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Review of Planning Criterion: Interim Progress Report

13 June 2012

Items to Discuss

- Summary of methodology
- Illustrative examples
- Concluding remarks

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Background

We are undertaking a five-yearly review of the SWIS Planning Criterion for 2015/16 to 2019/20

Current Planning Criterion has two parts:

(a) Defined Scenario: 8.2% of 10% POE peak demand

(b) Max annual unserved energy limited to 0.002%

Summary of Methodology

Six Main Steps in the Review Process:

1. Compliance with market objectives
2. Review of practices in other systems
3. Analysis of existing plant performance
4. Review of Defined Scenario criterion
5. Impact analysis
6. Stakeholder consultation

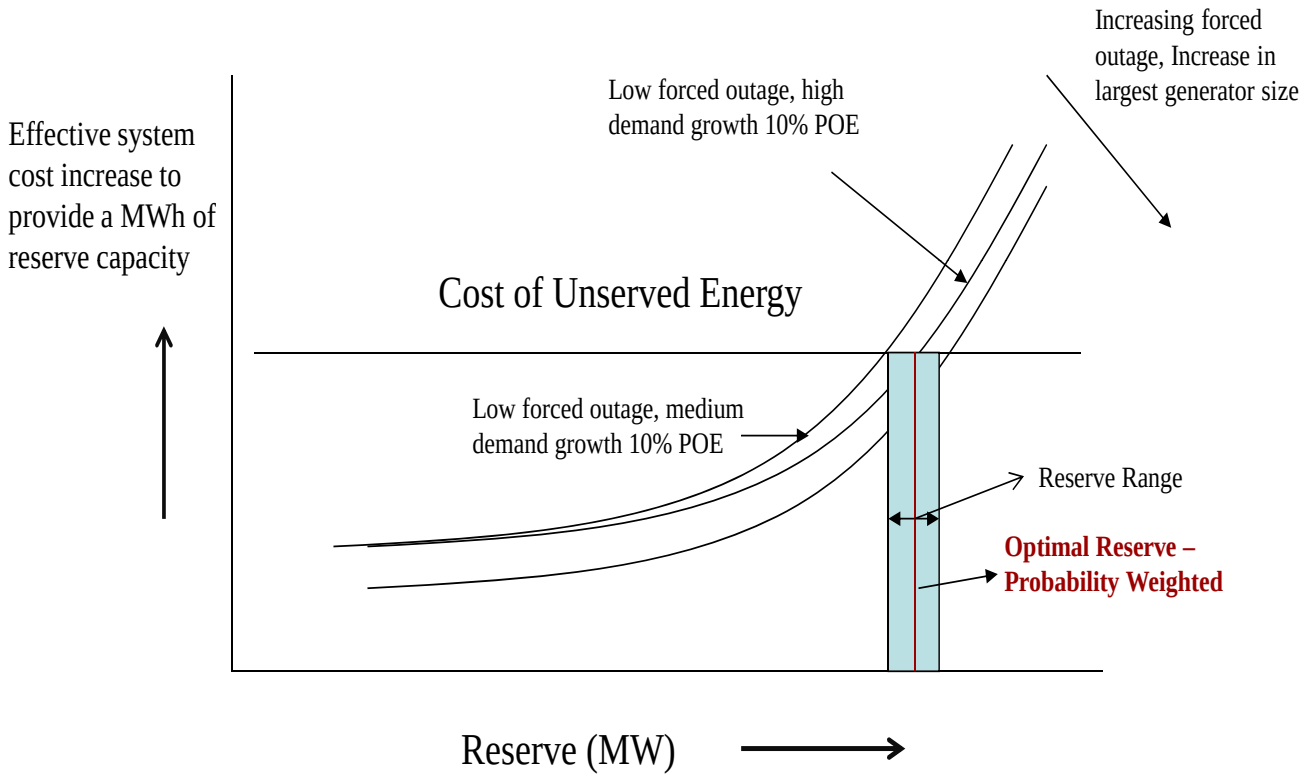
Summary of Methodology

1. Least-cost criterion that translates into finding a balance between
   - Cost of delivered MWh, and
   - Reliability

2. Marginal cost of reserve – efficient?

3. Need to be tested through historic performance and forward looking analysis

Summary of Methodology



Efficient outcome: Marginal cost of reserve = Cost of unserved energy

Review of Reliability Standards

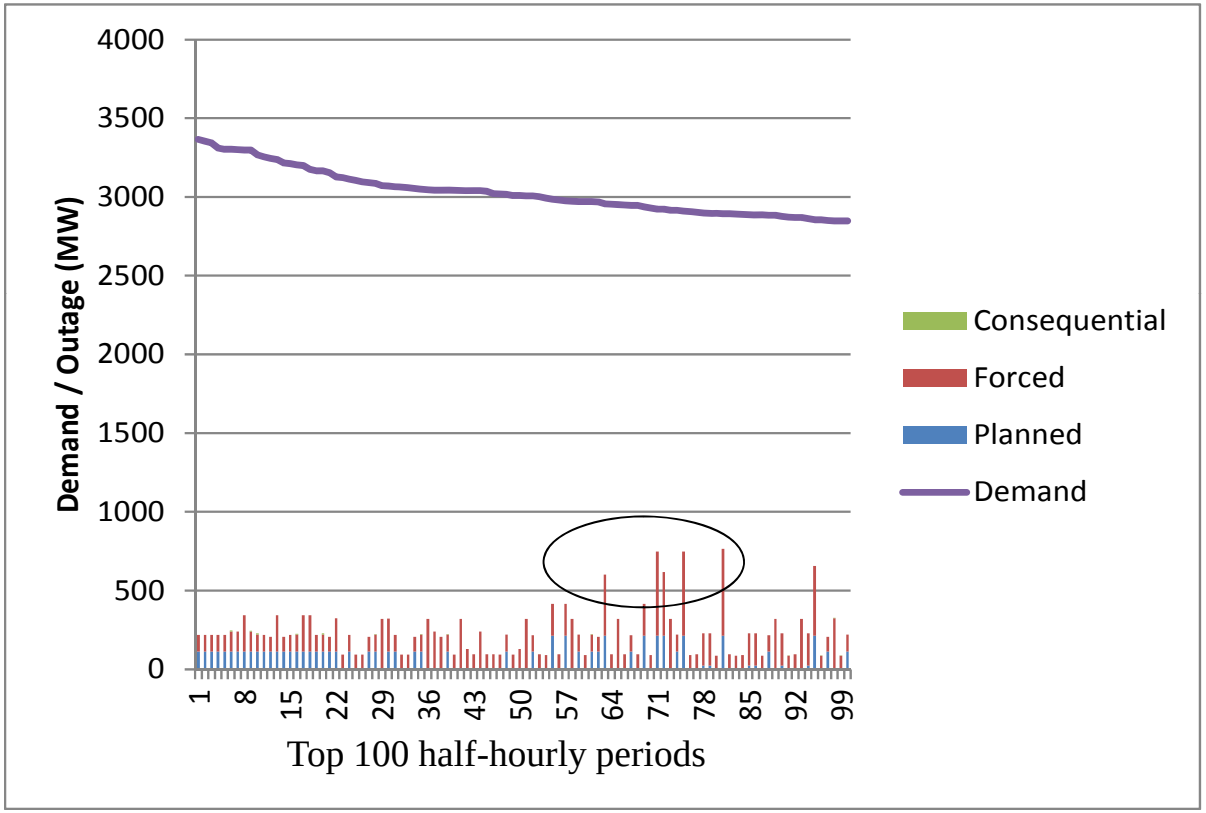
Country/Region	Level and Form of Reliability Standard	Capacity Reserve Margin
SWIS, Australia	Two-part criterion: 0.002% EUE subject to meeting a “Defined Scenario”	8.2% of 10% POE peak
North Island, New Zealand	1 drought year in 60 years (NZ)	Winter energy margin of 17% for New Zealand and 30% for the South Island.
Alberta, Canada	A two year EUE threshold of 1600 MW, current two year forecast EUE: 1,392.	n/a
Ireland (Rep & N Ireland)	LOLE expressed as 8 hours per year (ROI and NI), 8 hours per year (ROI) and 4.9 hours per year (NI).	n/a
Singapore	3 days per year LOLP	30%
Malaysia	1 day per year LOLE (0.0274 LOLP)	40%

No uniform standard. Mostly a continuation of planning standards from regulated days.

Review of Last Five Years…

	All year average outage (MW)		Average Outage During 100 half-hours of Peak period (MW)		Maximum Outage During 100 half-hours of Peak Period (MW)	
Year	**Planned**	**Forced**	**Planned**	**Forced**	**Planned**	**Forced**
2007	631	70	65	165	214	550
2008	495	223	56	173	217	691
2009	630	110	32	269	263	537
2010	727	86	93	128	381	251
2011	789	109	62	48	396	443
Average	**654**	**120**	**62**	**157**	**294**	**494**

Review of Last Five Years…



However, there were (a) coincident outages close to the peak period, and (b) some planned outages

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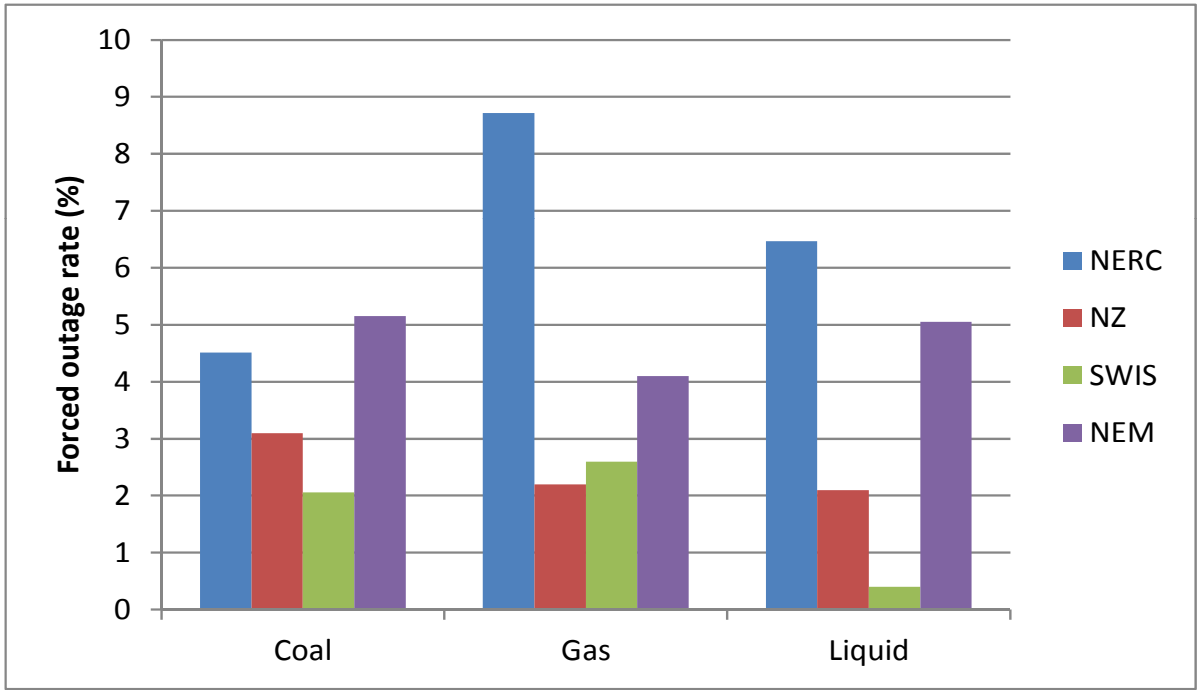
Review of Last Five Years…



Reported forced outage rates have been relatively low – about half of NERC/NZ/NEM

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Key Assumptions

- Definition of peak demand
  - 10% POE captures well the demand volatility in SWIS
  - Provides reasonable compromise in capturing the “tail” of the distribution of loads (SKM review)
  - Readily available, used for planning and network augmentation
  - Demonstrably worked well in other systems including South Australia (ETSA review 2009)
- Cost of capacity – set at administered RCP approx 15% below MRCP – approx. $122,000/MW for 2014/15
- Cost of unserved energy (or VCR – value of customer reliability) estimated for the Eastern states at $47,850/MWh with a 20% band (AEMO VCR Issues Paper January 2012: http://www.aemo.com.au/~/media/Files/Other/planning/0400-0055%20pdf.pdf)

Scenarios

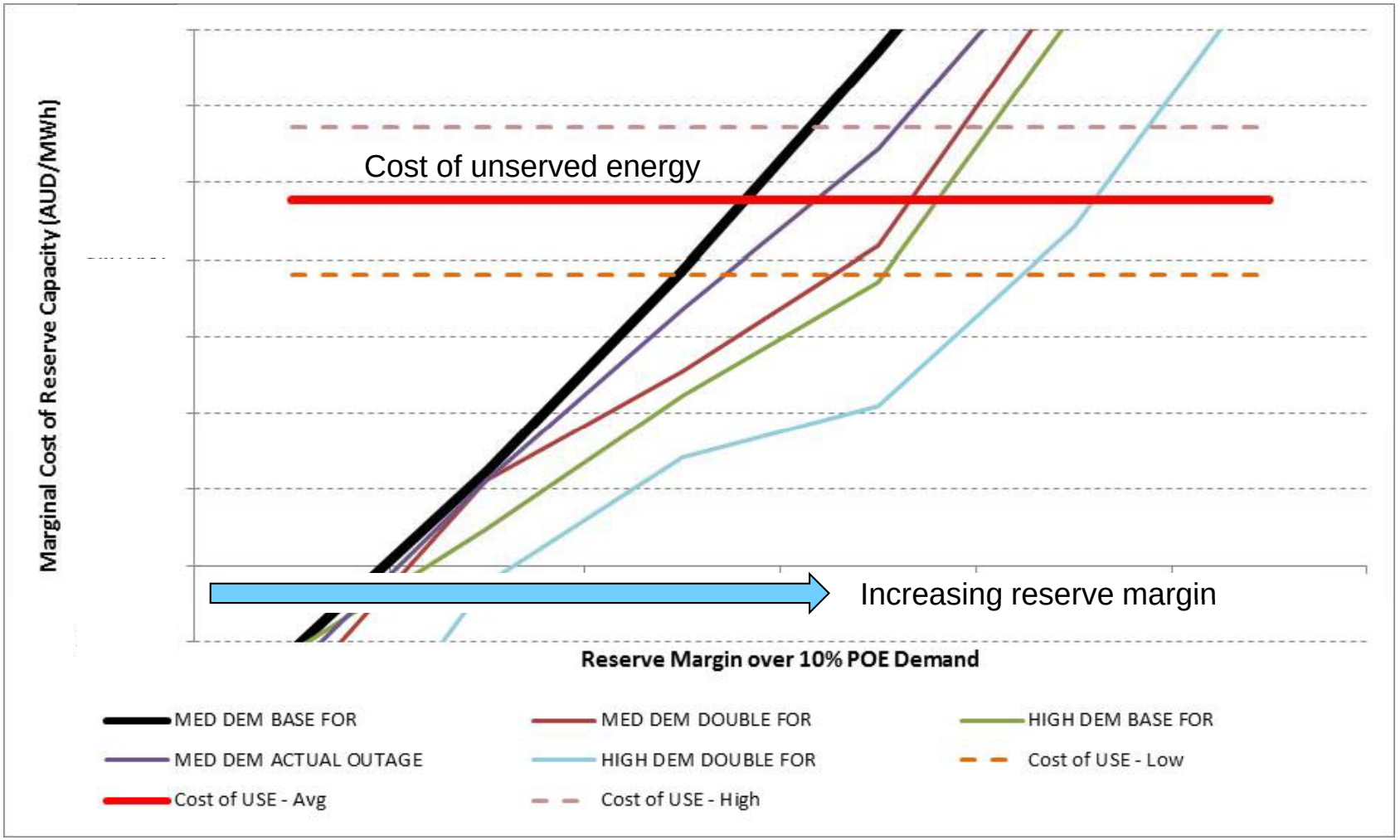
Medium Economic Growth

- Base forced outage rates
- Double forced outage rates
- Actual outage rates

High Economic Growth

- Base forced outage rates
- Double forced outage rates

Cost Benefit Analysis of Planning Criterion



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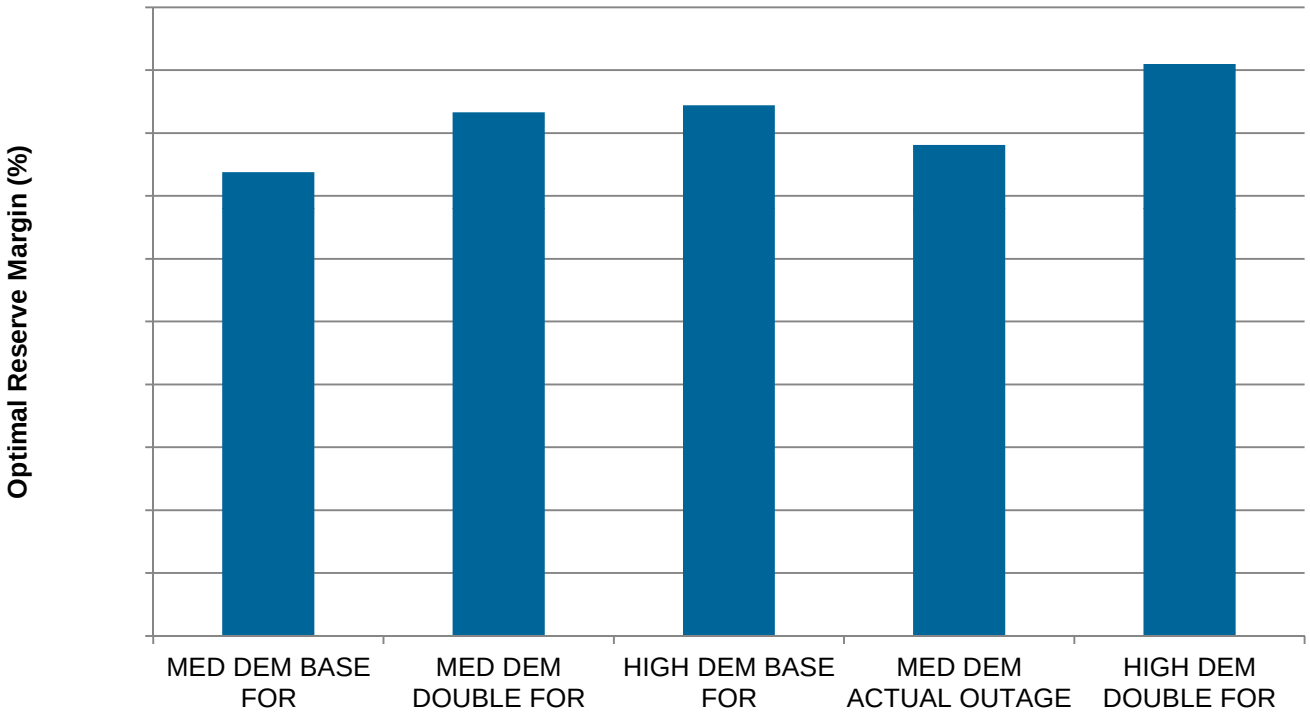
Cost Benefit Analysis of Planning Criterion



We need to consider a weighted average of median scenarios

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Comparison of Alternative Standards

Illustrative example

	x% over 10% POE	Largest generator	LOLP/LOLH of 5 hours
Reserve level (MW)	427	330.6	458
Frequency of capacity shortfall	5.5	**8**	5
Max depth of shortfall across all simulations (MW)	264	360	236
Max Duration of Shortfall (Hours)	1	3	1
Unserved Energy (MWh)	186	**583**	156

LOLP 0.05% requires RM that is higher but yields little marginal benefit: The x per cent margin achieves very similar performance as the LOLP 0.05% (or LOLH 5 hour). While the latter helps to lower the depth of shortfall for **one half-hour period** by 28 MW, it requires 31 MW of additional capacity

Largest generator (330.6 MW) leaves the system open to significant USE and number of load shed events

Concluding Remarks

- **No obvious international standard that can be adopted:** Little uniformity internationally – LOLP/LOLH standards from regulated regime continued in many cases without a clear economic rationale. SWIS has already tried a LOLH standard but it does not befit its “peaky” loadshape

- **Significant outages close to peak have occurred:** Standard forced outage rates that are close to half of outage rates in other systems, do not adequately reflect this risk – albeit, surplus capacity in recent years adequately covered for these

- **Max USE component is heavily dominated by the Defined Scenario making the former redundant**

- **We need to consider actual outages in arriving at MCRC which in turn determines the reserve requirement**

- **We also need to compare the performance of Defined Scenario with other standards, e.g., the largest generator, LOLH, deterministic approximation**

Present Status & Next Steps

- **We are currently undertaking modelling analysis to assess MCRC using updated demand forecasts**

Next steps:

- **Draft report -- around early July**
- **Stakeholder consultation -- July/August**
- **Final report – around 31 August**
- **Final presentation to MAC – 12 September**
- **IMO publishes final report – 16 October**