ACIL Tasman

Economics Policy Strategy

Outline of proposed methodology

ACIL Tasman

QCA Workshop,

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Background to price distribution approach

- The approach involves establishing a distribution of possible load weighted annual prices for 2012/13 for each tariff, the net system load profile and the overall Energex load incorporating weather and plant outage variations
- It has been used by ACIL Tasman over many years to provide clients with advice on likely contract prices
- The mean of the distribution is seen to be a robust estimate of the price a prudent retailer would be prepared to pay for energy, including insurance against extreme price events due to weather and plant outages
- The approach is able to be applied down to the individual tariff level
- The approach allows an additional amount for the time value of contracts with longer tenor or commencing later as this is not incorporated in the mean of the price distribution.
- An allowance for distribution and tran-smission losses are also added as the price distribution is at the regional reference node.

Key steps proposed

- Step 1: Estimate the Energex retail tariff load traces
- Step 2: Develop 41 years of load traces each representing 2012/13
- Step 3: Develop 20 sets of unplanned outages across the NEM
- Step 4: Estimate pool prices across the 820 data years
- Step 5: Estimate the annual price distribution for each retail tariff
- Step 6: Find the mean of the price distribution and applying a loss factor/s
- Step 7: Add a further premium to account for other costs and risks associated with energy purchase

Step 1: Estimate the Energex retail tariff load traces

- Data sources
  - half hour load traces for each Transmission Node Identity (TNI) for Energex
  - controlled load traces from AEMO
  - Half hour interval meter data for Energex area customers
  - 400 domestic customer interval meter recordings
  - net System Load Profile (NSLP) from AEMO
  - customer usage profiles for each tariff from Energex
  - Energex forecasts of system summer and winter peaks and annual energy
- The load traces for the various tariffs for 2010/11will be constructed from these data ensuring that the relevant individual tariff load traces sum to the NSLP and the overall Energex load trace by applying trim factors
- The individual tariff load traces will all be consistent with the NEM regional load traces for 2010/11

Step 2: Develop 41 years of load traces each representing 2012/13

- **Select the days:** Under this approach each day in the 40 years of temperature data is populated by load traces selected from the 2010/11 data by matching the day type and season and selecting the day in 2010/11 which best matches temperature conditions across the NEM. The 41 years are the 40 years built from the analysis and the 2010/11 year itself
- **Method of day selection:** Selection of the day which best matches the temperature conditions is achieved by finding the closest least squares match between the temperature profile for that day and the temperature profile for a day in the 2010/11 across all NEM regions.
- **Process to preserve relationships:** To preserve the relationship between the NEM regional loads traces and retail tariff load traces in the Energex area, all the associated load traces for the selected day are inserted for the day being assessed.
- **Adjusting to 2012/13 level:** Using a non-linear transformation the 41 years of load data are adjusted to match the AEMO 2011 ESOO forecast for 2012/13 for each NEM region and the consistent forecast for the Energex area from the Australian Energy Regulator (AER). This involves matching the forecast annual energy for each of the 41 years and matching the forecast peak demand across the whole 41 years with the 10% POE (probability of exceedance) summer peak demand for 2012/13.

Step 3: Develop 20 sets of unplanned outages across the NEM

- Using binomial probability theory ACIL Tasman has simulated 20 sets of forced outages. This process has allowed a range of outage outcomes to be produced.
- The most important factor in outages is coincidence – if a number of units are forced out at the same time, volatile prices usually result.
- The process used to simulate the outage sets allows these sorts of coincidences to be represented appropriately in the sample.

Step 4: Estimate pool prices across the 820 data years

- Combining the 41 years of load data adjusted to 2012/13 levels and 20 outage scenarios to create 820 years of data for input to *PowerMark* to produce 820 years of half hourly prices representing 2012/13.
- These half hourly prices represent a range of prices which encompass the likely weather and outage effects which could emerge in 2012/13.
- The prices produced by the *PowerMark* modelling are at the South Pine regional reference node for Queensland.

Step 5: Estimate the annual price distribution for each retail tariff

- This step involves calculating 820 annual load weighted prices based on:
  - the half hourly loads traces adjusted to 2012/13 levels from Step 2 and
  - Queensland half hourly prices from Step 4.
- 820 annual load weighted prices are calculated for each retail tariff in the Energex area based on:
  - the retail tariff load traces from Step 2 and
  - the Queensland pool price from Step 4.
- This process produces a price distribution for each retail tariff in the Energex area for 2012/13.

Step 6: Find the mean of the price distribution and apply loss factor/s

- **Find the mean**: The mean of each of the retail tariff price distributions established in Step 5 represent the price at the Queensland reference node for each retail tariff in 2012/13 which a retailer would be prepared to pay accounting for weather and outage risks.
- **Apply loss factors:** To bring these retail tariff prices from the Queensland regional reference node to the customer terminals requires the application of a distribution loss factor (DLF) for Energex and load weighted Marginal Loss Factor (MLF) for the Energex area.

Step 7: Add a further premium to account for other costs and risks associated with energy purchase

- **Other factors that are likely to influence energy purchase costs would include:**
  - **different risk profiles:** counterparties to hedge contracts may have different risk profiles and risk appetites meaning that they may be prepared to pay more than the mean of the price distribution. *However, it is assumed that this would not add to the contract prices paid by a prudent representative retailer.*
  - **regulatory risk:** regulatory changes pose a risk with the potential to either increase or reduce EPC. This risk is best assessed on a case by case basis for particular regulatory proposals. *At this time we are unable to identify any proposed regulatory changes which need to be taken into account for 2012/13.*
  - **reactionary component**: contracts also tend to have a reactionary component – forward contracts being offered or negotiated at a time of high price volatility tend to be higher in price than they would be otherwise, and vice versa. *It has been assumed that this aspect will not impact contract costs for 2012/13.*
  - **time value:** contracts with longer tenor or commencing later may have an additional cost component reflecting time value. *Making allowance for the time value component in electricity contracts would appear justified. ACIL Tasman proposes an allowance of 1.5% for this aspect.*