Supply Demand Balance in SA

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Presentation Outline

- Role of the Planning Council
  - Important issues for the NEM
  - Structural reviews
- Some NEM Information for generators
- Demand Situation
- Supply Situation
  - Existing capacity
  - New projects
  - Prospective projects
  - Interconnectors
- Supply / Demand balance
- Geothermal Penetration
- Questions

Role of the Planning Council

- Established to provide a source of independent analysis and advice to the Government and the SAIIR
- Created under the Electricity Act 1996 as an independent corporation with its own Board of Directors
- Reporting to the Minister for Energy
- four primary functions:
  - Monitor supply/demand balance
  - Identify areas of network deficiency and investigate appropriate solutions
  - Encourage new investment by highlighting opportunities in the market
  - Represent South Australia's interests in the development of the national market
- Separately tasked by the government to be the Responsible Officer for the State

Generating in the NEM

- All generators offer their capacity into the pool
- All retailers buy from the pool
- Customers buy from retailers
- Generators and retailers also build hedge contracts to secure their revenue and risk

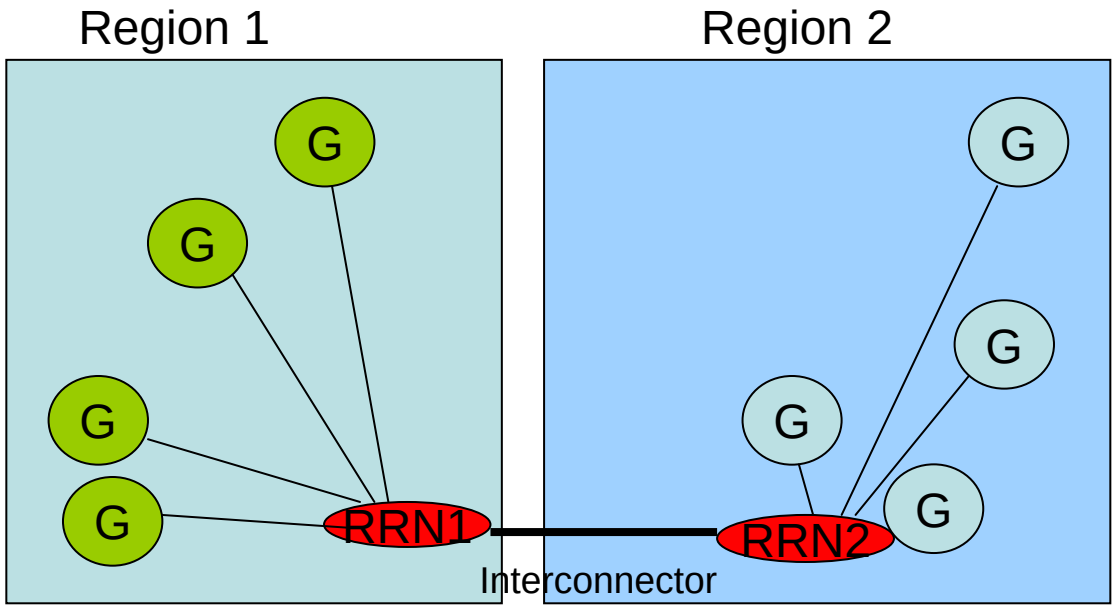
The Retail Market and prices are not the same as the Pool

Generator Dispatch

- All scheduled generators lodge offers with NEMMCO
  - 10 Price bands fixed for the trading day
  - 10 quantities
    - Quantities can vary at any time
- Offers are accepted on lowest price basis
  - Ie cheapest MW to satisfy demand
  - Highest price offer dispatched to satisfy demand sets price
- Dispatch targets are issued every 5 minutes
- Settlement is ½ hourly (average of 6 x 5 minute intervals)

Market Structure

All generators dispatched are paid the RRN price x MLF



- Interchange governed by RRN1 and RRN2 prices
- This means that the last one on sets the price for all generators
- No-one gets automatic base load dispatch

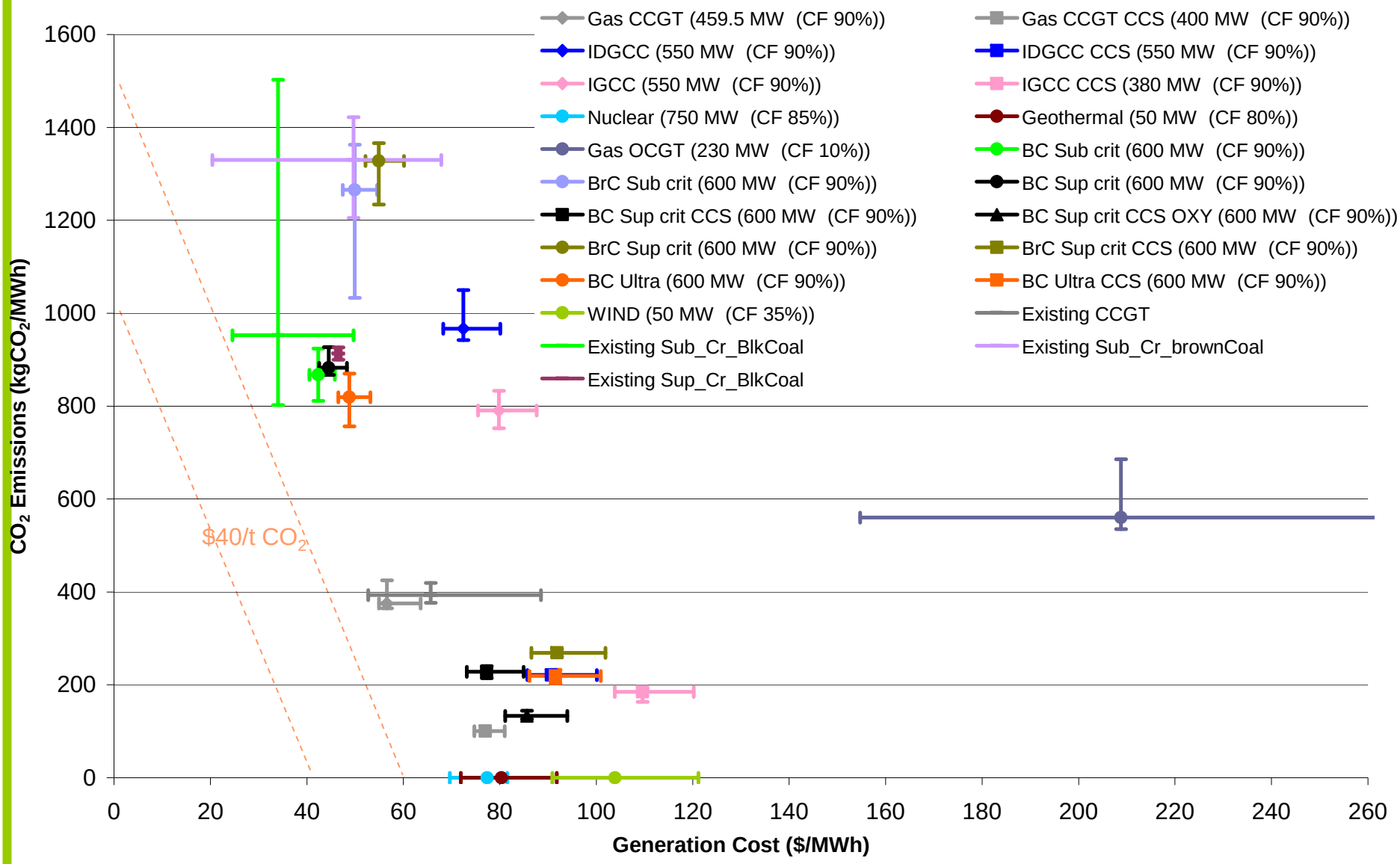
Generator Dispatch

- Imports and exports are also decided on price
  - Lowest price between
    - MW from interstate RRN to SA RRN including marginal losses
    - OR
    - Local MW offer
- Generators are paid for energy received at the Local Regional Reference Node
  - Adelaide RRN is Torrens Island

Generator Offer Structure

- Offers can be a simple or complex as needed BUT
- Understanding another generators offer is not simple!
  - Hedge and risk positions will affect offers
    - Typical structure
    - Some MW @ very low or –ve $/MWh – up to min load
    - Some MW at SRMC values – up to contracted position
    - Rest at blue sky values

Emissions by Technology



Important Factors for Generators

- Marginal Loss Factors – MLF's
  - Regional reference node for SA is at TIPS
  - All generators and loads have a MLF
  - Fixed annually – represents losses between point of generation/load and RRN
  - Acts as a price signal for an area
    - Generation < load in an area MLF > 1
    - Generation = load in an area MLF = 1
    - Generation > load in area MLF < 1

MLF examples

- MLF's
  - to represent the losses expected in delivering energy from generator through the transmission network to the RRN.
    - Wattle point wind farm = 0.8748
    - Cathedral Rocks Wind farm = 0.9896
  - Far North generation
    - if the total generation :

      < OD load : MLF >1

      ~ same as OD load : MLF ~ 1

      > OD load : MLF < 1

      >> OD load : MLF << 1
  - This will affect the not only the pool earnings but also subsidies like MRET payments

Historical Prices from SA

Year	Volume Weighted Price[1]		Maximum Settlement Period Price	Minimum Settlement Period Price
	Full Year ($/MWh)	Summer ($/MWh)	($/MWh)	($/MWh)
1999–2000	68.97	85.25	5,000.00	2.51
2000–01	66.54	111.2	4,754.83	1.82
2001–02	33.5	27.95	4,453.65	3.6
2002–03	29.87	34.43	3,869.91	-246.57
2003–04	39.29	61.23	8,166.67	-822.45
2004–05	39.25	32.62	8,999.98	7.5
2005-06	43.91	67.5	7,758.08	1.49
2006-07[2]	53.79	67.21	7,813.10	-476.86

Summer and Financial Year Prices

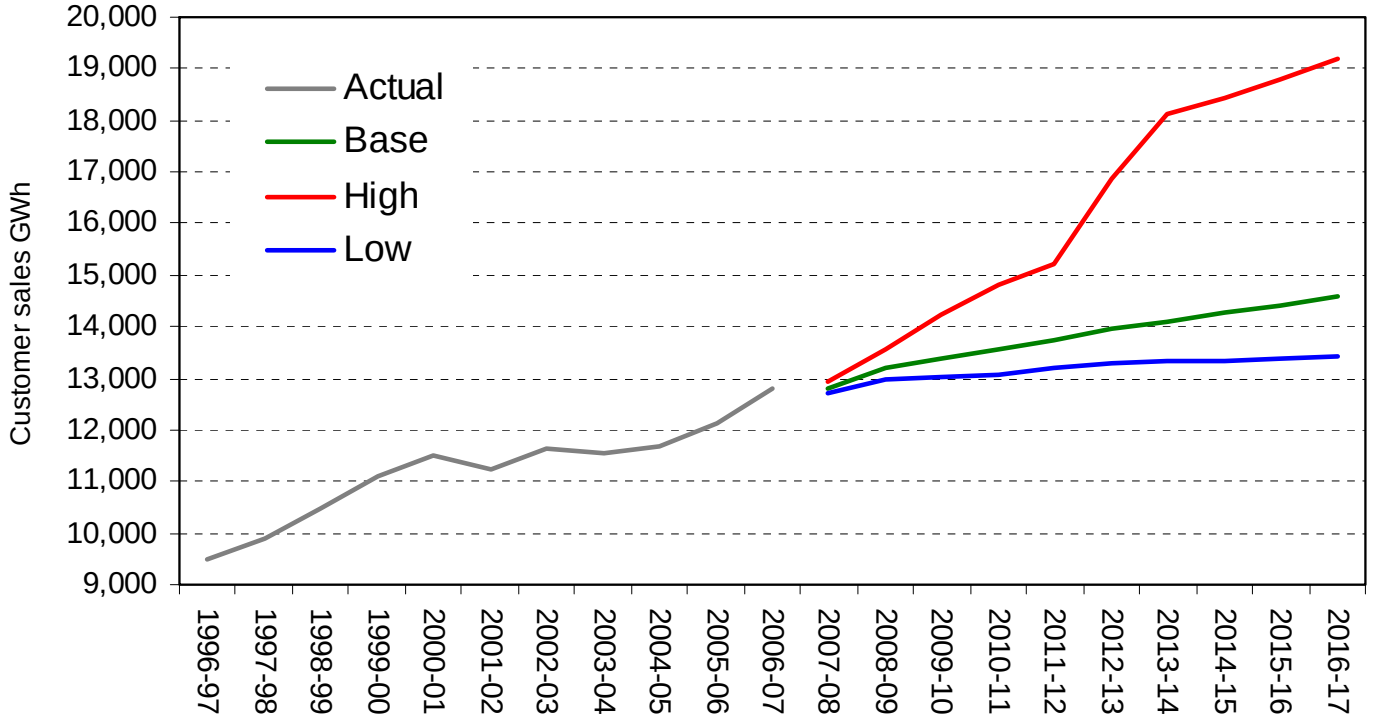
Real financial year and summer volume weighted prices ($2007/MWh)

Energy and Demand Forecasts

Sales and Demand Forecasts

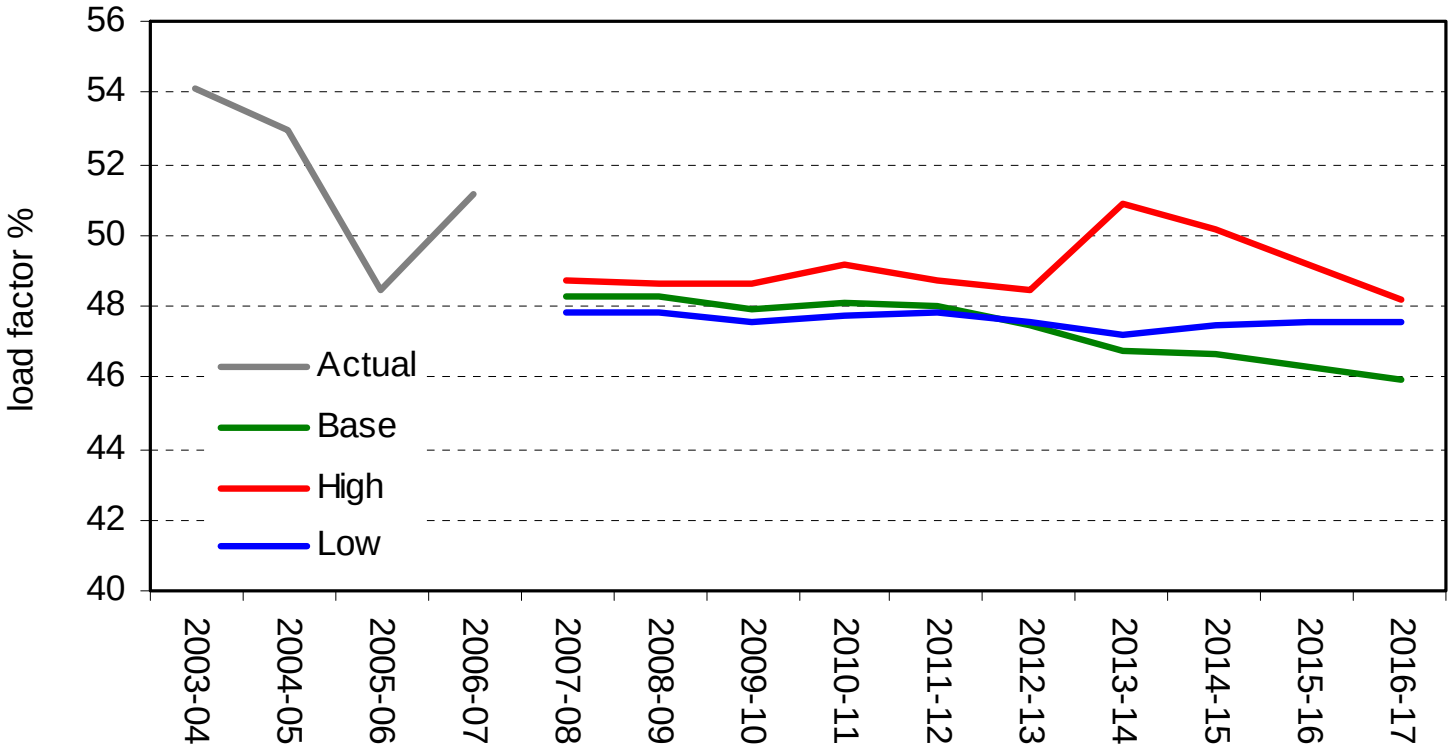
- Sales and Demand forecasts
- Economic assumptions
- New forecasting methodology for summer peaks

Customer Sales



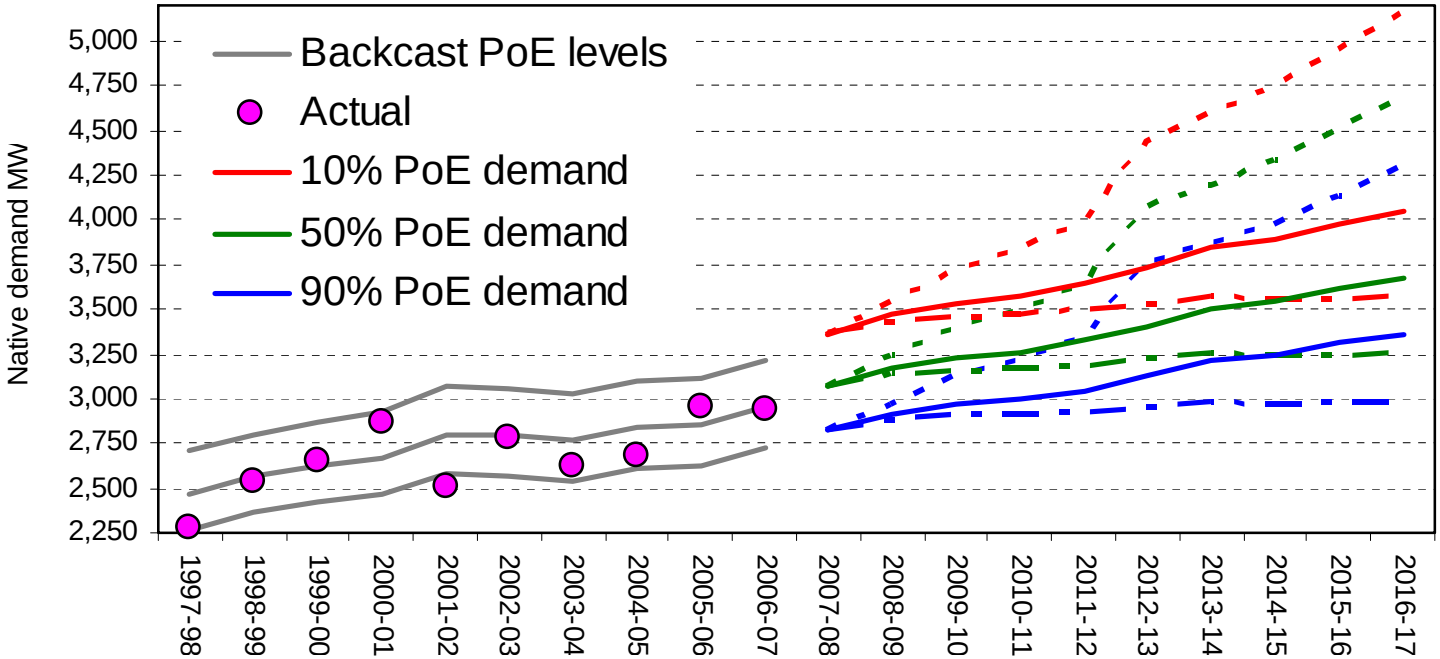
- 5.3% growth in 06-07 and 9.1% over past two years
  - price response weakening; drought & pumping loads; weather effects on sales
- Lower growth expected in 07-08 – assumes return to average weather
- Average growth of 1.3% over next decade (base case economic outlook)
  - 0.9% for residential sector; 1.8% for business sales
  - forecasts assume carbon price signal from 12-13
  - High case includes major expansion of Olympic Dam mining operation

Scheduled Generation Load Factor



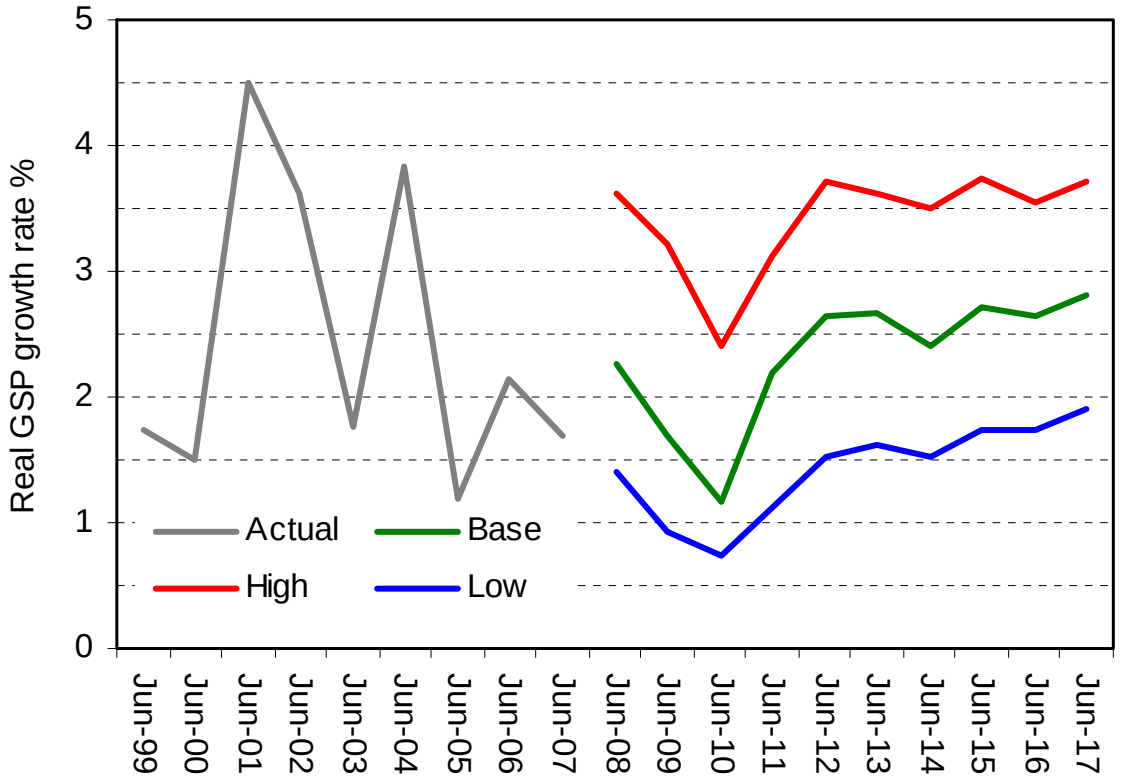
- Based on 50% PoE summer peaks; includes scheduled wind generation
- Projected to remain stable at around 48% until 12-13
- Significant improvement if Olympic Dam expansion proceeds

Summer Peak Demand



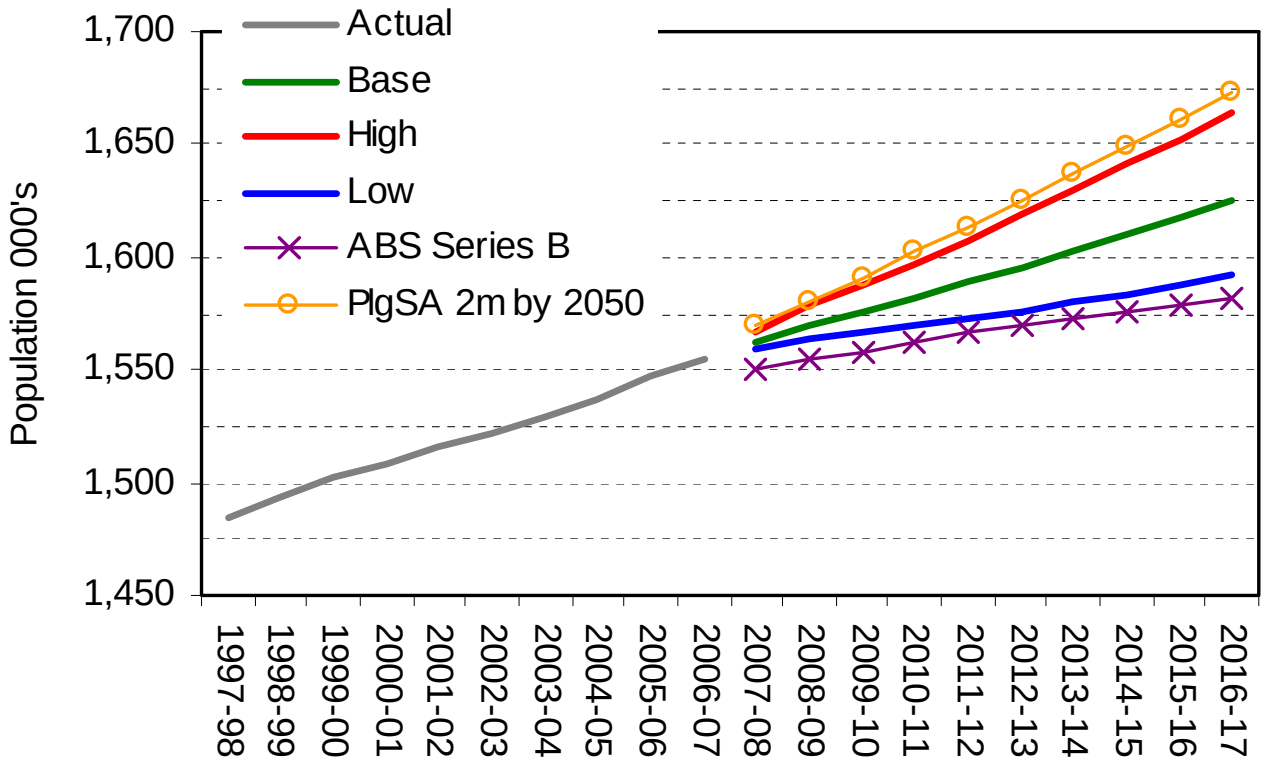
- Focus on Native Demand (scheduled, market non-scheduled, wind & DSP)
- Actual 06-07 peak of 2,942 MW on 16 Jan 07 (52% PoE outcome)
  - higher peak reached in 05-06 (2,953 MW, 20 Jan 06; 30% PoE outcome)
  - record non-work day peak of 2,866 MW on 17 Feb 07
- Forecast 50% PoE level for 07-08 = 3,069 MW
  - up by 119 MW on 06-07 level, ave. growth of 2.2% over next 10 yrs (base case)
- Forecast 10% PoE level for 07-08 = 3,363 MW
  - up by 143 MW on 06-07 level, ave. growth of 2.3% over next ten yrs (base case)
- Stronger growth in high case (4.9% pa; Olympic expansion & eco assumptions)

Economic Assumptions - GSP



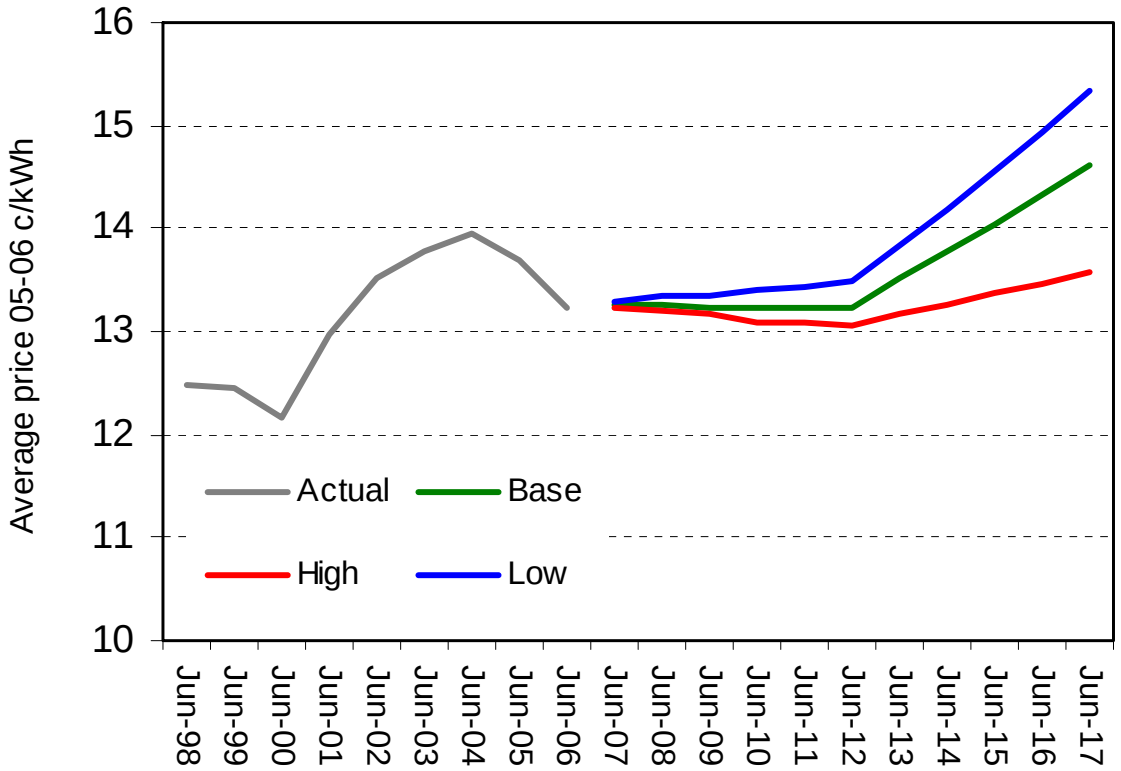
- Base case assumes robust growth of 2.3% in 07-08 (up from 1.7% in 06-07)
- Slower growth in 08-09 & 09-10 assumes ongoing oil price spikes and slower consumption spending/ reduction in household debt levels
- Medium term outlook assumes strong commodity prices & mining activity

Economic Assumptions - Population



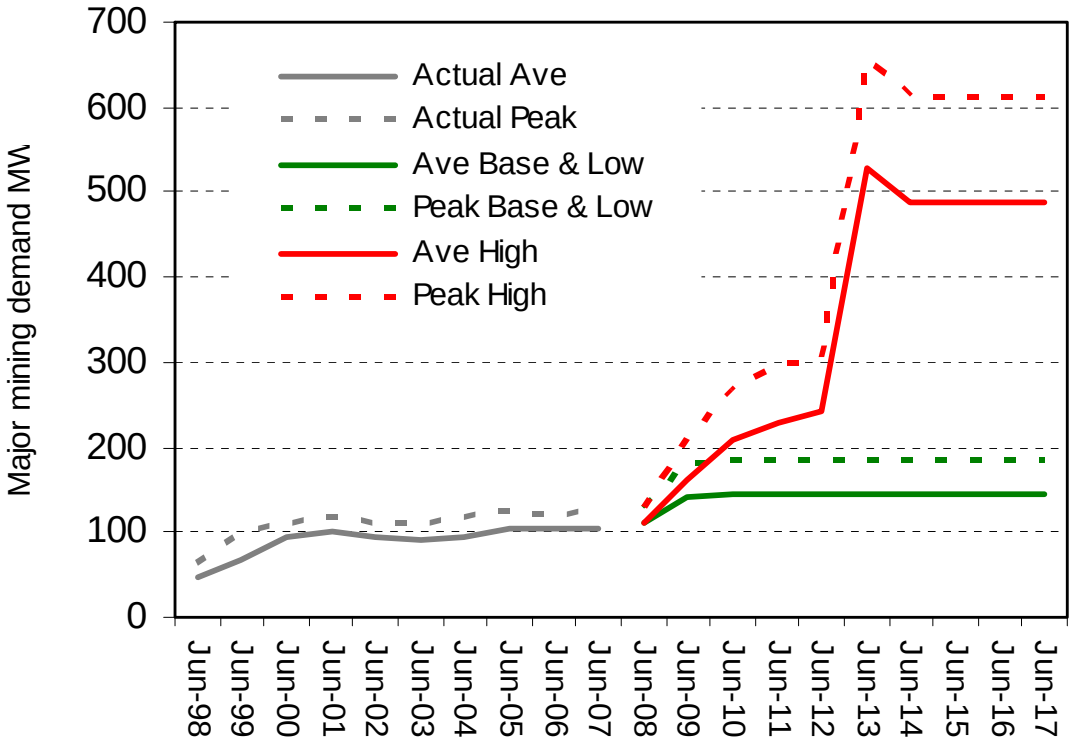
- Base case assumes average population growth around 0.5% annually
- High case near to SA Government population target of 2m by 2050
- Low case near to current ABS series B projections for SA

Retail Price Assumptions



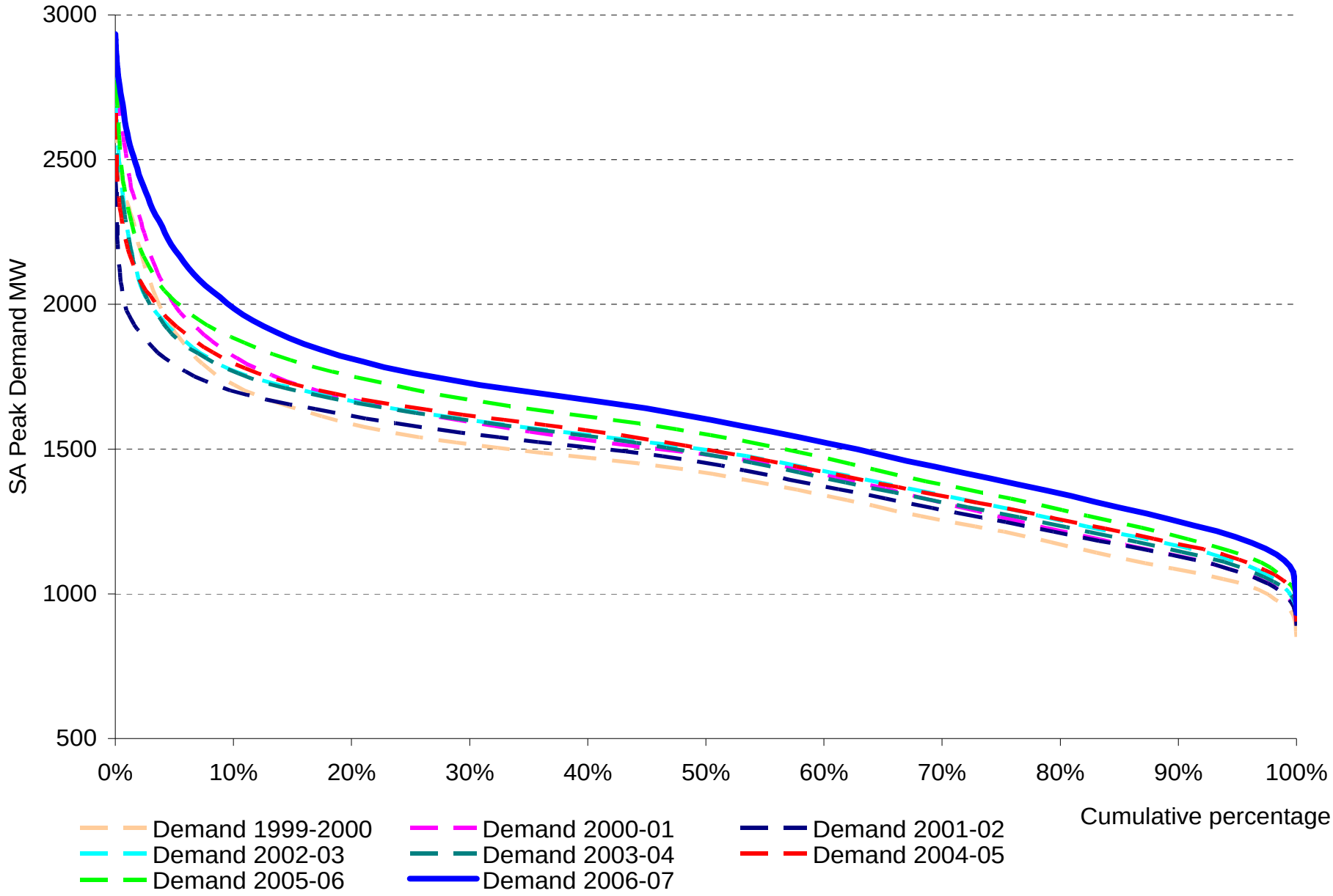
- Base case - $15/t carbon price signal phased over 5 years from 12-13
- High case - lower carbon price signal of $5/t
- Low case - higher carbon price signal of $20/t

Major Mining Loads



- Based on BHP-Billiton advice (includes Oxiana's Prominent Hill mine)
- Base & low case assumptions are the same
  - Prominent Hill operating from 2008 and some expansion at Roxby Downs
  - around 60MW rise in peak demand and additional 360 GWh energy required
- High case assumes major expansion of operations at Olympic Dam
  - incremental increase of around 450MW in peak and 3,000 GWh energy

Load Duration Curve



Supply Summary

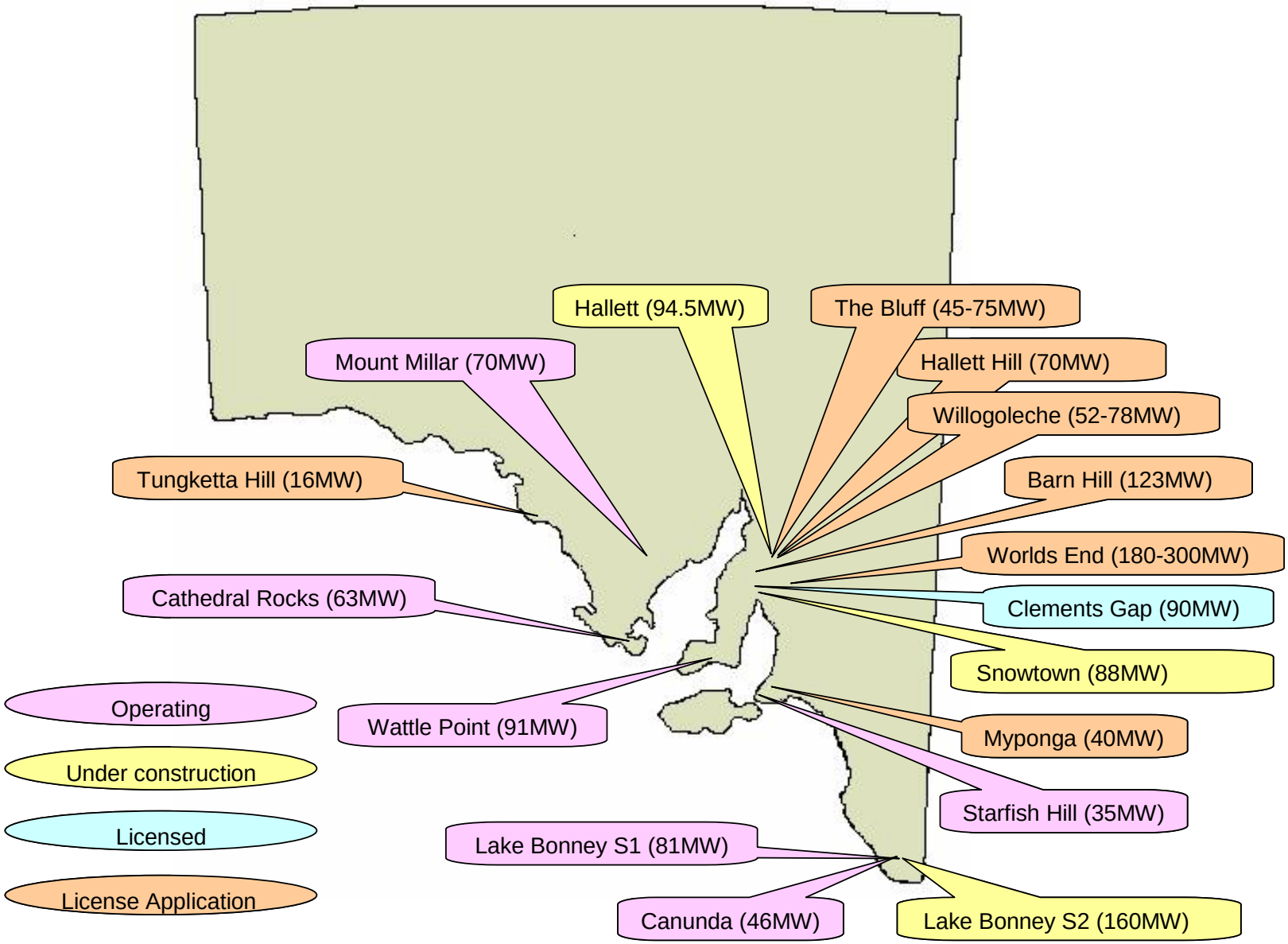
Generation in SA

- Current name-plate capacity
  - Scheduled 3,515MW
  - Non-scheduled 387MW wind
- 3,264*MW summer ratings
  (10%PoE day avg temp 34.8°C)
- 3,530MW winter ratings
- Generation changes since 2005-06:
  - Mt Millar completed but not released for full output
- “committed” scheduled generation:
  - Origin Energy 120MW OCGT at Quarantine
  - 345MW Scheduled wind
    - Babcock and Brown 160MW Lake Bonney S2,
    - TrustPower 88-100MW Snowtown
    - AGL 95MW Hallett
    - AGL 88MW Hallett

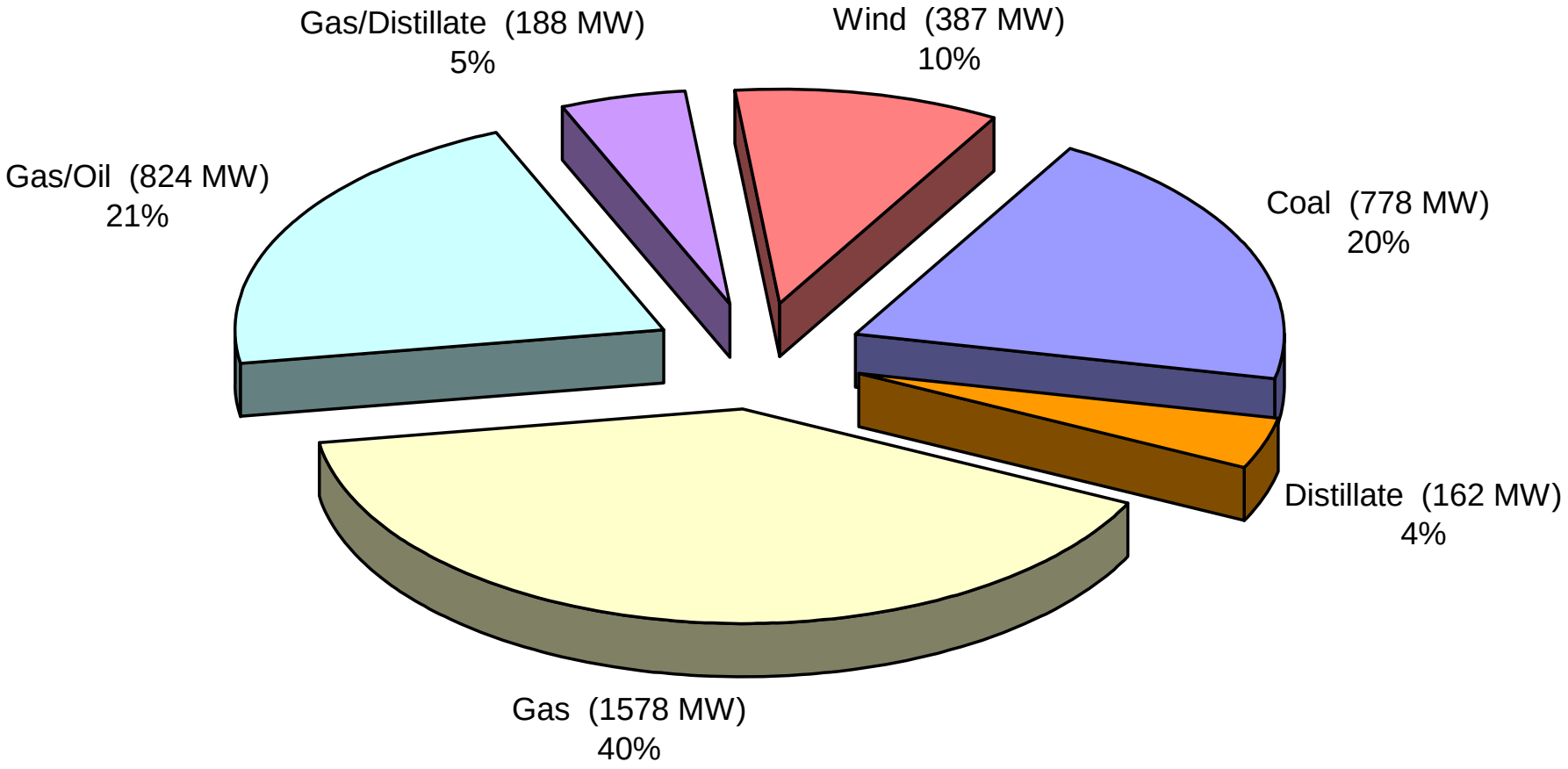
Scheduled Generation Projects: Future Options

- AGL
  - OCGT Expansion of Hallett to 400MW
- Quarantine (Origin)
  - 75MW conversion to combined cycle
- International Power
  - 240MW CCGT expansion at Pelican Point
- ATCO
  - 180MW stage 1 development adjacent the existing Osborne station
  - Potentially up to 450MW
- Babcock and Brown
  - 30MW Biomass plant in the South East
- Snowy Hydro
  - Investigating locations and opportunities
- More wind farms
  - Driven by VRET, NRET and potential changes to Federal Emissions regimes,
  - Planning Council anticipates reaching 1500MW of wind by 2015

Wind Project Summary



SA Capacity by Fuel Type

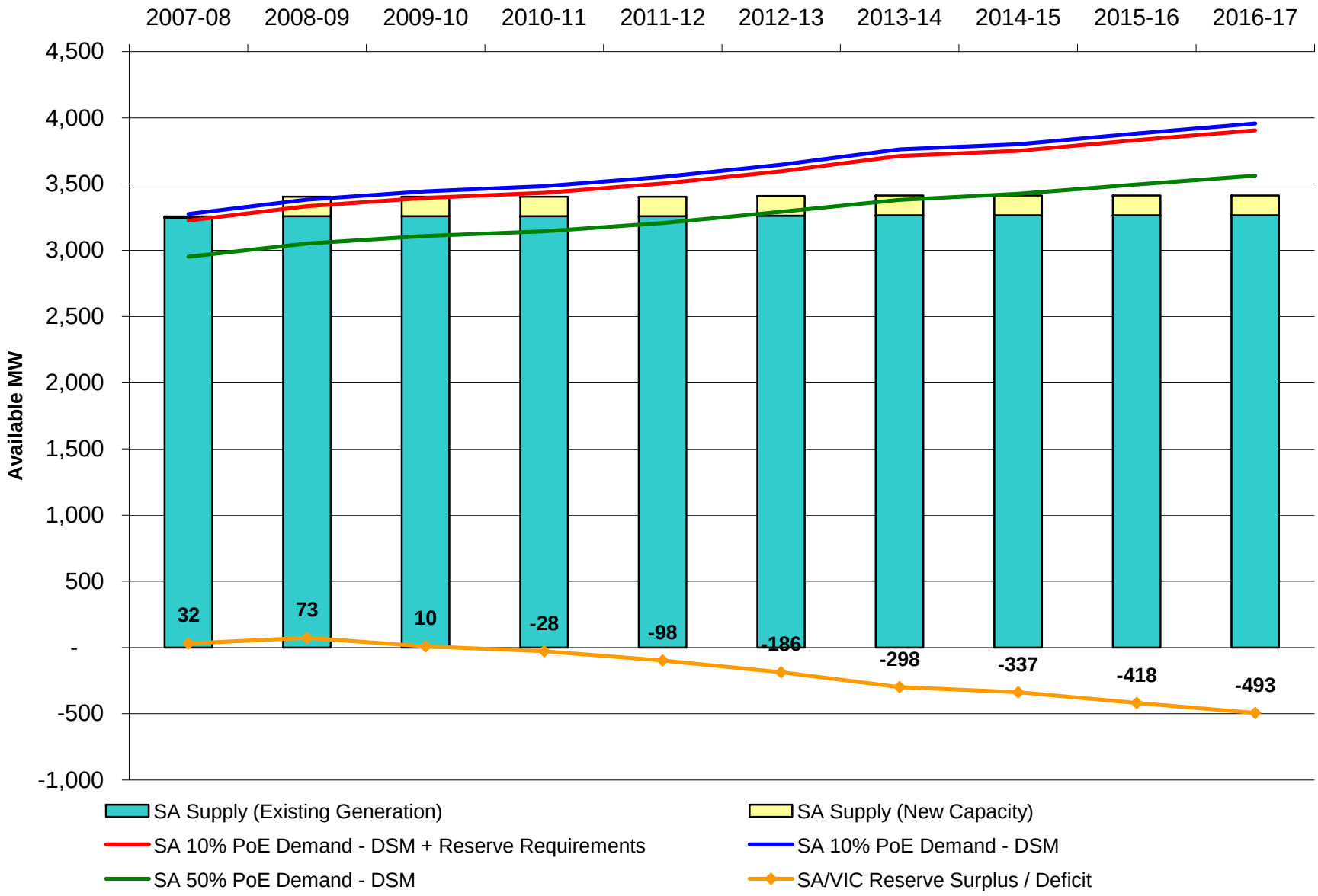


Supply – Demand Balance

Supply-Demand Balance: SA Assumptions

- All generators in service to declared summer capacity
- New quarantine station in operation by summer 2008-09
- Scheduled Wind Farms contribute
  - 10MW at peak demand 2007-08;
  - 28MW at peak demand from 2008-09; and
  - Other wind farms deducted from demand
- Capacity from interconnectors not included, implied in Reserve Margin

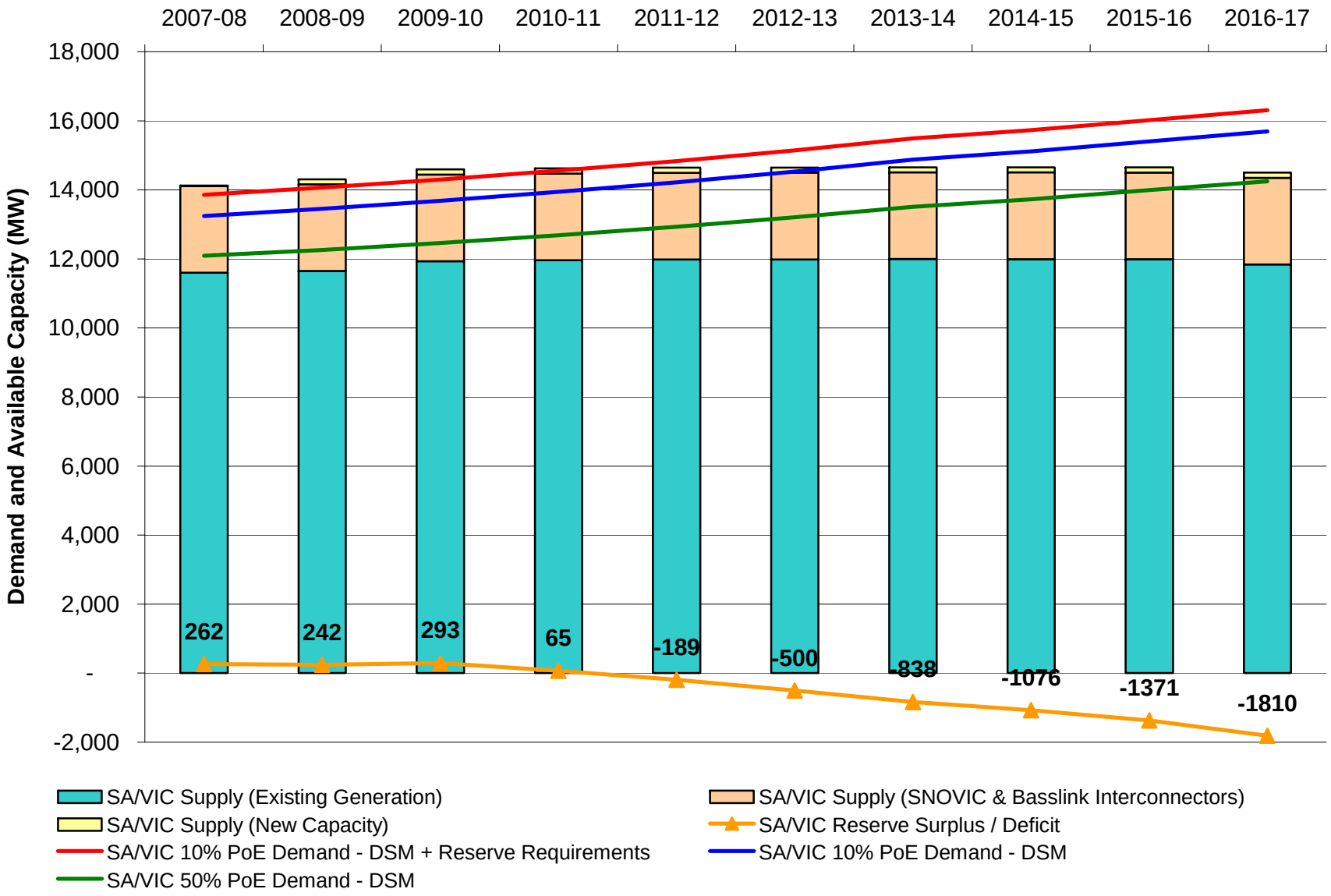
SA Supply-Demand Balance



Supply-Demand Balance: SA- VIC Assumptions

- All generators in service to declared summer capacity
- No demand diversity, peak in SA at the same time as VIC
- Full capacity of interconnectors
  - SNOVIC 1900MW; and
  - Basslink 610MW
- Murraylink and Heywood operate within their limits

SA-VIC Supply-Demand Balance



Scope for Geothermal Penetration

- SA becomes a net exporter of power ~400MW from SA to rest of NEM
- Load Growth ~ 70-90MW/year
- Potential expansion of mining loads ~ 500MW
- In 10 years then ~1600-1800MW
- Assumes no other new entrants in that time, either Conventional or Renewable Very unlikely

Scope for Geothermal Penetration

- More likely
  - Exploit export capability ~400MW to access load growth in SA and Eastern States
  - Match development in mines in the State, particularly major increases ~200MW
  - Examine opportunities for enhancing export or directly connecting to NSW grid
  - Probably 600MW + some portion of IC upgrades

Questions