Demand response in the wholesale market

Presentation to Power of Choice review Stakeholder Reference Group

Sydney, 28 May 2012
“we will further consider the ways to better facilitate the role of aggregators and the ways in which they may directly access the wholesale market”
Idea has widespread support from stakeholders

Including:

- Networks
- Retailers
- Generators
- Major energy users
- Governments
- Consumer groups
- Environmental groups
Lessons from directions paper submissions

Any solution must:

- Be technology-neutral
- Be market-based
- Increase competition, to improve efficiency
- Not involve any subsidy for demand response
- Not impose excessive costs on other participants
Principles for wholesale market demand response

- **It is a resource like a peaking generator**
  - It can earn the spot price
  - It can participate in central dispatch *(but maybe not right away)*

- **It is a separately contestable service**
  - Not forcibly bundled with retail contracts
  - Consumers can choose a DR service provider, or go direct
  - If the consumer does DR independently of their retailer:
    - The retailer should be unaffected by their DR actions
    - They should be neither better nor worse off
    - It should be as if the consumer did not alter their behaviour
How does it work?
Embedded generator *(not spot market exposed)*

Retail FRMP

Load

NMI 1

Energy Consumption (MWh)
Embedded market generator *(already happens)*

![Diagram of embedded market generator](image)

- **NMI 1 (parent)**
- **NMI 2 (child)**
- **Load**
- **Retail FRMP**
- **Demand Response FRMP**

Energy Consumption (MWh)

- $M_B$
- $M_R$
Do we need the generator meter?

Dispatch times known

NMI 1 (parent)

NMI 2 (child, deduced)

Retail FRMP

Load

Demand Response FRMP
Do we care whether the resource is a generator?

Dispatch times known

NMI 1 (parent)

NMI 2 (child, deduced)

Retail FRMP

Normal load

Demand Response FRMP
How does the money flow?

Net energy

Retail FRMP

DR FRMP

AEMO

Customer

DNSP

Retail energy

Spot price

Contracted prices

Demand response energy
Measurement & verification
Essential attributes of baseline algorithms

Need to balance these requirements

- **Accuracy**
  - Minimal errors
  - No bias

- **Simplicity**
  - Easy to understand and calculate by anybody
  - Can be calculated automatically in real time

- **Integrity**
  - Robust to gaming attempts
Baselines are a solved problem
Other markets already incorporate baselines

- **PJM**
  - high 4 of 5 average with additive adjustment

- **NYISO**
  - high 5 of 10 average with additive adjustment

- **ISO-NE**
  - rolling weighted average with additive adjustment

- **IMOWA**
  - median of 32 peak intervals in previous summer
Who calculates the baselines?

It doesn’t really matter, if they’re totally non-subjective

- **AEMO**
  - The obvious choice, and is the approach taken elsewhere

- **Meter data agents**
  - This might fit better with the data flow

- **DR providers**
  - This is quickest and easiest to implement
  - Could easily be audited by AER
What effect does it have?
Interaction with other forms of demand response

**Network-driven**
- Works alongside any network initiatives: tariff or contract based
- Facilitates participation in these programmes

**Retailer-driven**
- Only draws consumers away from tariff-driven DR to the extent that the retail tariff is not cost-reflective
- Is a contestable version of contract-based retail DR initiatives

**Other**
- Works alongside Small Generator Aggregation framework
- Works alongside other proposed multi-FRMP approaches
- Works alongside ancillary services programmes
Practical benefits

- **Competition to procure demand response**
  - Enables a variety of business models (rather than just the retailer’s business model)
  - Motivated specialists find DR more efficiently than utilities
  - Competitive pressure leads to a good deal for consumers

- **Unbundling makes long-term approaches possible**
  - Allows investment in real-time telemetry and control
  - Retailers are limited by churn
  - Networks are limited by short-duration deferral programmes
Economic benefits

- **Demand response can compete with generation**
  - It is a more cost-effective source of super-peaking capacity
Economic benefits

- **Demand response can compete with generation**
  - It is a more cost-effective source of super-peaking capacity

- **Networks benefit from decreased peakiness**

- **Network capex deferral programmes become easier**
  - There’s a pool of consumers with:
    - Training in demand response
    - Real-time telemetry and/or control
    - Proven willingness and ability to respond
This is not an optimal solution
It’s a compromise that’s easy to implement in the NEM

- **Economic incentives are lower than they should be**
  - FERC approach would be better
  - DR providers cannot capture any of the benefits seen by networks due to decreased peakiness

- **Other NEM deficiencies impact DR disproportionately**
  - 5m/30m anomaly penalises responsive resources
  - Lack of day-ahead market creates unnecessary risk for slow-start resources
Is it worth it?
Do the benefits outweigh the costs?

**Benefits**
- Other markets have shown that 10% penetration is achievable
- 5% participation is 1,800 MW of response to peak demand
- Ausgrid estimates that peak demand costs $3.3m/MW to supply
- So we can avoid around $6 billion in capital expenditure

**Costs**
- Much less than this

Data: $3.3m/MW value taken from Ausgrid submission to Power of Choice directions paper
Extra material
Possible data flows (scheduled)

Provider

MB

Boundary meter data

Near-real-time telemetry

Near-real-time performance data

Retail FRMP

AEMO

Dispatch instructions

Deduced DR meter data

DR FRMP

Possible data flows (scheduled)