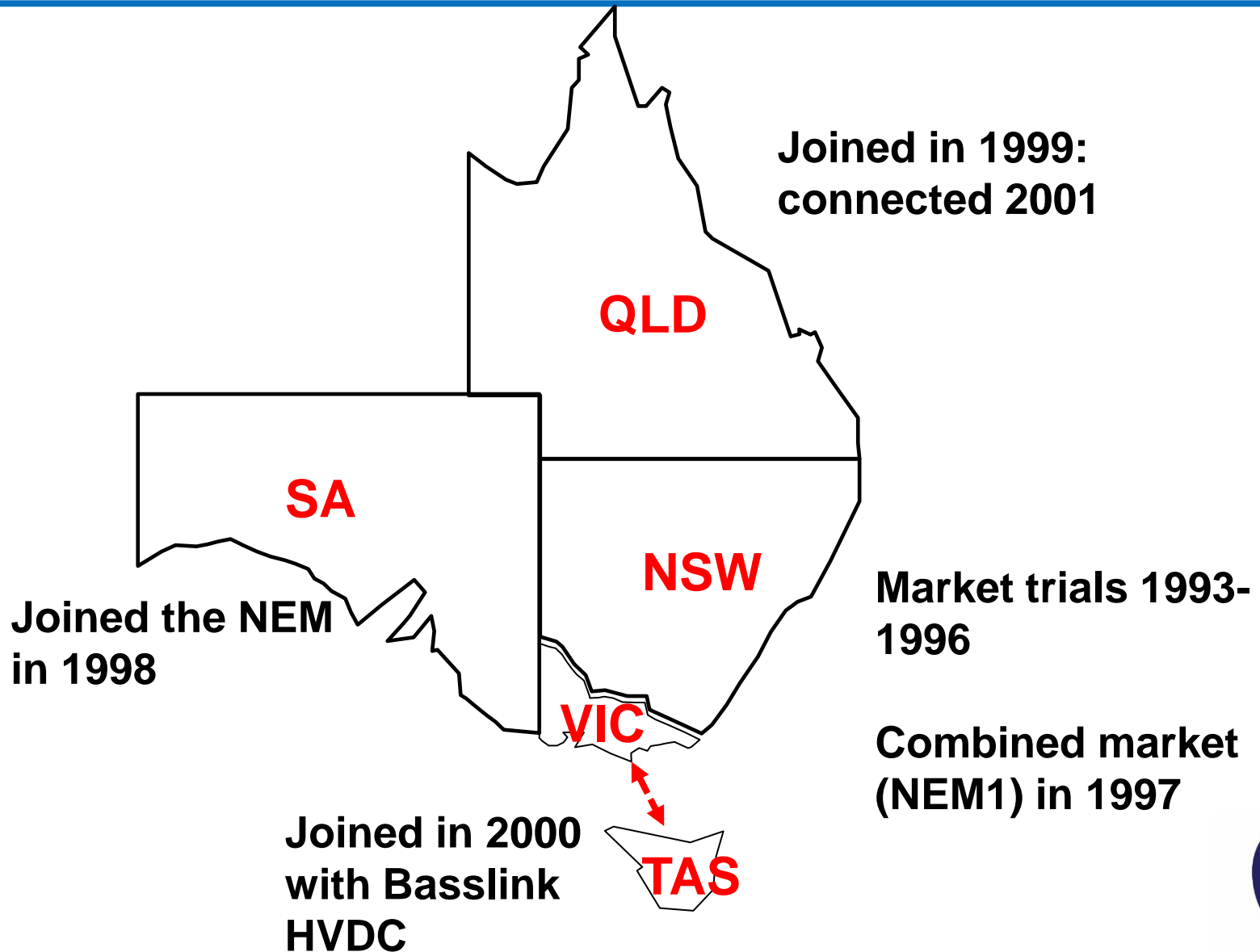
Linnfall Consulting

Structure of this presentation



Introduction to the National Electricity Market

Evolution of the Australian NEM



High level market design

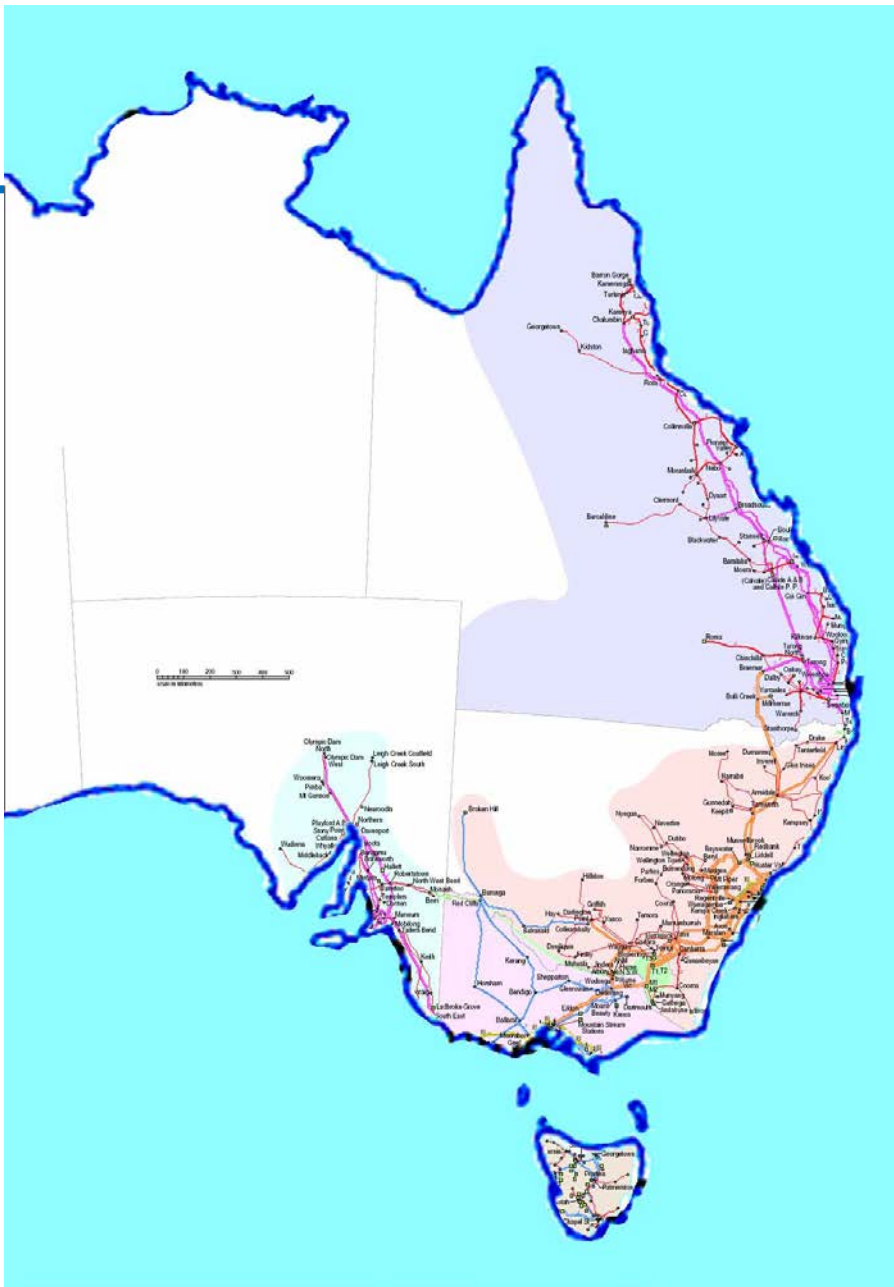
Mandatory gross pool

Energy only, day ahead bids and offers. Renewables dispatchable

Five price zones: prices separate when transmission constrained

Price caps and floors reset every 4 years by Reliability Panel to meet Reliability Standard

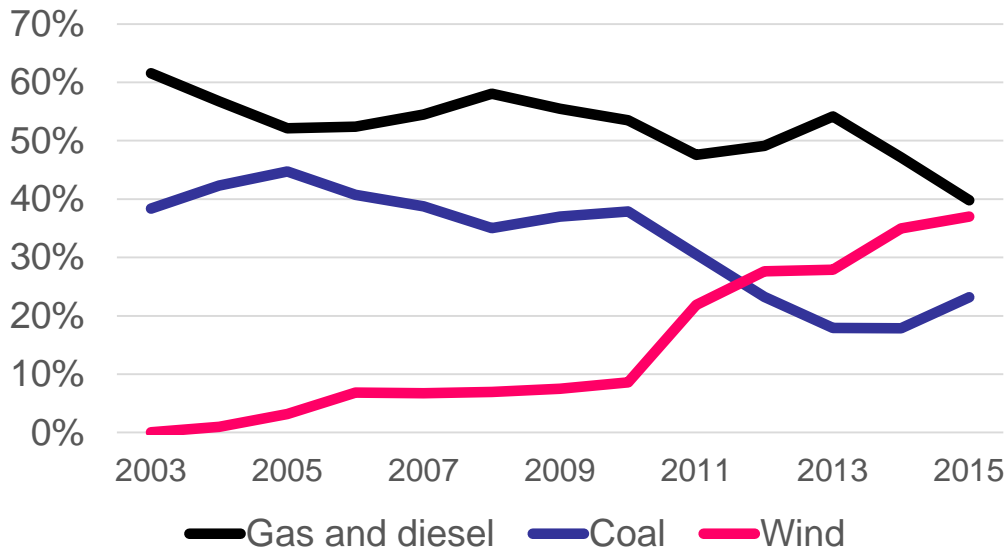
**Price cap currently
A\$13,100/MWh (c. €3,300)**



Impact of renewables under this market design

A large share of renewable energy is located in South Australia

Energy generated in South Australia by technology



Source: 2015 SA Historical Market Information Report, 2010 Supply and Demand Outlook at www.aemo.au

Wind 16% of installed capacity FY 2015. Likely to rise substantially given projected withdrawal and investment

Strong wind regime: 33% average load factor, 37% of energy generation in SA in FY 2015

Among the highest globally. 2011 comparison of Soder Metric - max wind/(min demand plus max export):

- Ireland 98%
- Western Denmark 59%
- ERCOT 27%
- Iberian peninsula 94%
- South Australia 67%

Sources: AEMO statement of opportunities FY2015, ECAR Energy 2011 report to AEMO



This market experiences extreme price spikes....

Price curve 2010 Calendar Year

\$9,000
\$7,000
\$5,000
\$3,000
\$1,000
-\$1,000

Approximately 3 days of negative price periods

Top 3 days of price periods

\$12,000
\$10,000
\$8,000
\$6,000
\$4,000
\$2,000
\$0

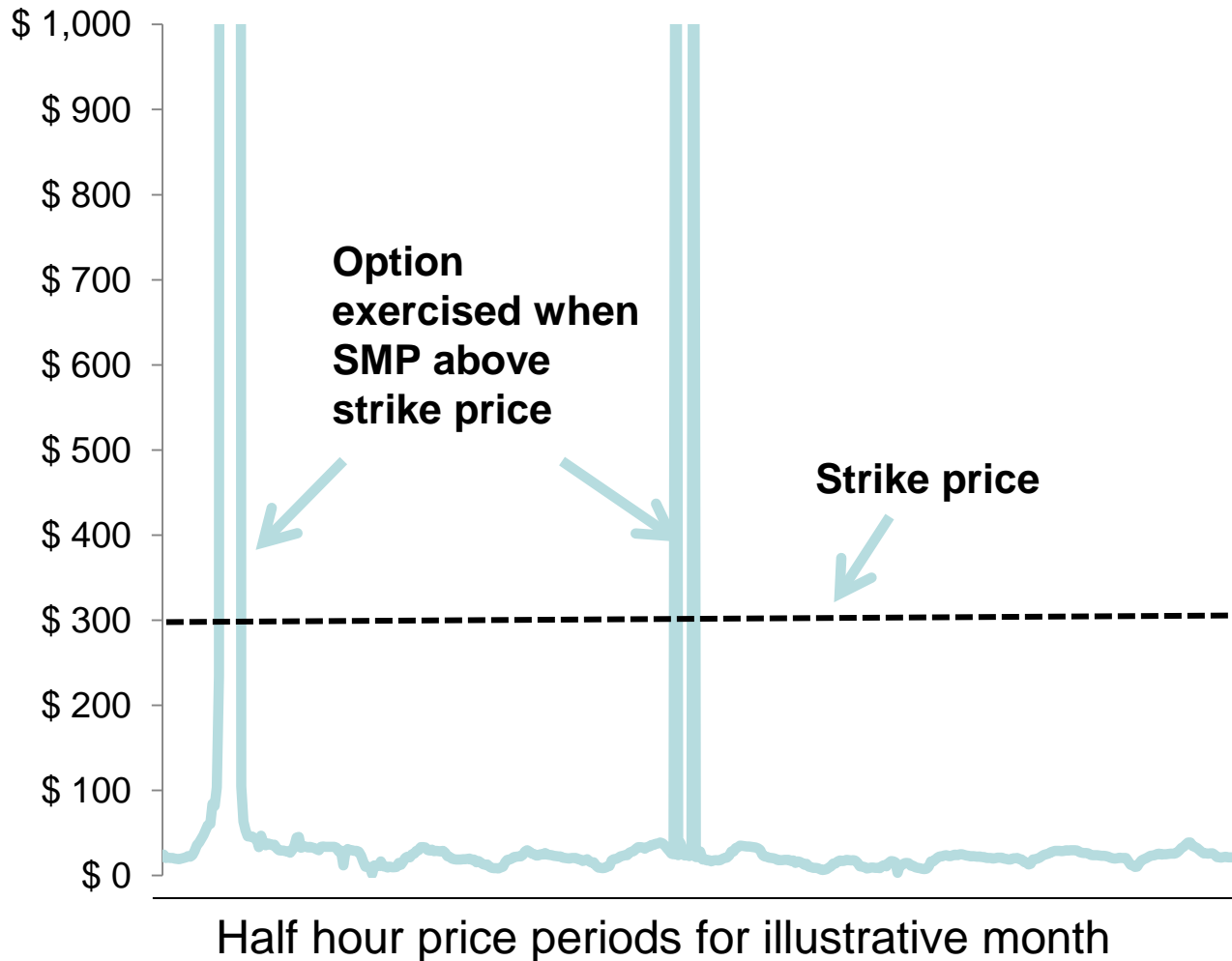
Top 3 days of price periods in SA:

- 50% of turnover 2008 and 2009
- 44% of turnover 2010
- 26% in 2011

Source: AEMO price data
EUAA submission to PC review



.... participants hedge this risk in part through 'cap' contracts – very similar to 'reliability options'...



One way option. Seller pays buyer when market price exceeds strike price

Unit: 1 MW per hour over CY or quarter for a zone

Strike price: often \$300 MWh, close to operating cost of OCGT

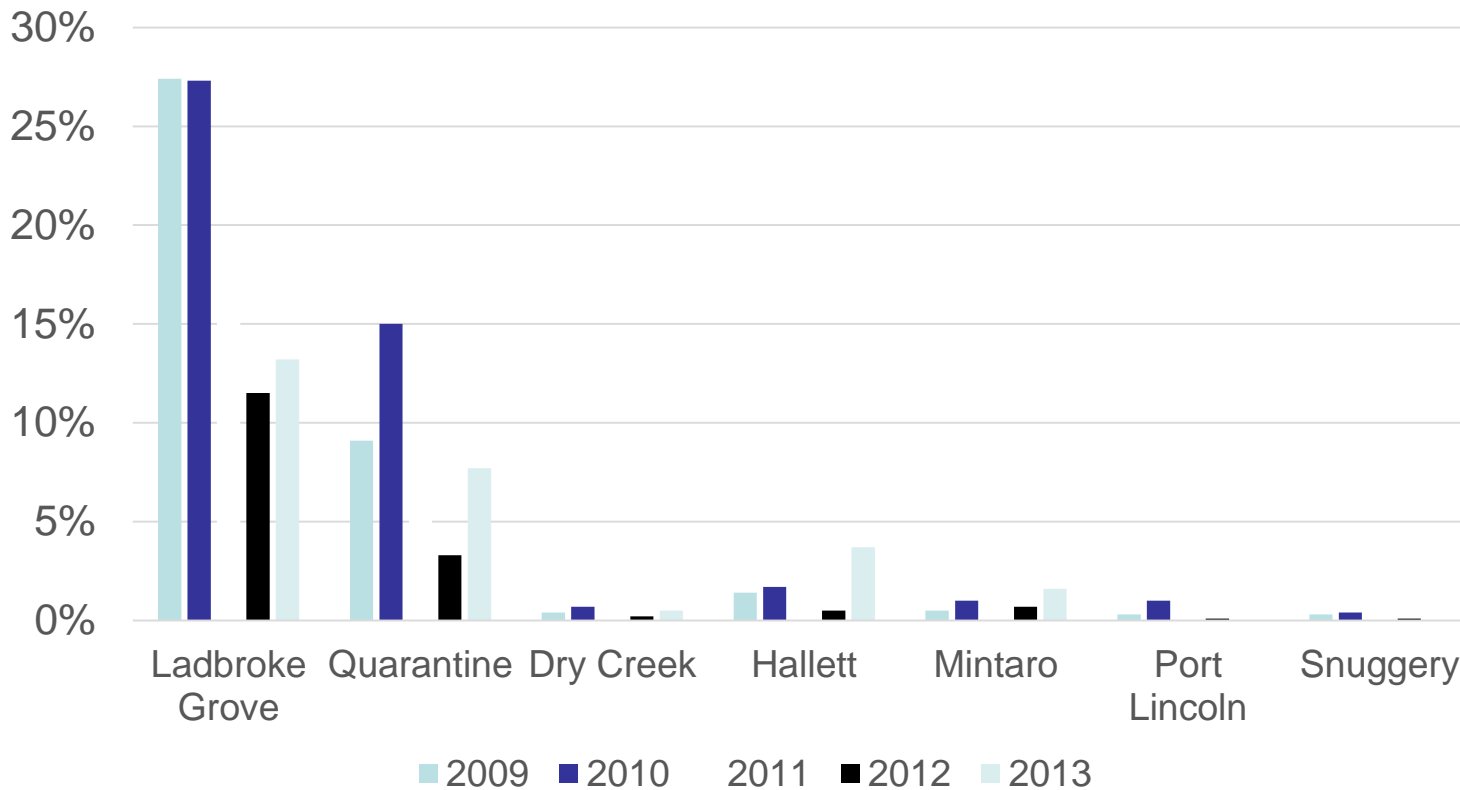
Volume and price set by market

Share in contract market varies by region and year: from very low to 50%

Sources: Australian Financial Markets Report 2014 statistical annex, AFMA 2015 Electricity Market Conventions

...and this supports low load factor peaking plant to back up wind

Annual load factor for OCGTs in South Australia



Source: South Australia Electricity Report, 2013, AEMO

This approach has similarities – and differences – to other capacity mechanisms

	Cap contracts in the NEM	UK Capacity Auction
Locational structure	Zonal	Single price
Quantity or price based	Price	Quantity
Price	Price per MW per year set by market	Price per MW per year set by market
Term	Season to 3 years Bilateral deals	1, 3 or 15 years
Penalty	Uncapped exposure from A\$300/MWh to A\$13,100/MWh	Lower capped penalties

What is needed for a similar solution to evolve in Europe?

Preconditions

Price spikes – and option contracts to manage them – only emerge under conditions of tight supply. Their absence before the conditions are met is not a concern

Pricing

High prices allowed to occur to ensure investment incentives can have full effect. Zonal pricing to reflect major constraints

Incentives

Balance responsible parties need incentives to ensure they have contracted enough power. Ineffective if penalties/risks are too low

Efficiency

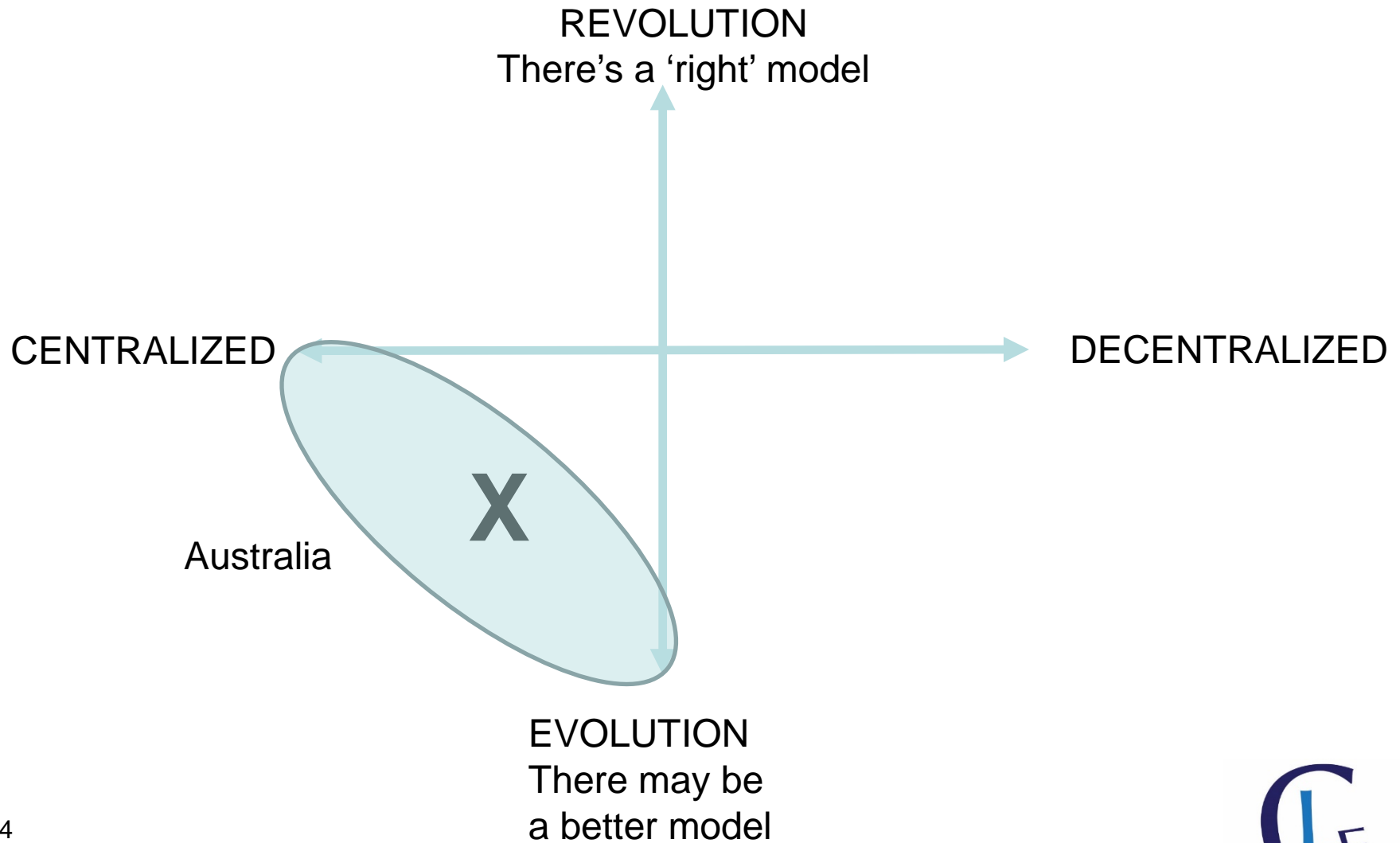
Ensure no barriers to efficient response – through trade, demand side participation and other measures

Acceptability

Measures to protect against market power
Out of the market measures to reassure on sufficient capacity?

And approach to evolving the market rules

Models for the governance of market rules?



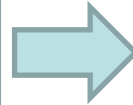
Institutional framework

2004 Inter-Govt Agreement (AEMA)

Australian Energy Regulator – economic regulator

Australian Energy Market Commission – rule maker

Australian Energy Market Operator



- **National Electricity Rules under NE Law**
- **Single objective – effectively long term interest of consumers**
- **Rule change request:**
 - **By govt, business or individuals**
 - **Statement of issues – what’s the problem, materiality, how the proposal helps**
 - **Costs, benefits and likely impacts**
- **Consultation process before final decision by AEMC**