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Get More From Energy

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”

AEMC Power of Choice Directions Paper, p.134

Idea has widespread support from stakeholders

Including:

- Networks
- Retailers
- Generators
- Major energy users
- Governments
- Consumer groups
- Environmental groups

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Source: Submissions on Directions Paper

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

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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

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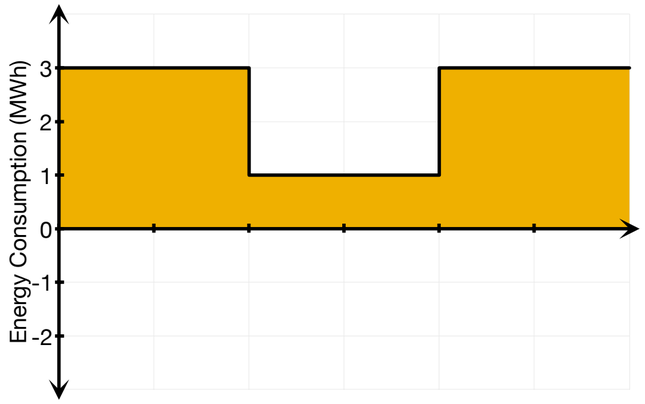
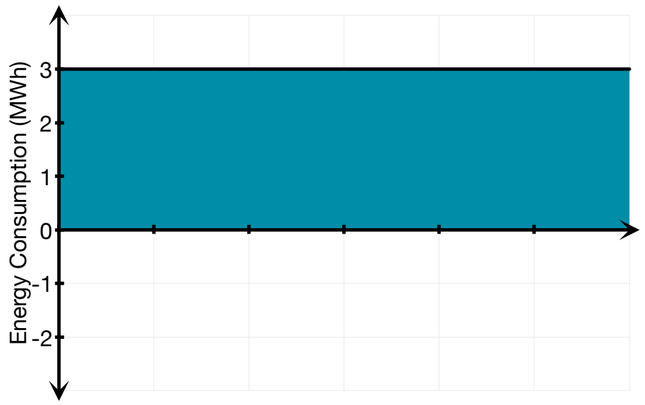
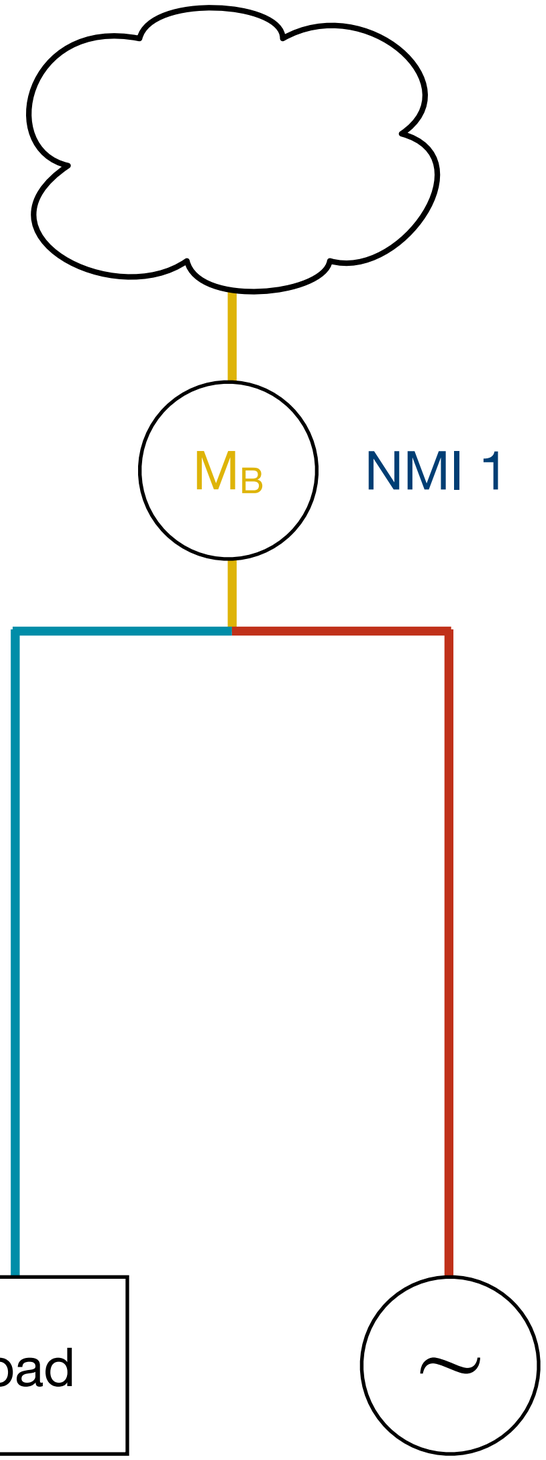
How does it work?

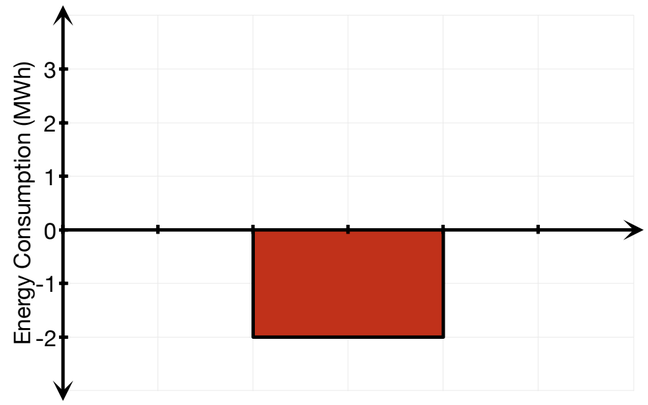
Embedded generator (not spot market exposed)



Retail FRMP







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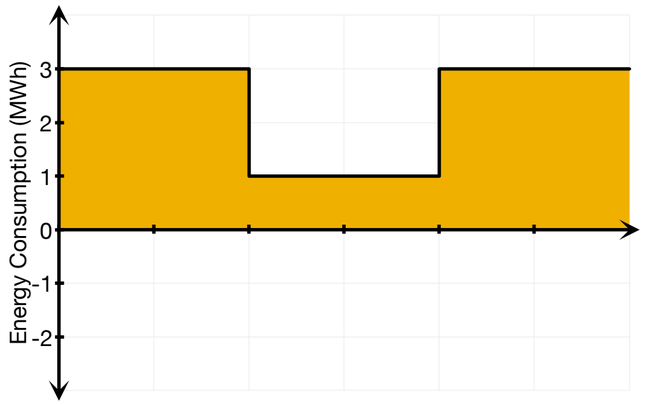
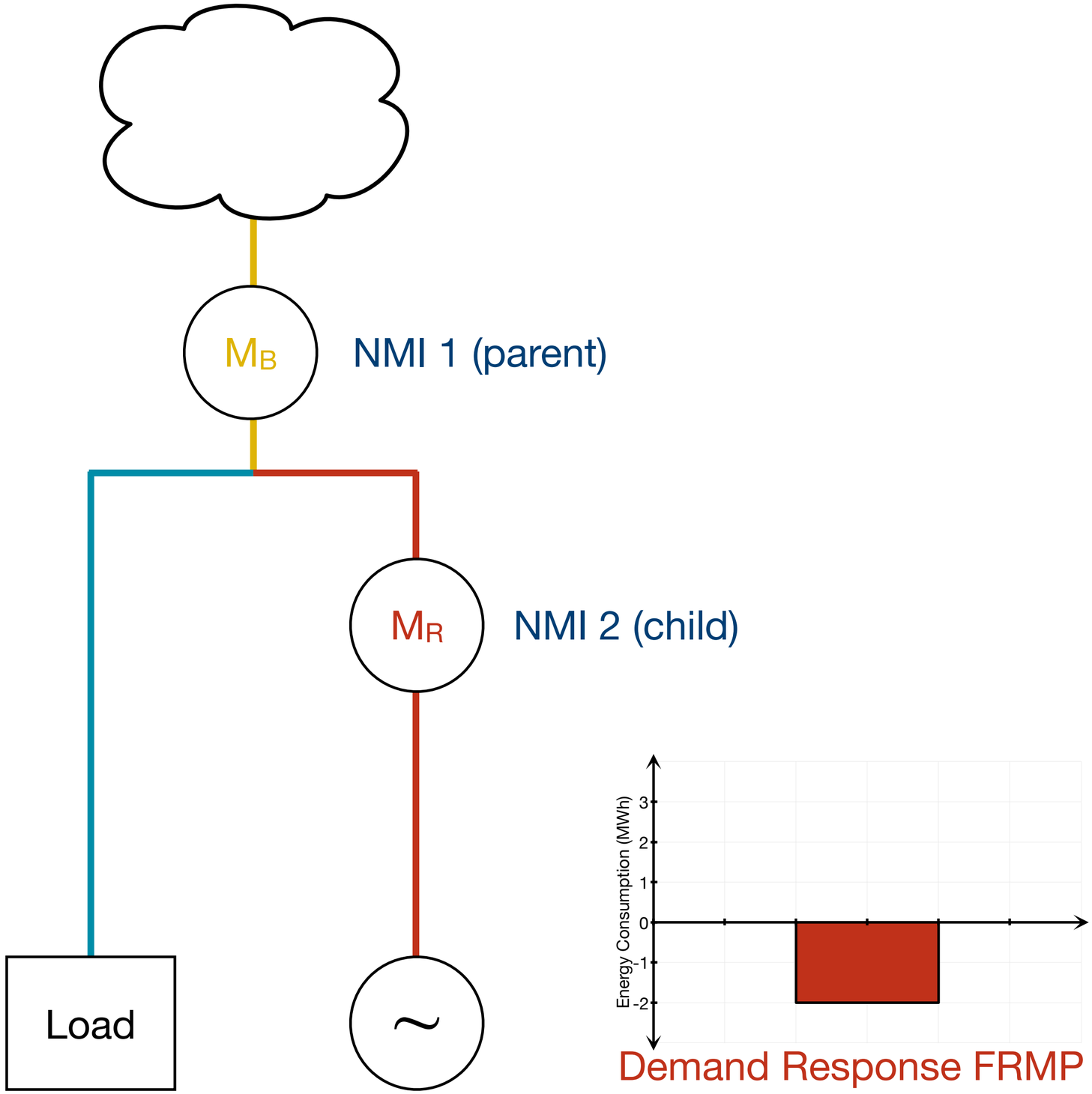
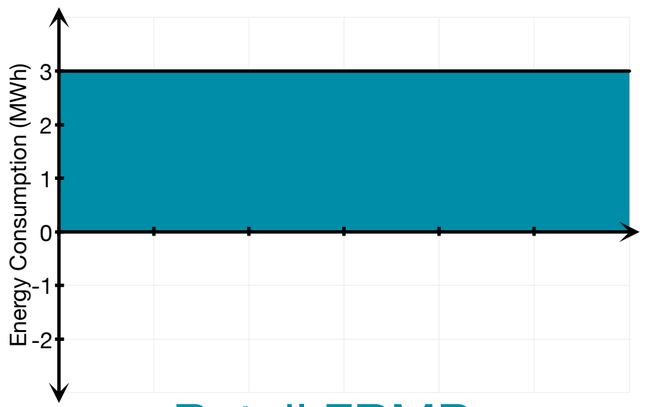
Embedded market generator (already happens)







Retail FRMP

Demand Response FRMP

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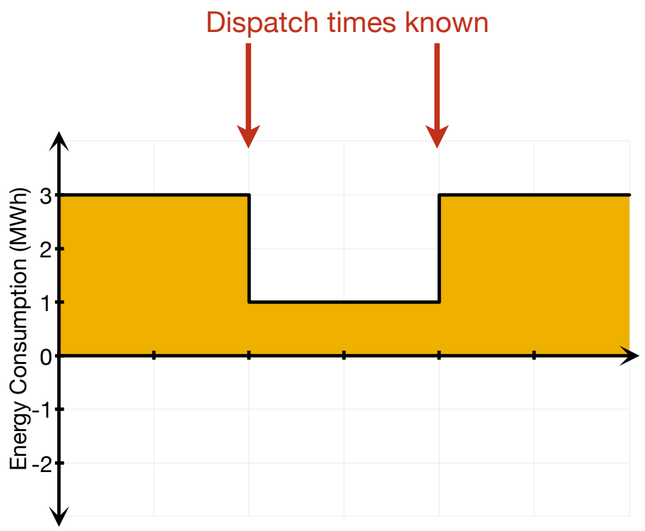
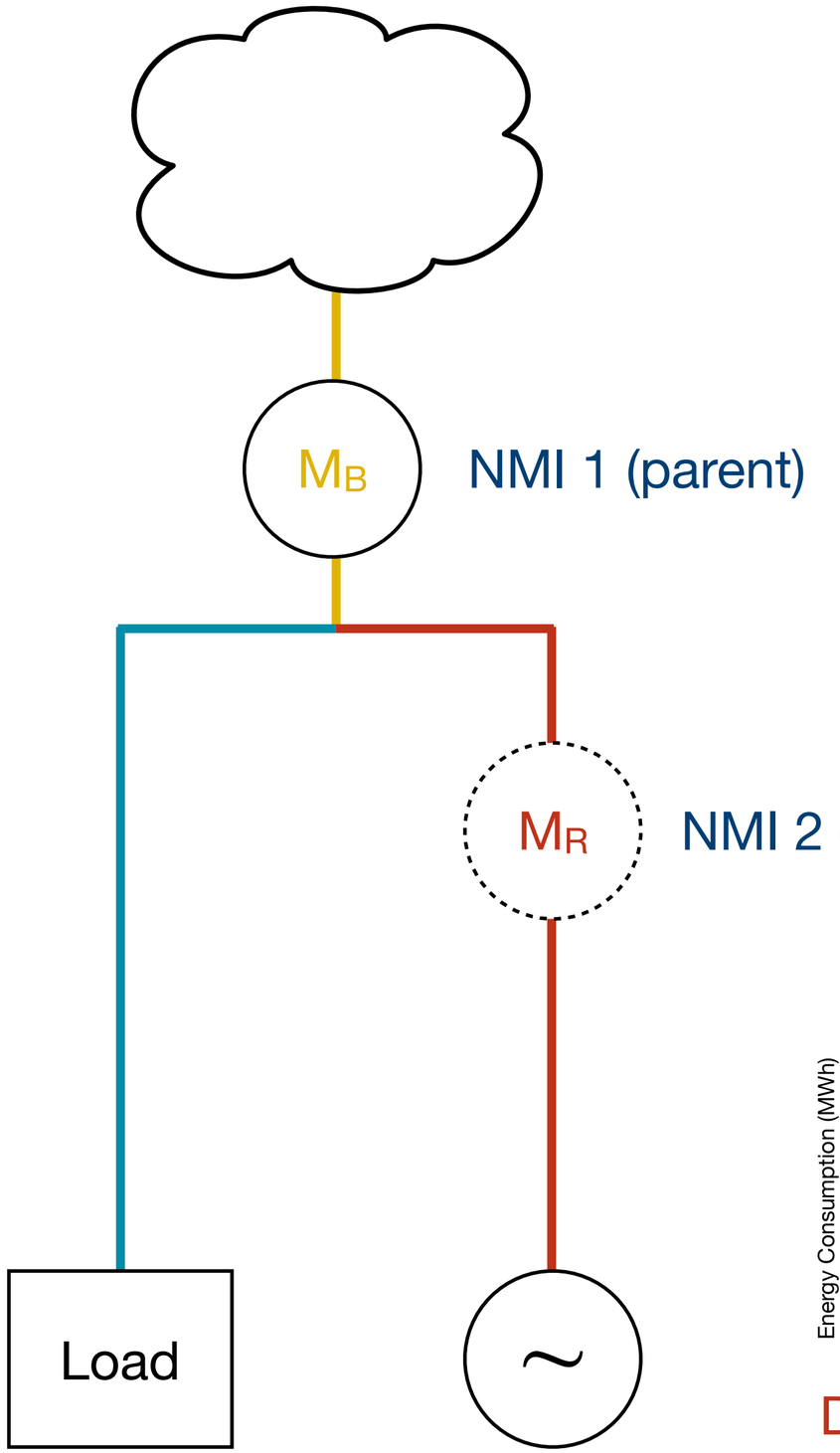
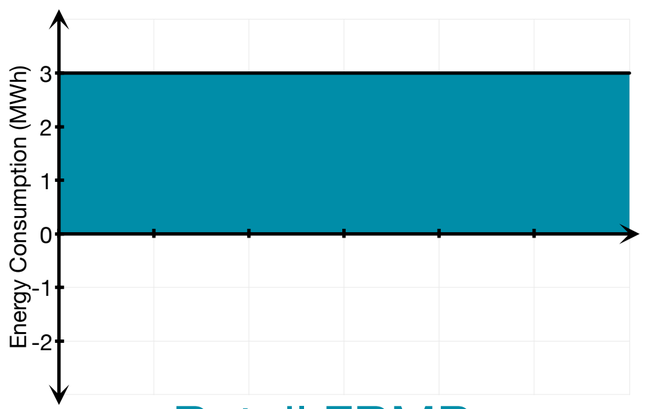
Do we need the generator meter?







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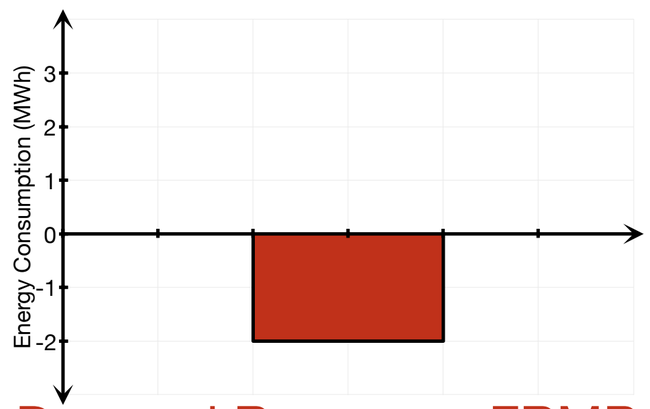

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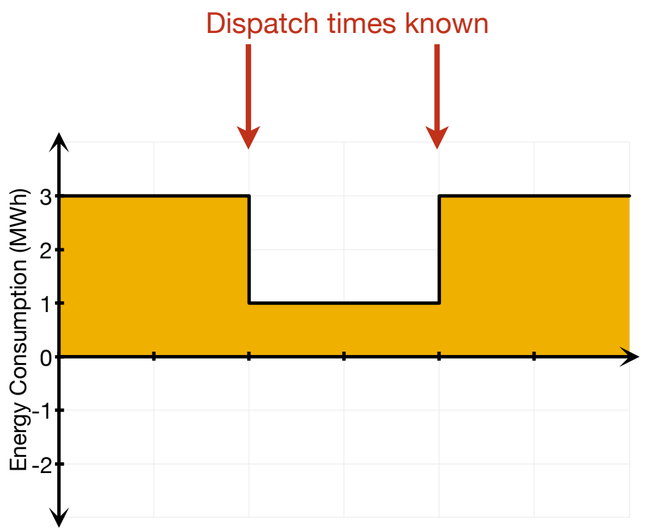
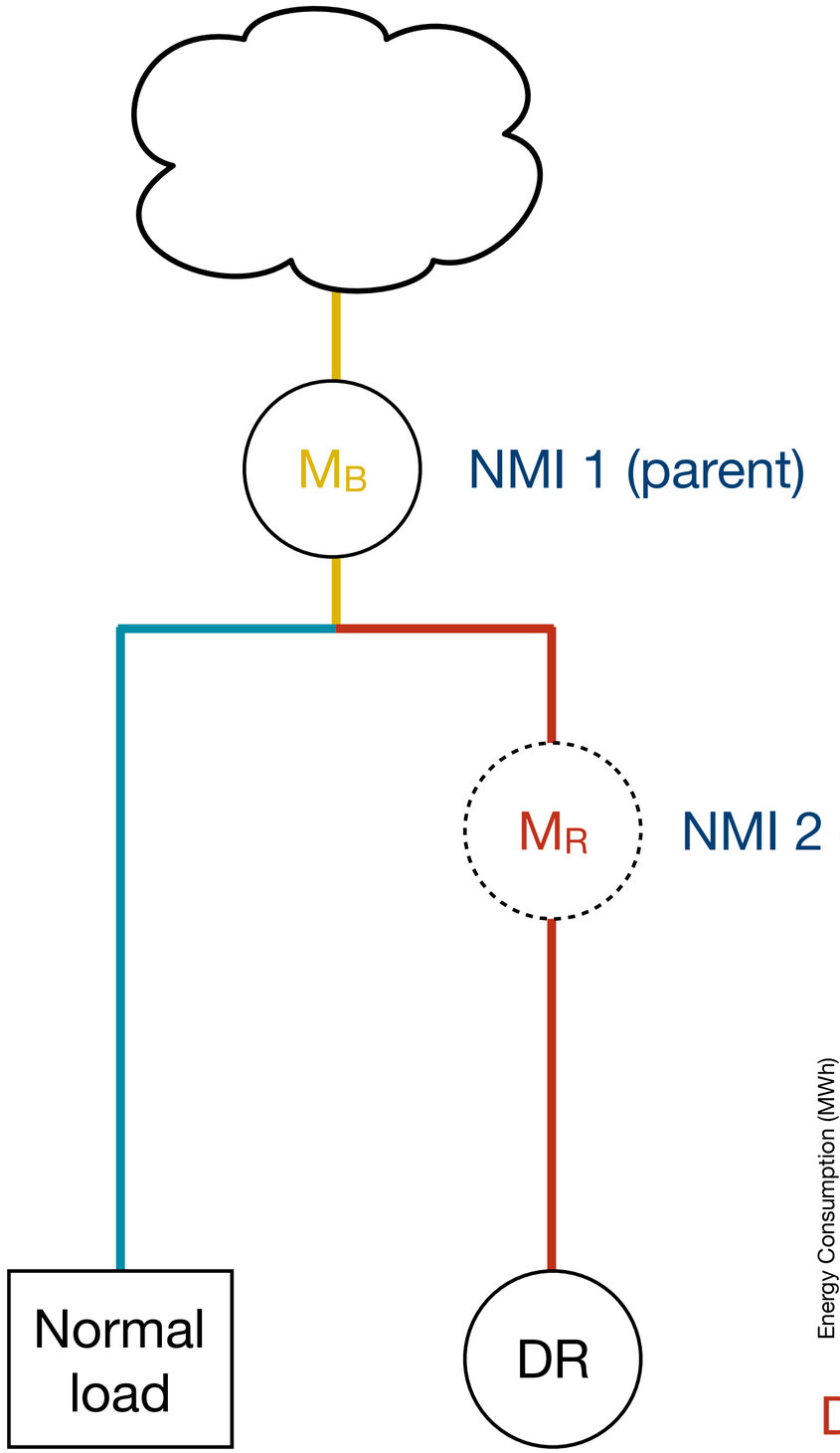
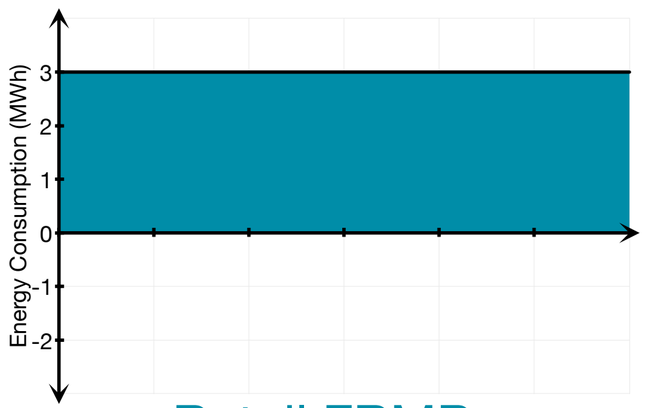
Do we care whether the resource is a generator?







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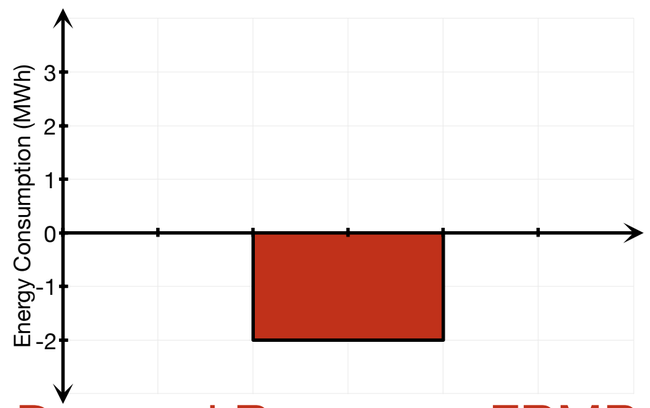

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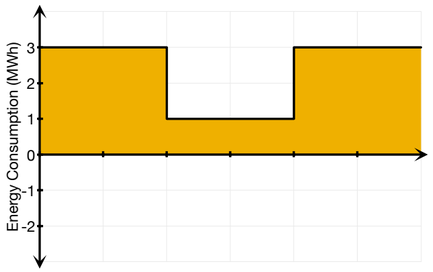
How does the money flow?

Net energy



AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Spot price

DNSP

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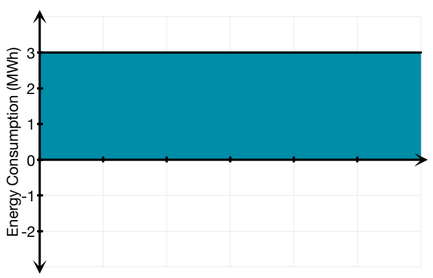
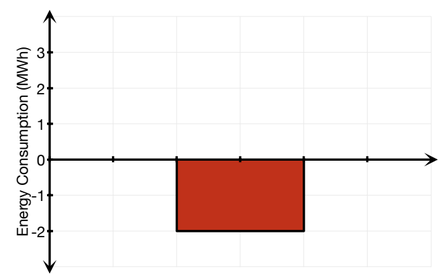
DR FRMP

Contracted prices



Retail energy

Customer



Demand response energy

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Measurement & verification

M&V

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

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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

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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

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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

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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

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Economic benefits

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

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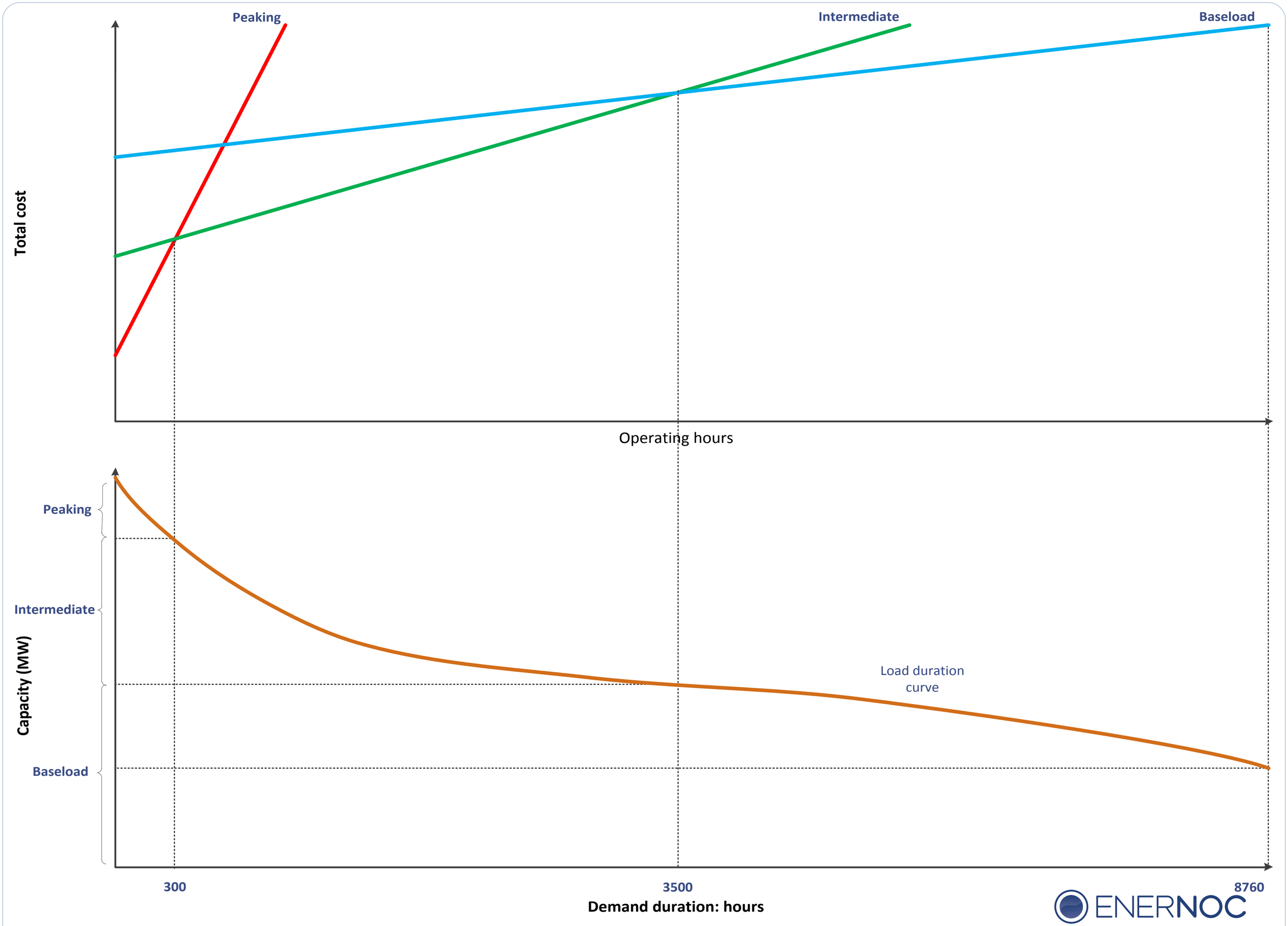
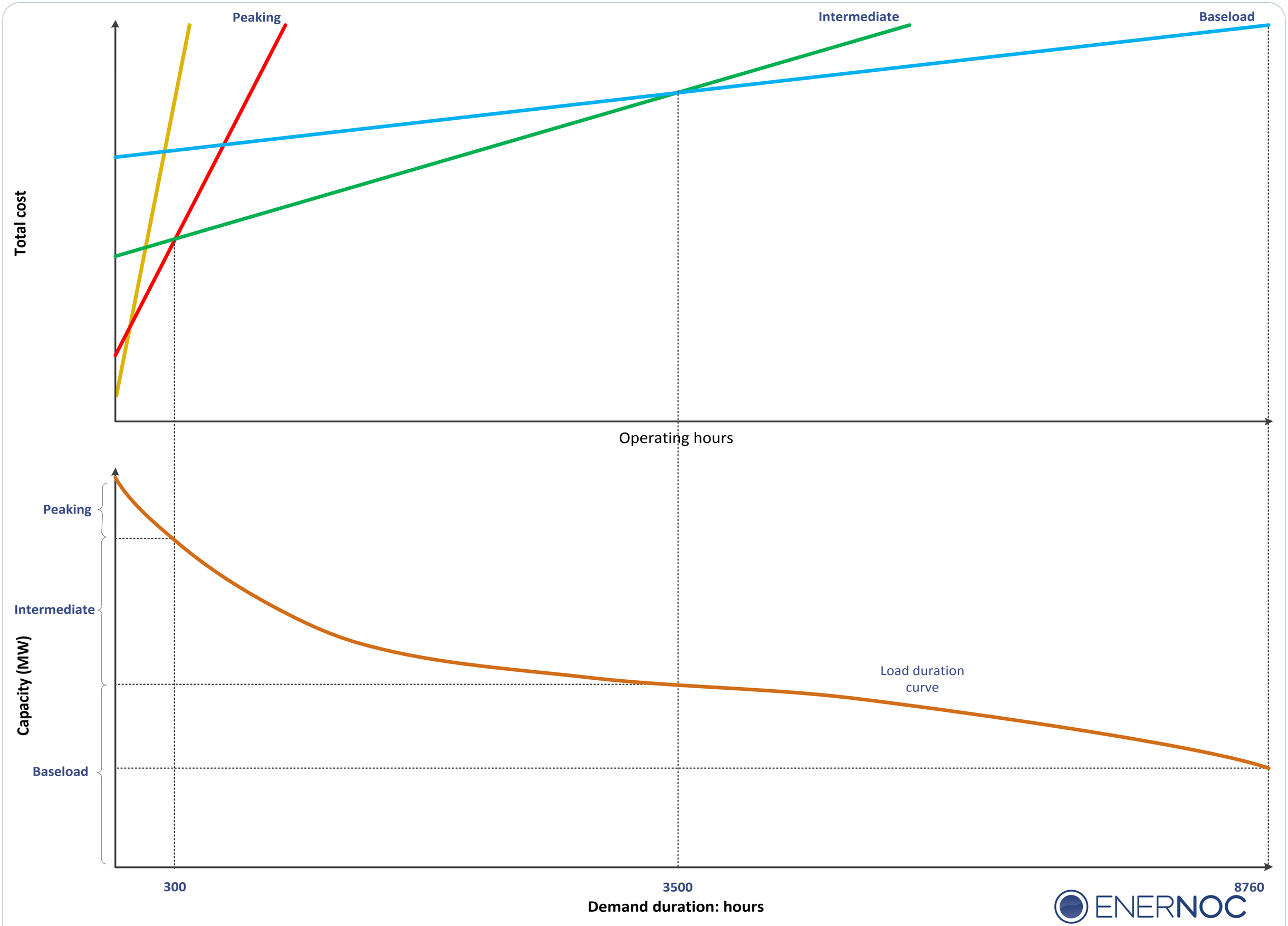


Source: John Pierce, *The Australian National Electricity Market: Choosing a new future*, World Forum on Energy Regulation, May 2012 (stretched)



Source: John Pierce, *The Australian National Electricity Market: Choosing a new future*, World Forum on Energy Regulation, May 2012 (annotated)

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

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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

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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

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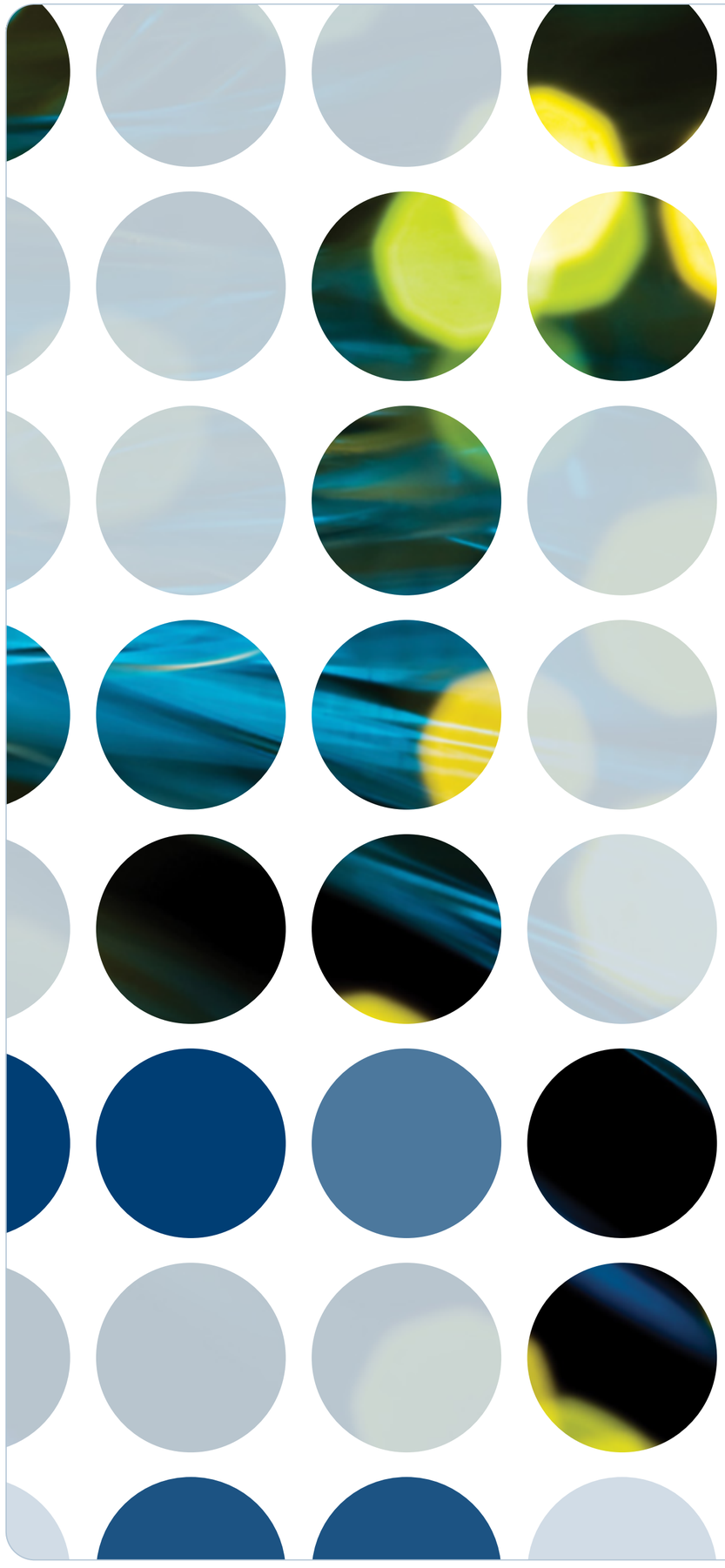
Data: $3.3m/MW value taken from Ausgrid submission to Power of Choice directions paper



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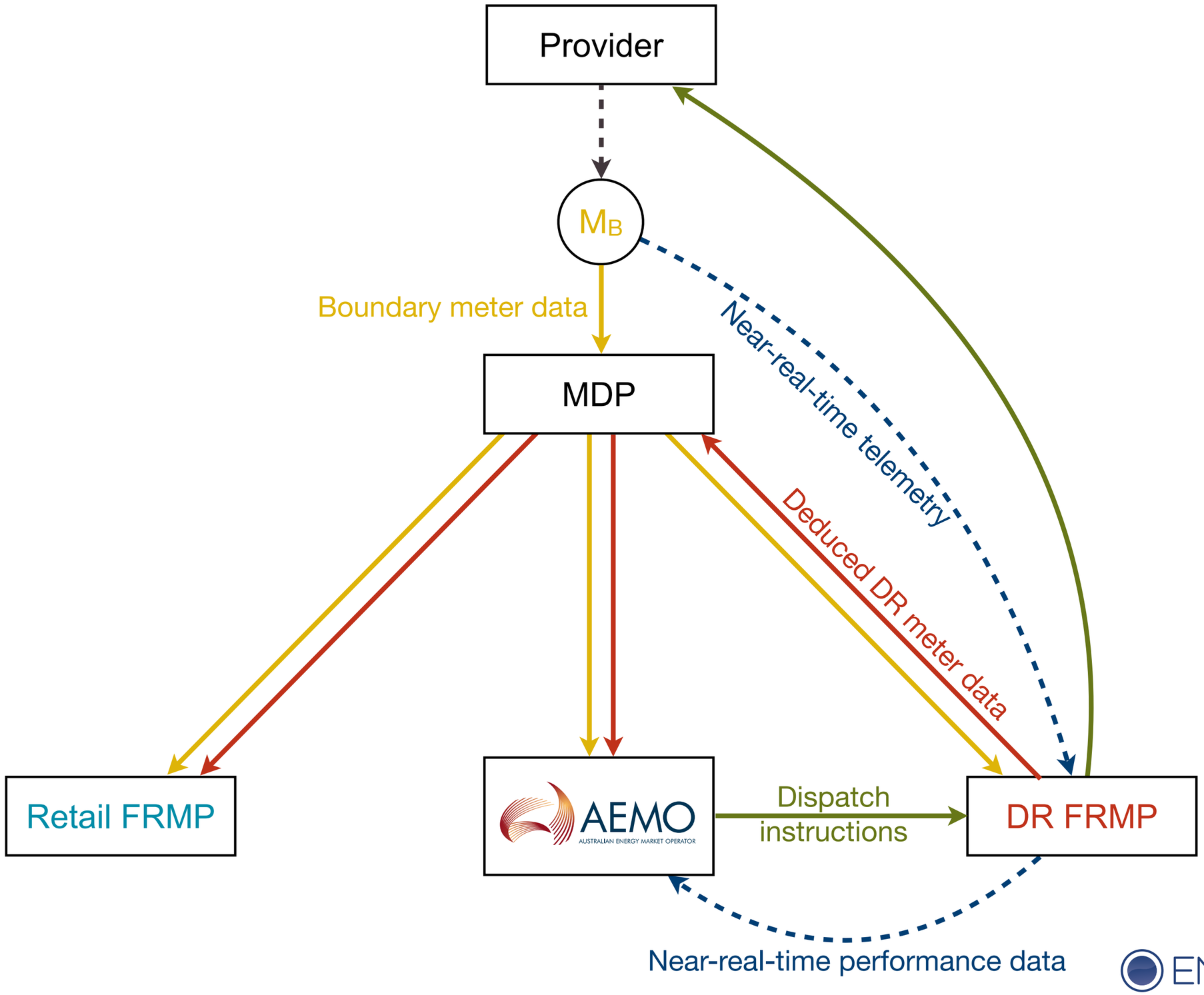
Extra material

Possible data flows (scheduled)



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