

**NEMMCO**

# **National Electricity Market and the Geothermal Industry**

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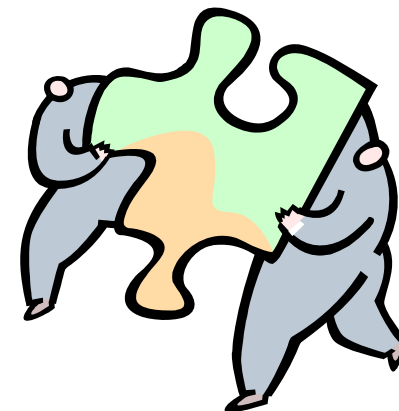
**Head of Regulatory Affairs & Compliance**

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# Topics covered

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- Physical power system
- Market design & pricing process
- Settlement and cash flows
- Options for participation in the National Electricity Market
- National transmission planning



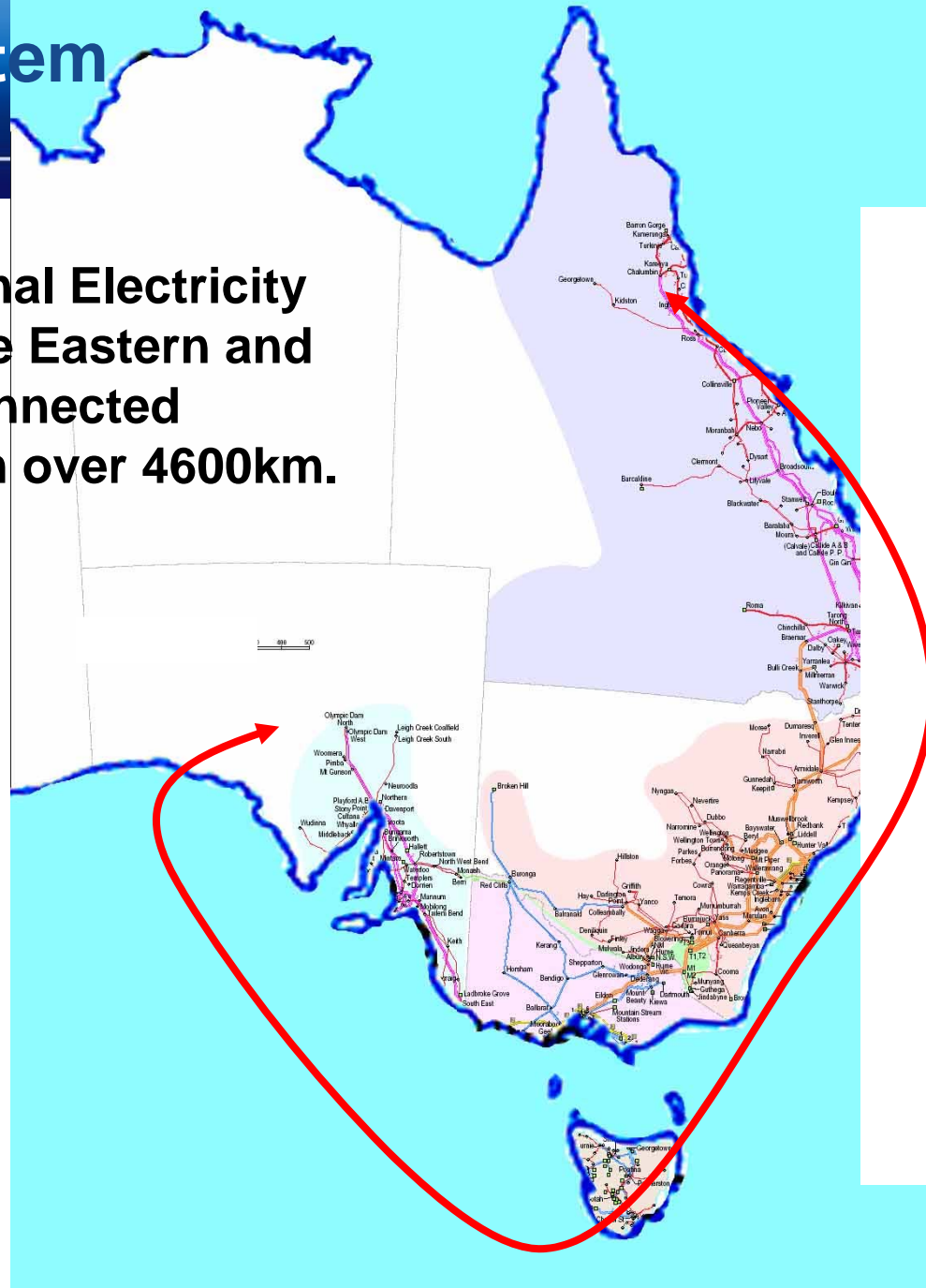
# Power system

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Australia's National Electricity Market covers the Eastern and Southern interconnected electricity system over 4600km.

It is made up of 6 "Regions":

- QLD
- NSW
- SNOWY
- VIC
- SA
- TAS



- Annual energy of 196,000 GWh worth \$11.5 billion

- Approx. 8 million customers

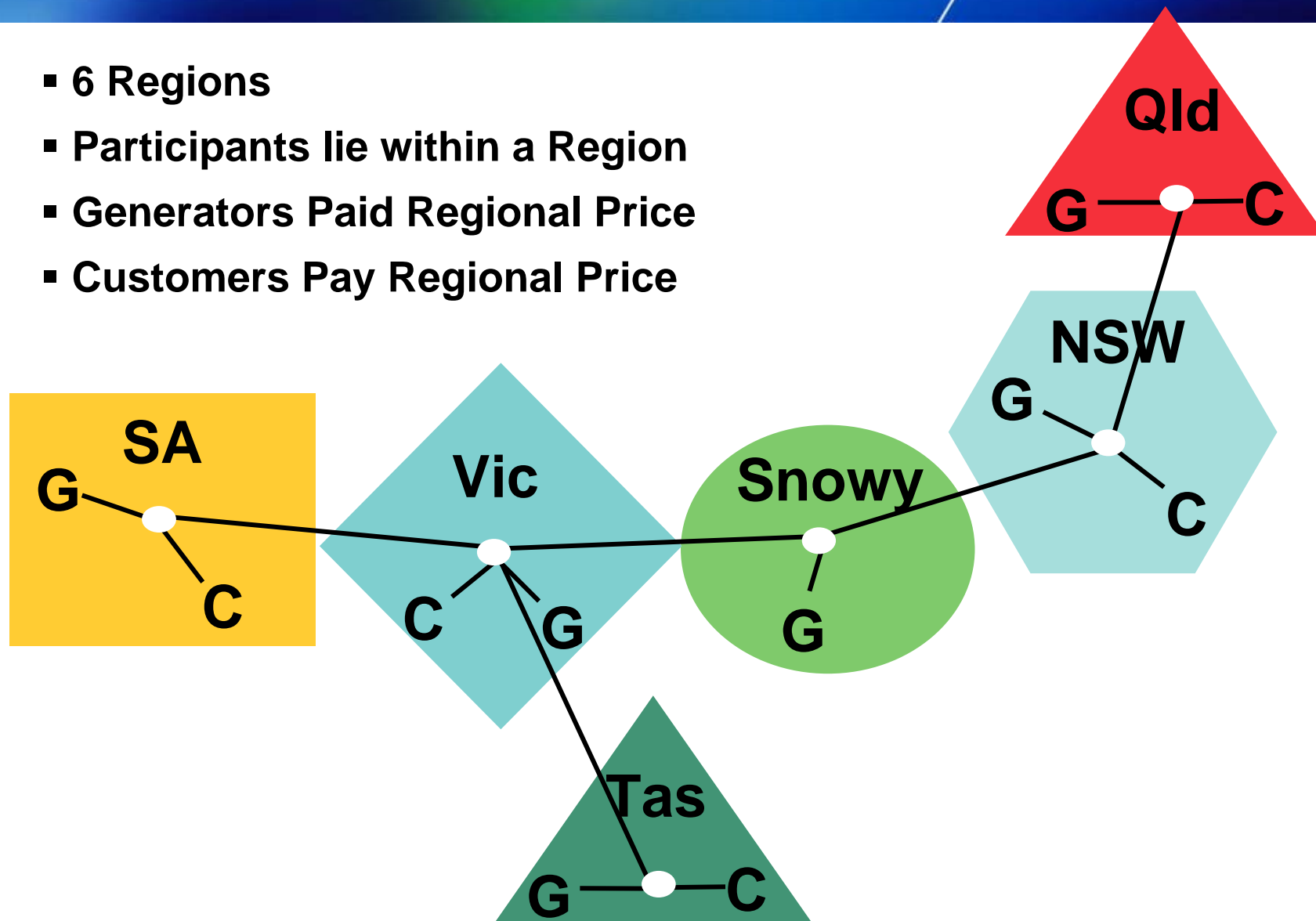
- Maximum Demand 33000 MW

- Largest unit ~700 MW

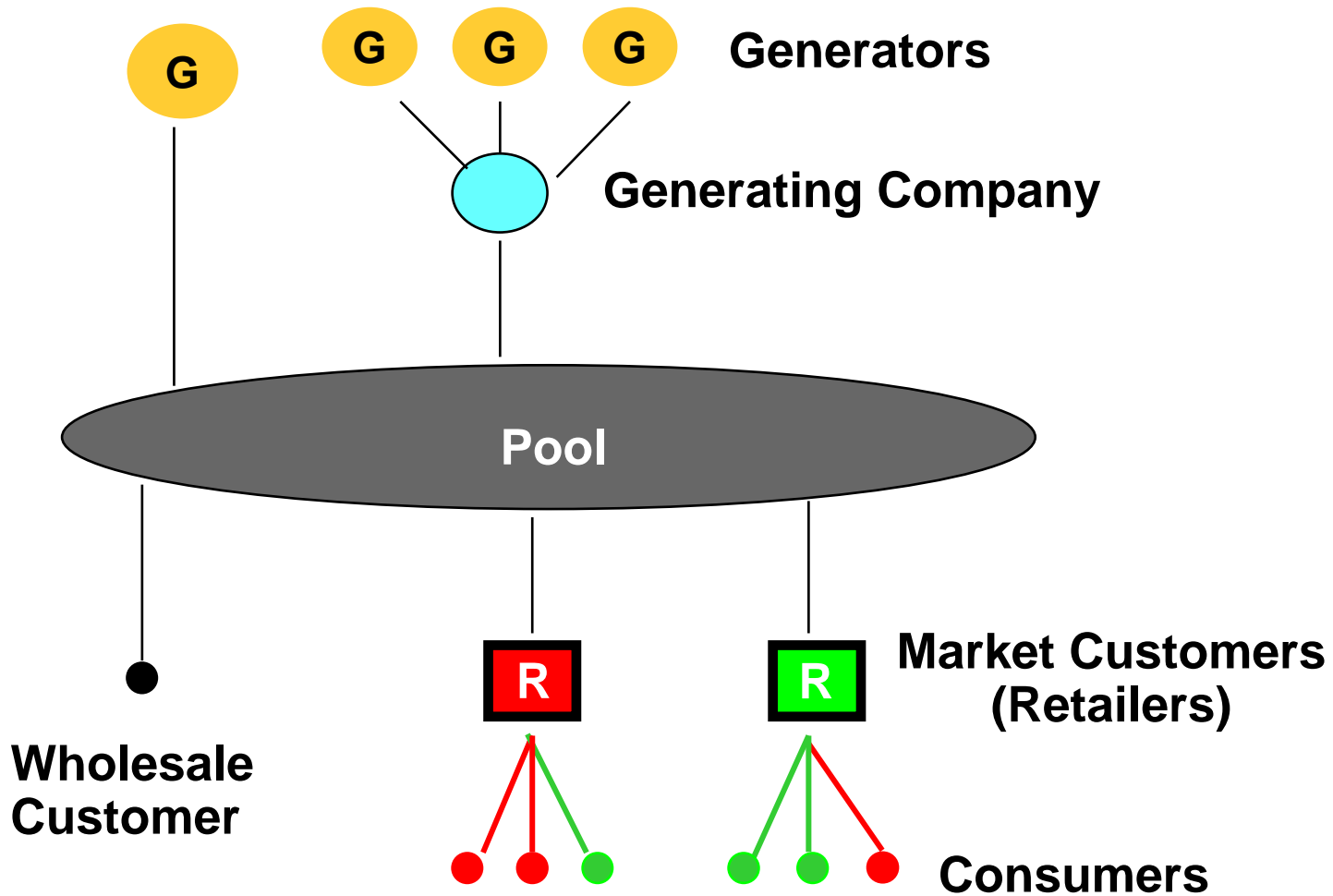
# Market structure - regions

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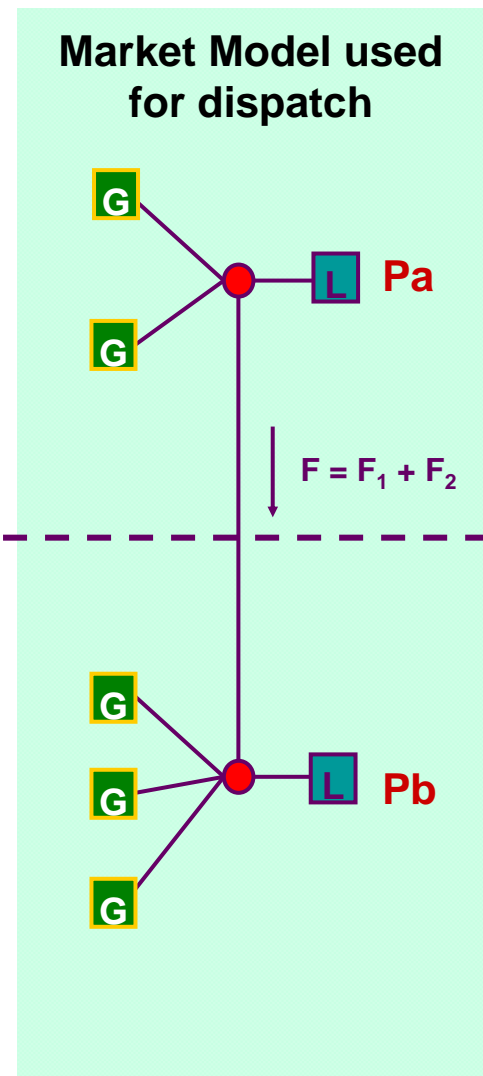
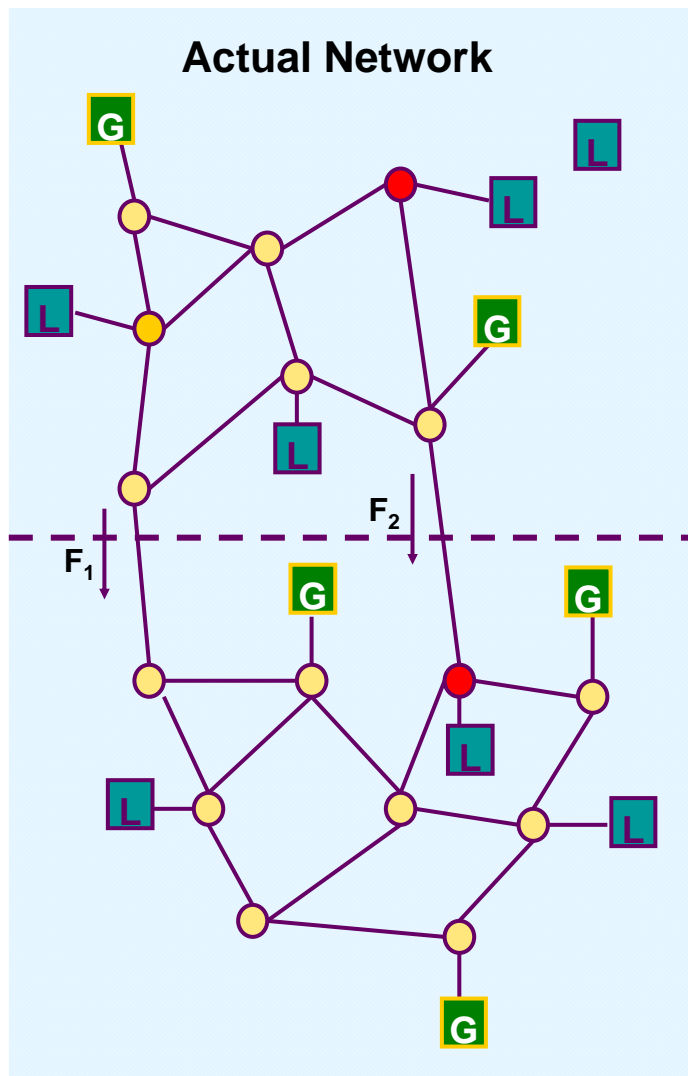
- 6 Regions
- Participants lie within a Region
- Generators Paid Regional Price
- Customers Pay Regional Price



# Wholesale market structure



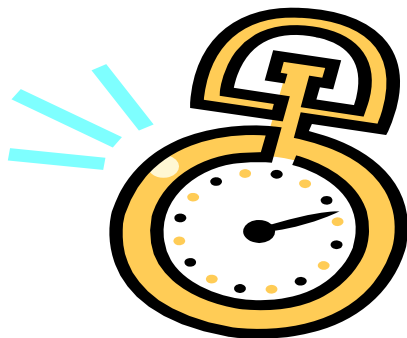
# Market model



- Regional Reference Nodes
- Transmission Network Connection Points
- G Generator
- L Load
- Px Price

## Dispatch Price

= Price calculated  
in the Dispatch  
Process  
(5 minutes)



## Spot Price

= Average of  
Dispatch Prices  
over half hour period  
(30 minutes)

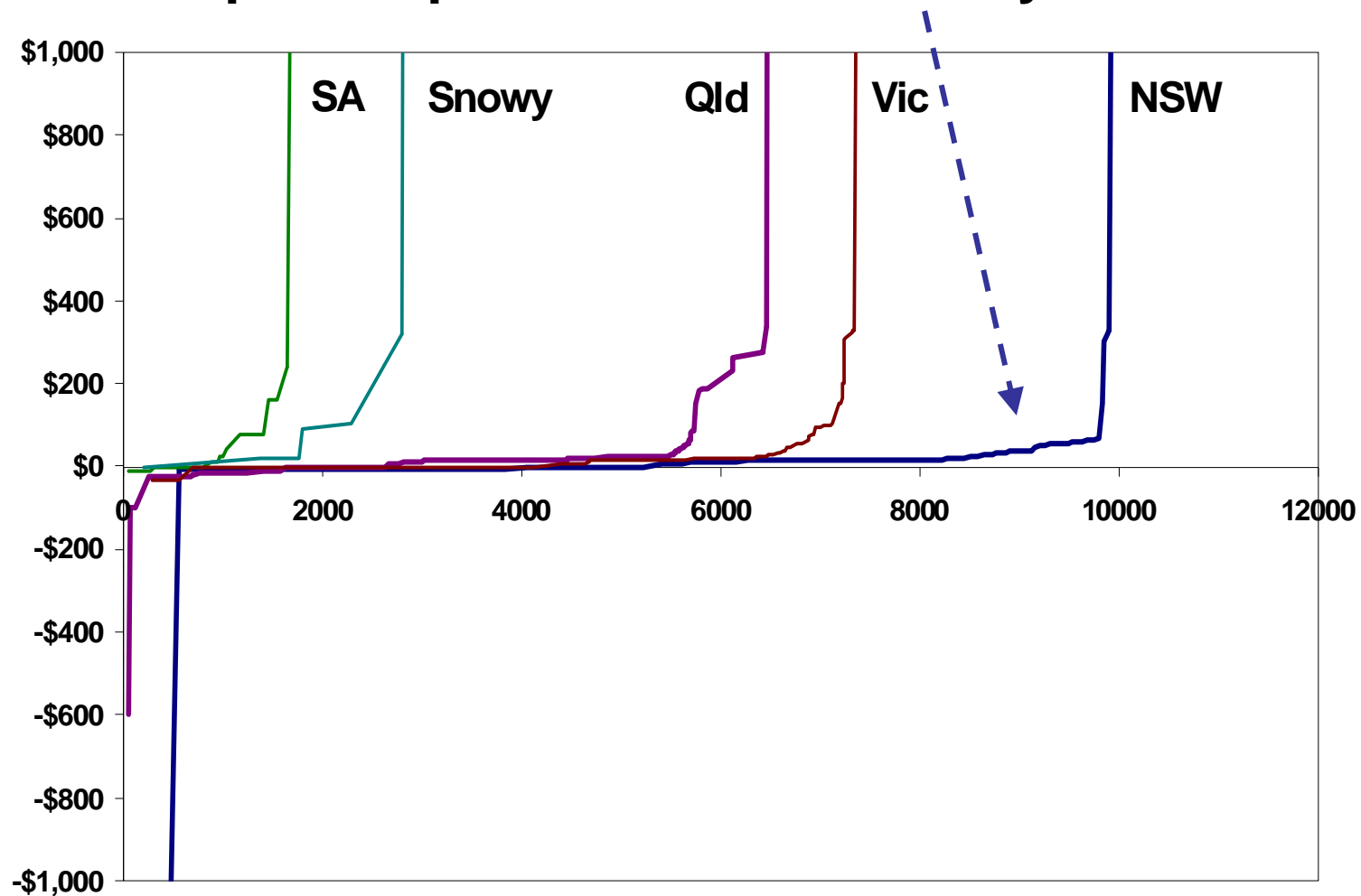


Spot Price is used in  
Settlement Process

# Supply curve

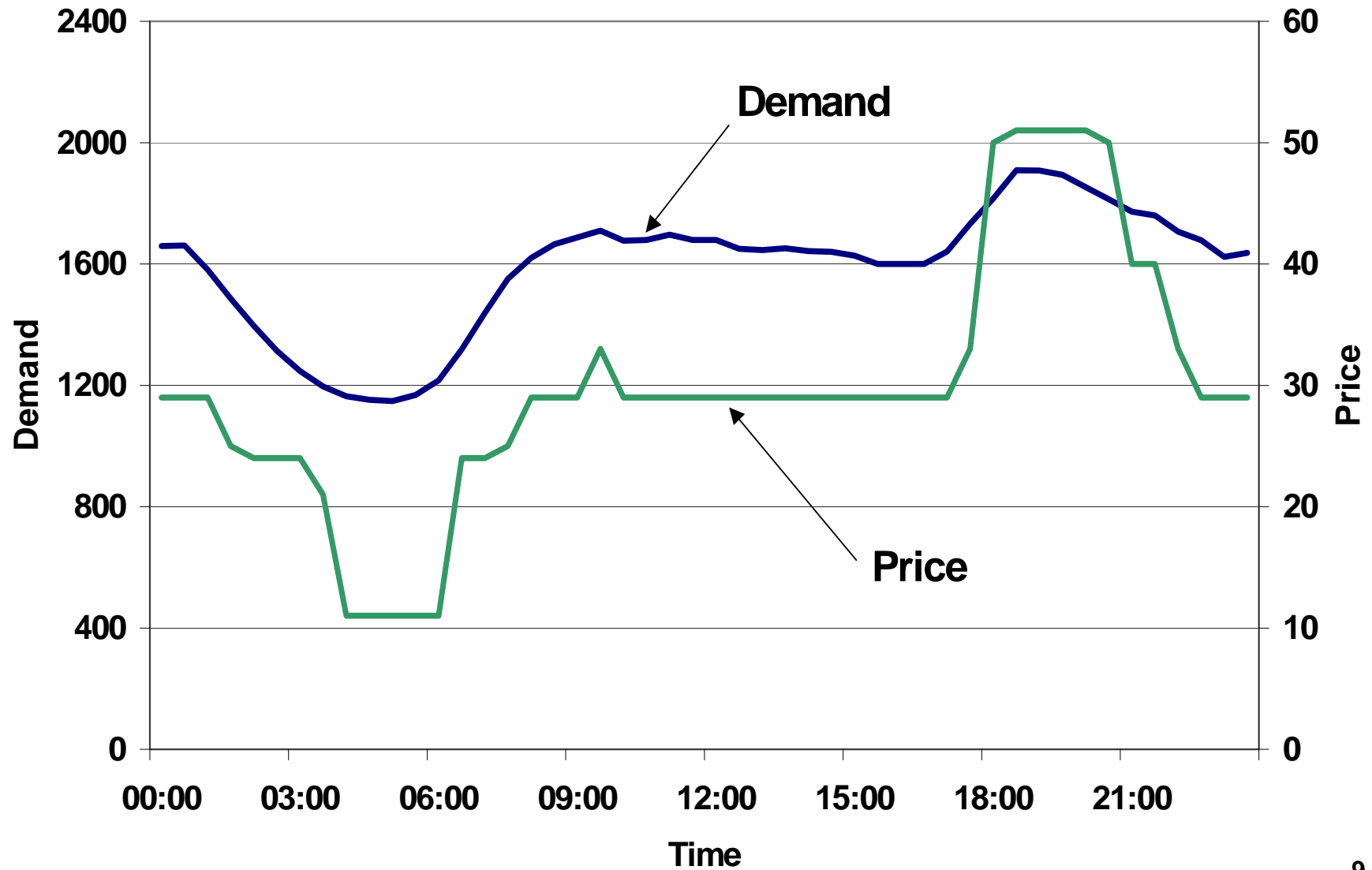
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Sharp knee-point → Price volatility



# Price outcomes

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# Settlement

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## Financial Market

*(hedging contracts)*



Retailers and  
Wholesale Customers

Generators

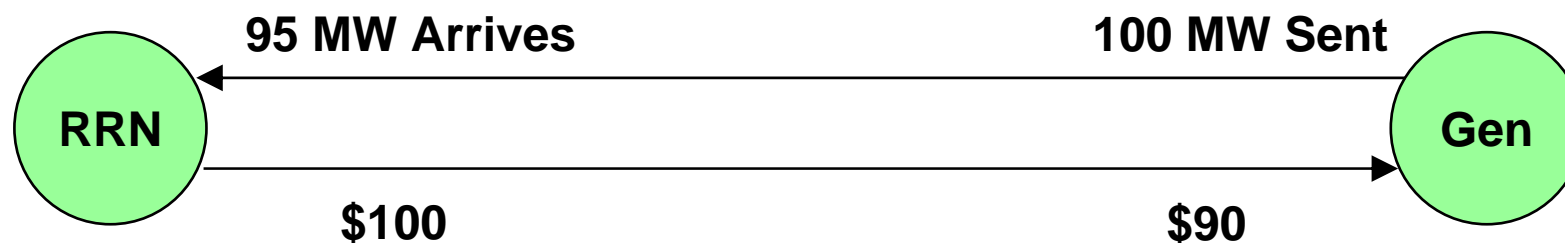
Settlement for  
Energy Consumed

Settlements Account  
(NEMMCO)

Settlement for  
Energy Generated

## Physical Market

- The imperative is to get electricity to the demand centres
- Remote generation has higher losses
- This is managed by price scaling so that everything is referred to the regional reference node
- Scaling:
  - Makes remote generation look more expensive for dispatch
  - Charges more for customers who are remote
  - Pays less to generators who are remote
- Prices reflect the marginal value of losses
- Example with 10% marginal losses (usually about 5% average losses)



- **Identified reserves are in all states**
- **Cooper Basin very large**
- **Other reserves lower grade**
- **Likely impact of the lower grade reserves on existing transmission system is probably going to be small**
- **More of a challenge for the Cooper Basin**

- **All generators greater than 30 MW must register – but can use an Intermediary**
- **All generators less than 5 MW are automatically exempt**
- **Some exemptions for those between 5 MW and 30 MW - energy export or extenuating circumstances**
- **Two (or three) separate considerations**
  - **Market vs Non-market**
  - **Scheduled vs Non-scheduled**
  - **(Ancillary services)**

- **Can nominate a different person to register on your behalf**
- **Often a counter-party to a PPA or other contract**
- **Same registration conditions apply, but owners can be at arms length**
- **Can't really comment on consolidators – what are they? – are they different?**

- **Financial treatment of the generator depends on who you are selling to**
  - **“Local Retailer” – treated as “non-market” and not settled by NEMMCO**
  - **Customer at the same location – also can be treated as non-market**
  - **To someone else – treated as market and settled by NEMMCO**
  - **To the spot market – also treated as market**

- **Less than 30 MW, non-scheduled. You can do what you like, but must meet technical requirements**
- **Greater than 30 MW, scheduled**
  - **Requires you to submit bids and respond to dispatch instructions**
  - **Within a region, losses are adjusted so that everyone can bid the same amount wherever you are**
  - **May be constrained by network limits**
- **Some exemptions allowable**

- **Exemption from being scheduled**
  - **Selling to a local customer with low export**
  - **If your unit is greater than 30 MW, you may be exempted if the physical and technical characteristics of the plant make it impractical for you to participate in central dispatch**
  - **Intermittent (such as wind) – this will soon go**
- **Geothermal may qualify for this but probably not.**

- **New generators must establish connection agreements with a Network Service Provider**
- **NEMMCO involved on power system security matters**
- **Performance standards cover**
  - **Reactive capability & voltage control**
  - **Response to disturbances – voltage, frequency, faults**
  - **Quality of electricity generated**
  - **Protection systems**
  - **Frequency and power control**
  - **Monitoring and communications**
- **Detailed electrical models must be provided to NEMMCO**

- **The Annual National Transmission Plan has the capability of including geothermal plant**
  - **If a plant is “committed” then it is in**
  - **Otherwise, the ANTS uses an economic-based generation construction model**
  - **Needs estimates of capital and operating costs to be modelled. Commitment is based on spot price outcomes in the 10-year simulations**
  - **Transmission costs also factored in (through NSPs)**
- **Consultation on this starting soon**

- **For the Cooper Basin geothermal generation to be included:**
  - a project is “committed” and connection would be modelled based on advice from the TNSP; or
  - cost information plus connection augmentation costs from the TNSP.
- **The ANTS commits economically viable generation using this information – carbon tax scenario is also studied**
- **Generation costs are published in a report coming out of a consultation**
- **In 2007, geothermal generation was not represented**
- **Consultation on the generation cost data for 2008 will start soon.**

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# Discussion