sapere research group

Harmonisation of Demand Side and Supply Side Capacity Resources

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16 April2012

Agenda

- Introduction & scope
- Background
- DSM
- Fuel requirements
- Options & Next Steps

Scope: Harmonisation of demand and supply side capacity

- One of a number of projects examining RCM
- In scope
  - Performance requirements for demand and supply side resources
  - Other factors affecting harmonisation of value
  - Role of demand side management
- Out of scope
  - Other issues not directly related to availability and performance requirements

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Harmonisation

- Need for harmonisation
  - All capacity resources provide same basic function
  - Capacity credit is a common unit
    (1 MW of DSM = 1 Capacity Credit = 1 MW of generation)
- However different resources treated differently
- Risks
  - Discrimination leads to inefficient signals for capacity development
  - Performance requirements are inefficient / overly complex
- Question: Can we bring them closer to together?

Differences in availability

- DSM nominate availability restrictions which include:
  - Total hours available: >= 24 hours
  - Hours per day >= 4 hours between 12 noon and 8pm
  - Number of dispatch events >= 6 per year
  - Minimum notice period for dispatch (must be <= 4 hours)
  - The hours available (must include 12-8pm on all business days)
- Generation
  - Must demonstrate that fuel storage, supply and transport arrangements are sufficient to allow 14 hours of continuous operation.
  - Must be available for dispatch unless undertaking Planned outage

Need for capacity

- Current dominant criterion is peak demand
- Based on historical data
  - Top 5 percent of capacity used < 24 hours per year
  - Top 10 percent < 96 hours per year
- Peak is reasonably predictable
- However care required
  - Correlations in load - often continuous days of high demand
  - Supply factors - shortage related to supply outages

The capacity value of resources

- For efficiency, interested in marginal capacity value
  - Interested in value not cost
  - Marginal value is additional contribution to load carrying capability
  - Value depends on being available to meet peak
- Marginal value depends on:
  - Load to be served and capacity resources
  - The availability and limitations in the use of the resource
  - Penetration of like resources
  - Nature of risks to reliability

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Features of DSM

- Performs same core function as other capacity resources
- ...however some special characteristics

- Expensive to dispatch.
  - Costs include opportunity costs to the loads dispatched
  - In general, would choose (and be efficient) to be dispatched last

- Other important features
  - DSM more flexible – quicker to expand
  - Underlying heterogeneity of loads

- Pros and cons of DSM

Capacity by class

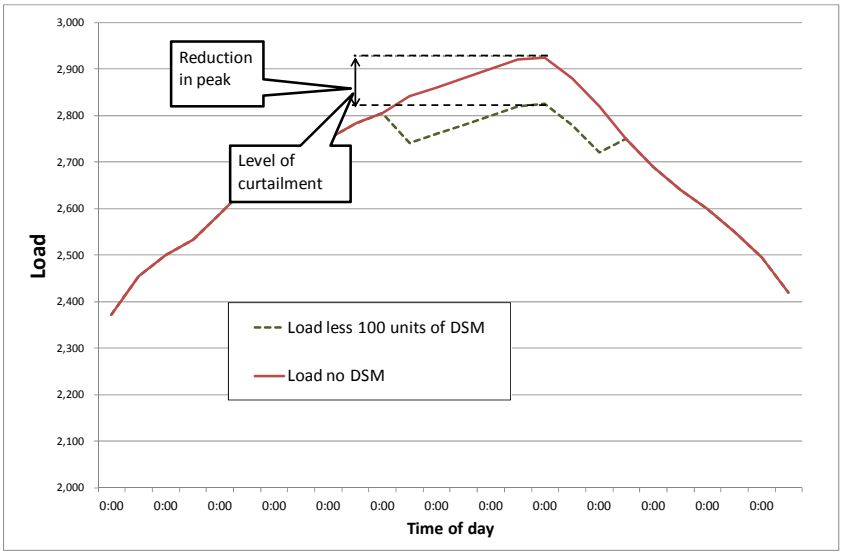
	Capacity credits by year							
	2006 /07	2007 /08	2008 /09	2009 /10	2010 /11	2011 /12	2012 /13	2013 /14
Class1, Generators	3,633	3,984	4,481	5,055	5,125	5,233	5,586	5,587
Class2, 72-96 hrs	-	-	8	-	17	-	-	-
Class3, 48-72 hrs	111	131	81	-	-	108	20	43
Class4, 24-48 hrs	-	-	30	82	117	152	389	457
Total	**3,744**	**4,115**	**4,600**	**5,136**	**5,259**	**5,493**	**5,996**	**6,087**
DSM penetration	3.0%	3.2%	2.6%	1.6%	2.5%	4.7%	6.8%	8.2%

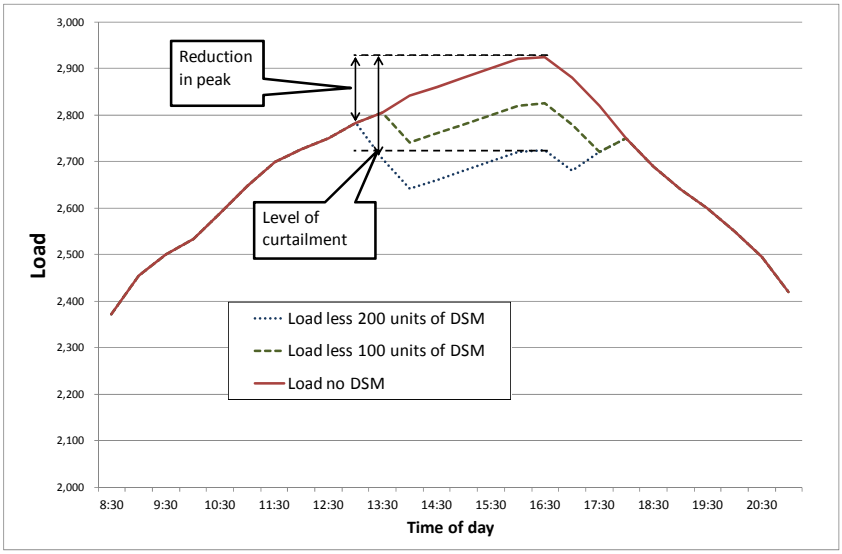
Issues with DSM availability

- Migration to low-availability class – Lack of incentive to nominate in higher classes
- Issues with low-availability
  - Limitations may come into effect – Insufficient availability
  - Risk of limitations coming to effect distort management – DSM not dispatched due to concerns of future unavailability
- Potential for higher availability
  - History suggests many loads could provide higher availability
  - Anecdotal evidence:
    - much greater availability possible
    - but varies significantly by load

Maximum duration and other limitations

- Other limitations
  - Maximum duration >= 4hours
  - The hours available (must include 12-8pm on all business days)
  - Minimum notification period of <= 4 hours
- Implications for value – depends on penetration of DSM
  - For low penetration, no effect as long as DSM can be used when required
  - At some point limitations count as greater use shifts the peak of the remaining load to a period which DSM cannot effectively cover





Other considerations

- Dispatch payments for DSM
  - Paid for by Market Participants – an additional cost of DSM
  - Small cost given low probability of dispatch
  - Small impact on efficiency but nevertheless heavily debated
- Incentives for participation for capacity not wishing to be dispatched
  - Interest in provision of capacity related to likelihood of being dispatched
  - Likelihood of dispatch inversely related to surplus of capacity
  - Risk
    - Increase in interest during surplus
    - Reduction in interest during shortage

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Fuel requirements

Demonstrate fuel storage, supply and transport arrangements are sufficient to allow 14 hours of continuous operation.

- Gas supplies
  - Available on 'take' or pay basis - not practical in many cases to get a firm arrangement
  - Relatively expensive to store
  - Subject to supply disruption risk
- Liquid fuel
  - Storage possible but more expensive fuel
  - Risk of supply chain issues during a crisis

What fuel availability is required?

- Need depends on other generation
  - Not all generators required to run continuously during peak
- Prior analysis (MMA 2010) recommended a lowering of requirement
  - Determined 12 hour continuous fuel supply sufficient
  - Included some conservative assumptions – more limited maybe appropriate
  - But also other considerations

Other considerations

- Other risks than fuel supply over a single day
  - Fuel use over consecutive days
  - Fuel disruption
  - Generator specific risks
- Commercial incentives to be available
  - Energy payments
  - Capacity refund payments
- Unserved energy requirement (USE) analysis

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Preliminary options - DSM

D1 Increase minimum availability requirements

- Increase in value if there is saturation of low-availability DSM
- Risk of reduction in DSM offered
- Most easily achieved by retiring some classes
- Short-term and long-term impacts

D2 Refine other DSM performance requirements

- The 12 to 8pm period, minimum duration, minimum notification period
- More likely to have a significant impact on DSM in short term

Preliminary options - Supply

S1 No change / minimal change

- Retain current system

S2 Adjust the minimum availability requirement

- Reduce continuous supply requirement
- Potentially combine with other options which enable sharing of requirement

S3 Modify the commercial incentives to be available

- Refine penalties for not being available when called

Next Steps

- Assessment of need
- Undertake analysis of impacts of limitations vs need
- Further analysis of options
- Other