# *Review of Investment Signals in the NEM and the implication for the Reliability Standards*

# *Review Impetus*

Reliability Panel review is timely coming as it does at a time where

- Reserve Margins in SA and Vic have been lower than the target
- NEMMCO ANTS analysis shows less investment than is required to maintain reserve margins
- Growing concerns regarding the reliability settings
- Completion of analytical review

# Examination Focus

- What level of investment will the current market settings deliver over the next 10 years?
- Will that investment deliver sufficient capacity to meet the reserve margins into the future?
- If not, what market settings should be changed to improve the outcome?

# *Study Approach*

- While focused on SA-VIC, analysis covers all of NEM
- Determined new entry costs in each region
  (based on full “merchant plant” investment criteria)
- Simulated future spot market prices
- Given that investment and market behaviour is influenced by risk instruments, modelling incorporates both market and contract revenue
- Results consider commercial viability and new investment levels compared to load growth and reserve margins

# Planning Council Model

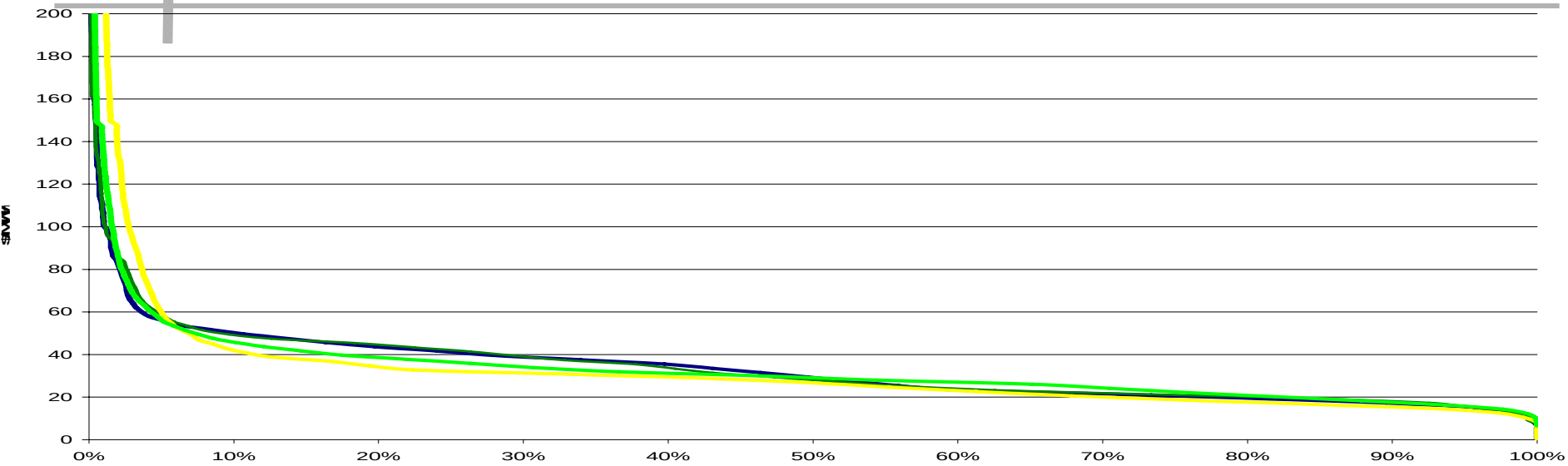
- PLEXOS
  - Chronological Linear Program model
    - 1 hourly basis
  - Comprehensive representation of:
    - Generator performance and operating costs
    - Forced and maintenance outages
    - Transmission constraints
    - Fuel costs
    - Hydro inputs limitations
    - Fixed bids only for generators with fixed operational patterns
  - Convergent Monte Carlo simulation

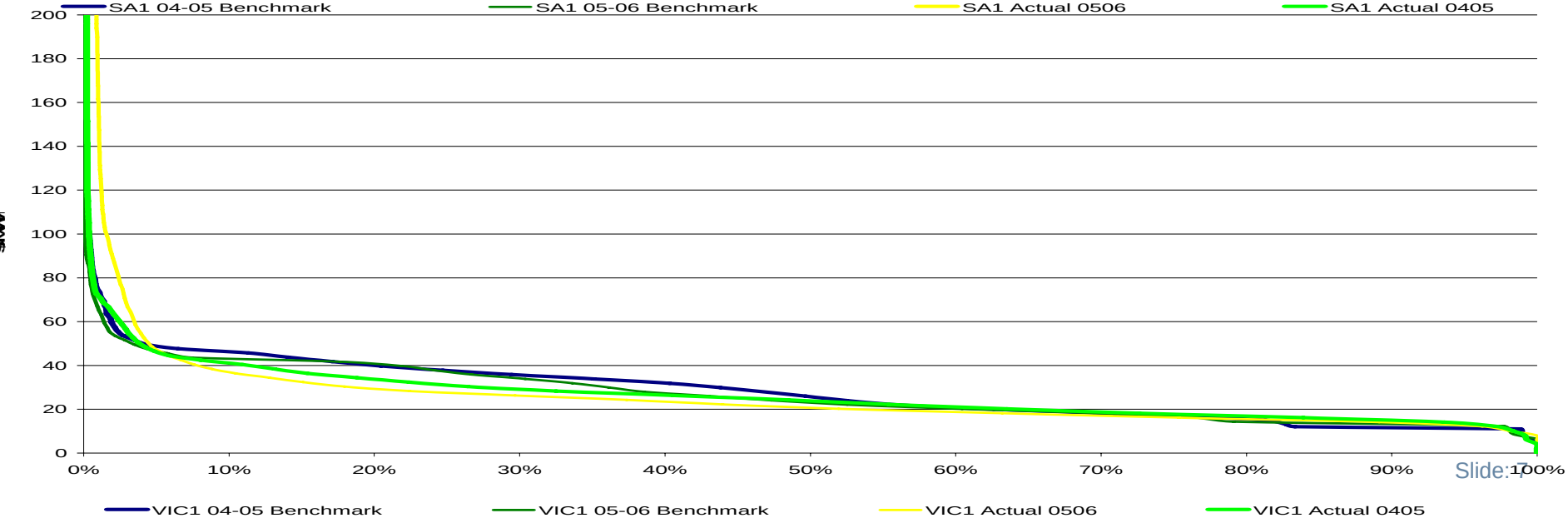
# *Verifying the Model*

- Prices
  - Average price
  - Price duration curves
- Interconnector flows
  - Total flows
  - Flow duration curves
- Generator dispatch
  - General behaviour
    - Service hours / number of starts
    - Capacity factor

# Model Verification

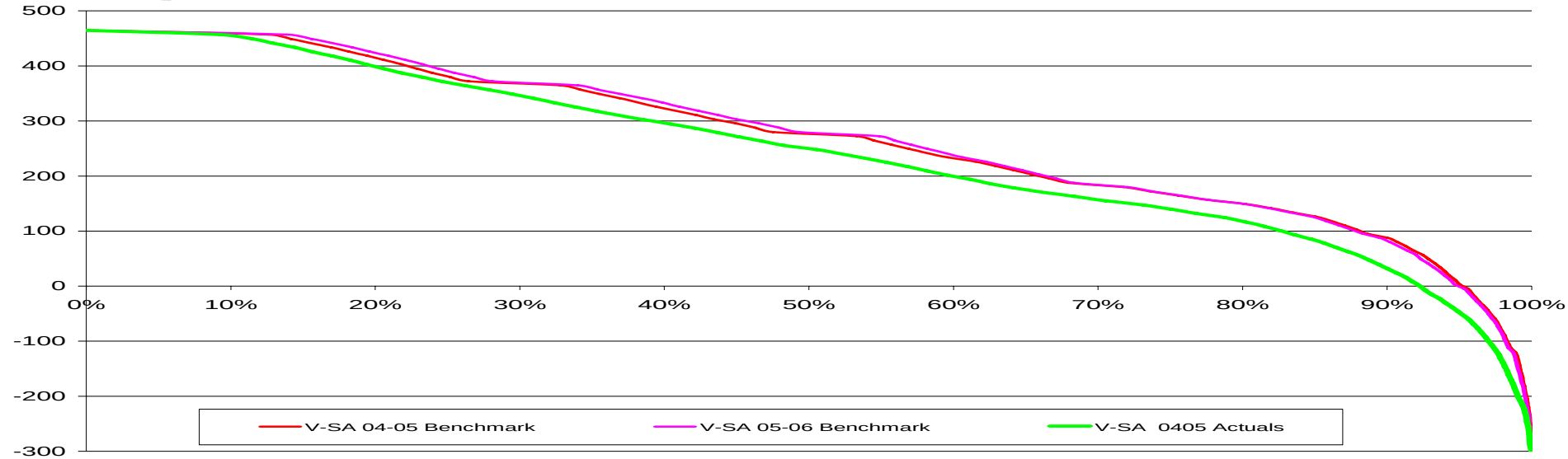
*(SA-VIC price duration curves)*

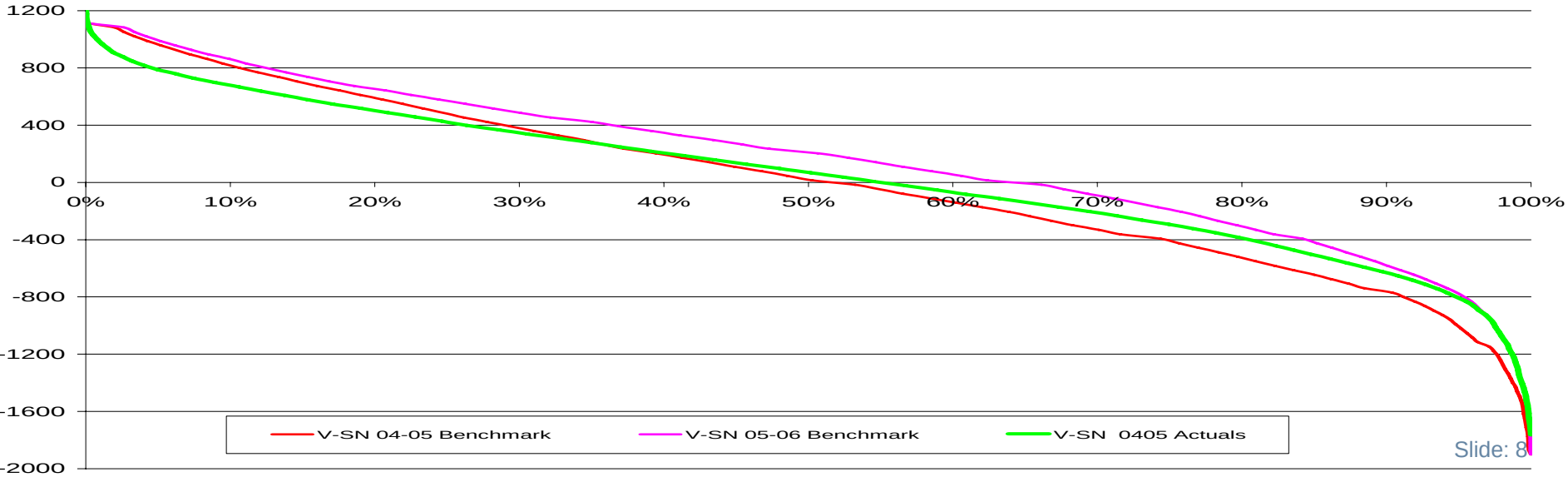


# Model Verification

*(Heywood and SNOVIC flow duration curves)*

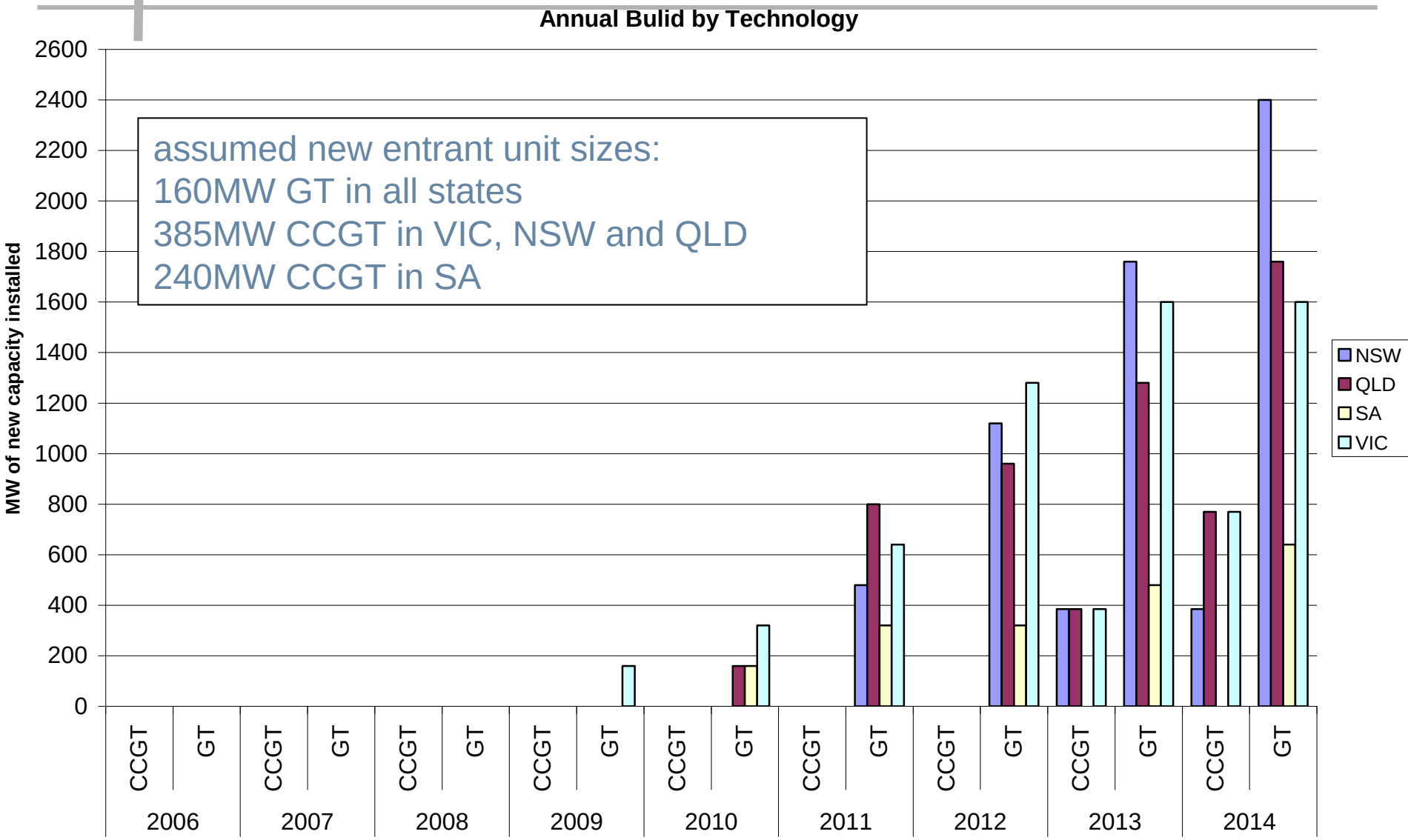


# *Investment Modelling*

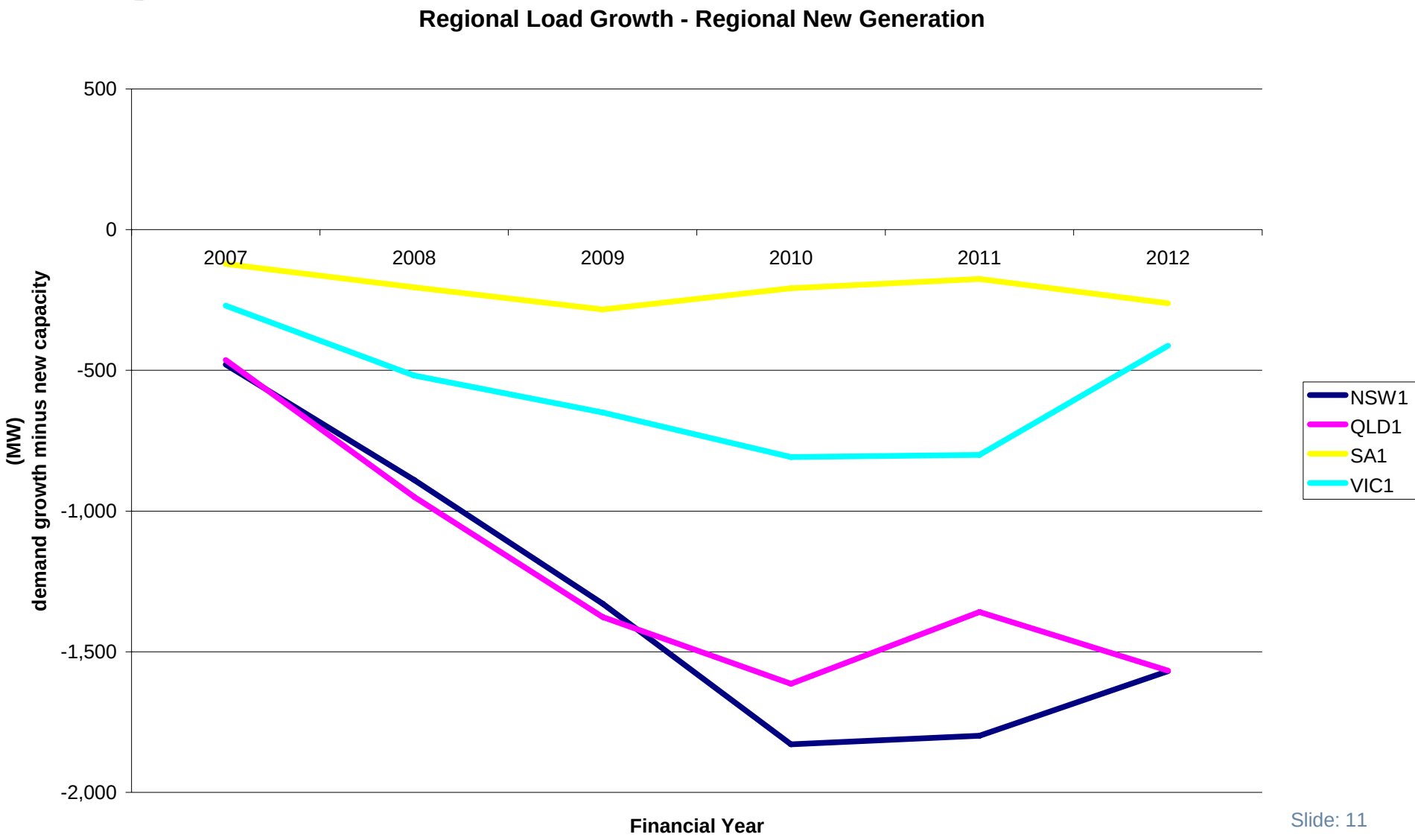
- Market model run for a decade
- Most viable investment taken first and price outcome modified
  - additional investments made if an adequate price premium still exists
- Only gas plant investments are considered

# New Investment

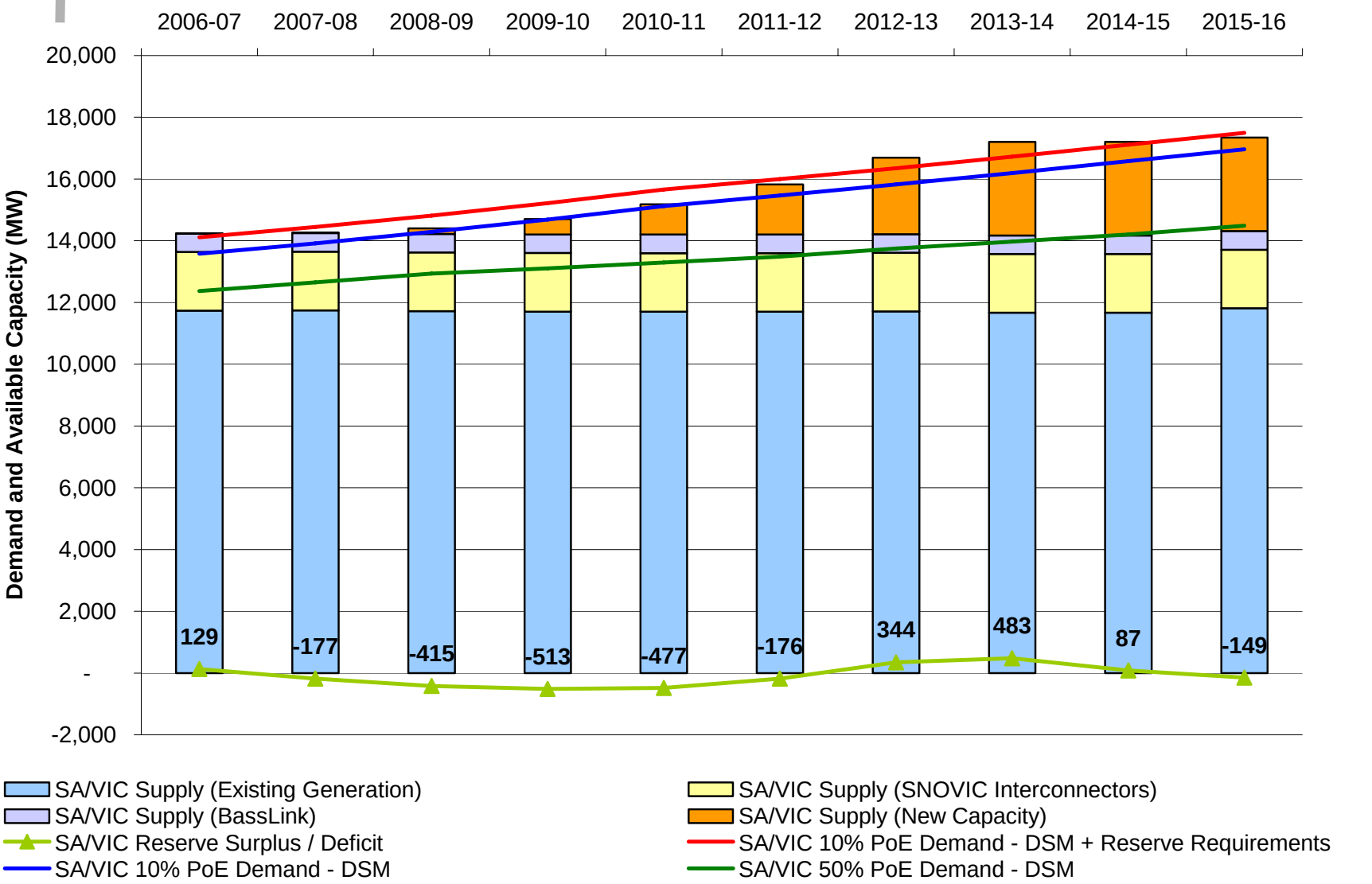


# Regional Demand vs New Entry

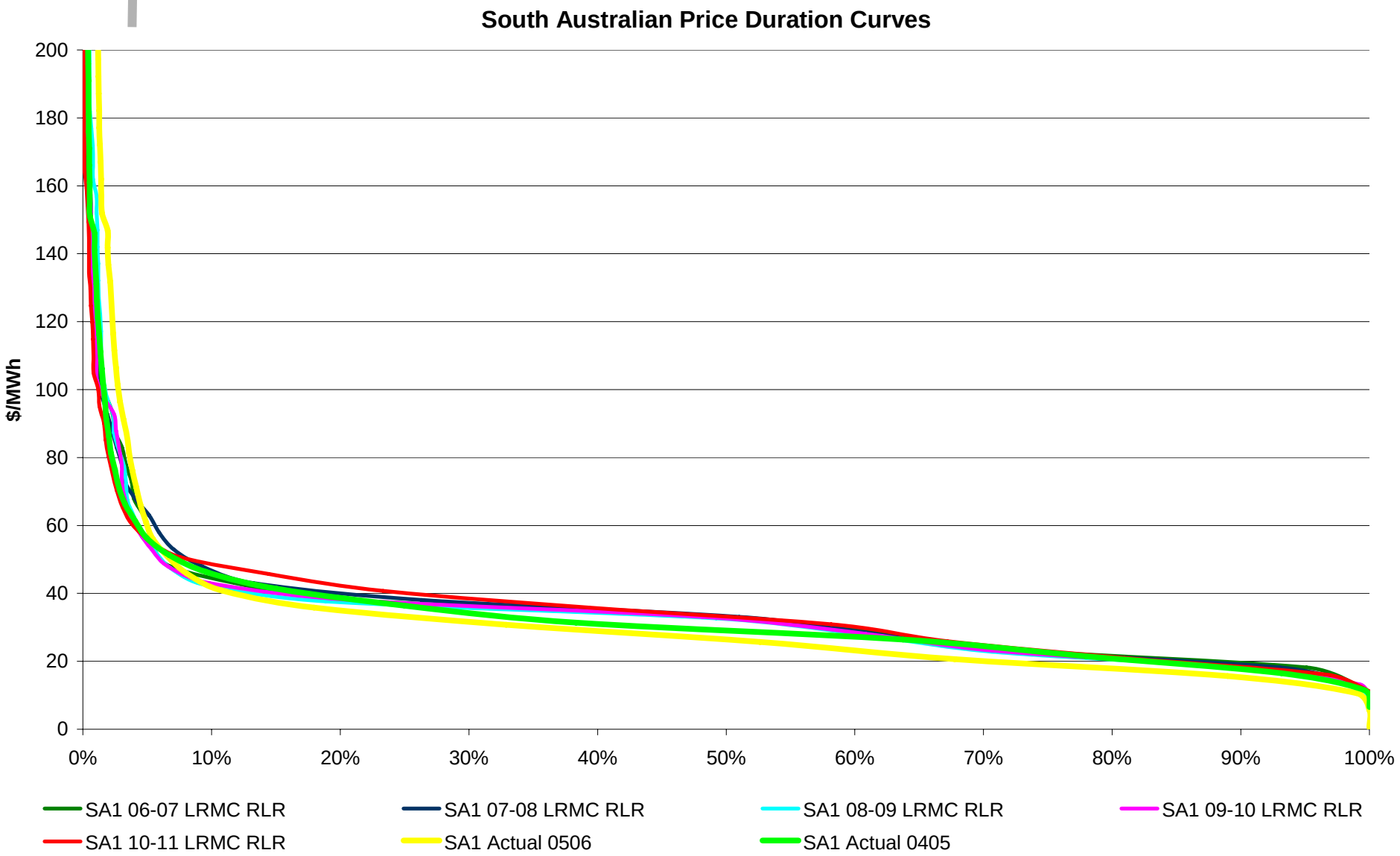
*(New Entry Vs Demand Growth)*



# Resulting Supply-Demand



# Post Investment Curves



# *Modelling Observations*

- Insufficient new investment to meet demand growth
  - reserve margins fall significantly
  - levels of USE increase although insufficient iterations to quantify the 0.002 USE levels
  - NEMMCO ANTS delivered a similar outcome
- beyond 2012 is less certain
  - transmission constraints
  - new entrant costs
  - bidding strategies and portfolio responses
  - excessive new entry in the regions where investment is “cheapest”

# Market Environment

- Any ongoing mismatch between reliability expectations and the market settings aiming to deliver investment is of concern
- Some change to the market setting appears to be required – preferably changes that:
  - can be incorporated into the existing market structure;
  - are clear and simply applied;
  - minimise the risk of market intervention;
  - provide clear investment signals; and
  - drive efficient market outcomes.

# Options

- Higher price caps (VoLL, CPT)
- Standing Reserve Offers (continuous reserve trader)
- Loss Of Load Expectation (LOLE) escalator
- Co-optimised Capacity market

# Higher Price Caps

- VoLL only affects price in rarely and in unpredictable instances
- These instances can have significant cost impacts
- Frequency of occurrence not always related to total installed capacity
- Would prompt a consequential review of CPT
- Increased VoLL will change sensitivity of all participants to contracts
  - generators could be expected to be more cautious about the level of contracts they offer
  - retailers could be expected to more carefully cover their expected purchases to manage higher risks
  - very difficult to model what will be a behavioural change

# Standing Reserve Offers

- Standing offer should provide sufficient certainty to encourage investment and could operate on either:
  - an acceptable price threshold or
  - a given reserve level
- Existing Reserve Trader
  - demand side contracts are available to improve reliability
  - short term, non-continuous and limits ability of parties to commit resources
- Standing Reserve Trader:
  - can be applied and funded regionally
  - is highly visible to participants and stakeholders
  - could operate with reserve margins and reliability standards as currently defined

# *Improved Price Signals*

- LOLE would put a surcharge on market prices when reserve levels low
- Co-optimised available reserve market would be an addition to ancillary services
- LOLE or a co-optimised available reserve market would:
  - enhance market signals to fund necessary levels of reserve plant
  - encourage forward capacity contracting for new capacity and DSP
  - complex impact on spot and contract markets

# Overall Impact on Prices

- The measures to encourage additional investment may increase the cost to service customer demand
- The measures generally do not simply add costs, but impact the dynamics of the market
- Overall effect on prices would be small and the minimum necessary to efficiently deliver the reliability required
- Impact on the market will be more severe if done through intervention

# Conclusion

The Planning Council's analysis shows:

- Current market setting DO encourage investment, but that investment is:
  - *Too little and too late to achieve the reliability targets*
- This mismatch of investment and reliability is only modest and any market correction should be proportionate
- However, without any market correction we face:
  - Increased reliability risks; and
  - The likelihood of non-market intervention