Net STEM Shortfall

MAC Meeting #26
10 February 2010

Overview

- The Net STEM Shortfall, SF, is a variable that is calculated by a formula in 4.26.2
- Identifies for each trading interval the quantity of Reserve Capacity that was:
  1. unavailable to the market, AND
  2. was not already reported as a forced outage
- The variable SF together with the Participant Forced Outage Refund forms part of the total Capacity Cost Refund (4.26.3)
- The NET STEM Shortfall therefore is a mechanism to capture capacity credit shortfalls that escape the obligatory reporting of forced outages to System Management

Issue

- Clause 4.26.2 has the following unintended consequences:
  1. Portfolios with intermittent generators will be able to off-set any Net STEM Shortfall stemming from a scheduled generator with any amount of actual output of the intermittent generators (MSQ > 0)
  2. Portfolios with curtailable loads will generate a Net STEM Shortfall equal to the reserve capacity obligation of the curtailable load unless offset by intermittent generators in the portfolio
  3. Portfolios with interruptible loads will generate a Net STEM Shortfall equal to the reserve capacity obligation of the interruptible loads unless offset by intermittent generators in the portfolio.
- The unintended consequences only apply to multiple facility portfolios which include at least a curtailable load, interruptible load or intermittent generator

Formula and variables

- Net STEM Shortfall Formula:

$$SF = \text{Max}\left(RTFO , RCOQ - A + \text{Max}(0, B - C) \right) - RTFO$$

Where:

$A = \text{Min}(RCOQ , CAPA)$
$B = \text{Min}(RCOQ - RTFO , DSQ)$
$C = \text{Min}(DSQ , MSQ)$

SF	Net STEM Shortfall
RTFO	Real Time Forced Outage
RCOQ	Reserve Capacity Obligation Quantity
CAPA	Capacity made available*
DSQ	Dispatch Schedule Quantity
MSQ	Metered Schedule Quantity

*Note that the CAPA variable is a sum of several elements, one of which is the RCOQ of Curtailable and Interruptible Loads in the portfolio

- All variables that form part of the SF calculation are summed over all facilities in the portfolio *before* the calculation of SF
- Summation of variables causes the unintended outcomes

Example: Intermittent Generator

- The intermittent generator's output (MSQ) offsets net STEM shortfall created by scheduled generator

	Scheduled Generator	Intermittent Generator	Portfolio
SF	**40**	**0**	**10**
RCOQ	100	0	100
RTFO	0	0	0
DSQ	100	30	130
MSQ	60	**30**	90
CAPA	100	0	100
A	100	0	100
B	100	0	100
C	60	30	90

Example: Curtailable / Interruptible Loads

- The curtailable and interruptible loads both increase the net STEM shortfall of the portfolio by up to their RCOQ

	Scheduled Generator	Curtailable Load	Interruptible load	Portfolio
SF	**0**	**0**	**0**	**40**
RCOQ	100	**20**	**20**	140
RTFO	40	0	0	40
DSQ	100	0	0	100
MSQ	60	0	0	60
CAPA	100	20	20	140
A	100	20	20	140
B	60	0	0	100
C	60	0	0	60

Example: Intermittent Generator / Curtailable Load

- Curtailable load contributes RCOQ of 20 towards SF
- Intermittent generator is offsetting by its MSQ of 15
- Portfolio SF still incorrectly calculated as 5.

	Scheduled Generator	Intermittent Generator	Curtailable Load	Portfolio
SF	**0**	**0**	**0**	**5**
RCOQ	100	0	**20**	120
RTFO	40	0	0	40
DSQ	100	15	0	115
MSQ	60	**15**	0	75
CAPA	100	0	20	120
A	100	0	20	120
B	60	0	0	80
C	60	15	0	75

Potential solutions

- Three potential solutions identified:
  1. Facility level calculation of Net STEM Shortfall (SF)
     - Calculate SF for each Facility separately, then sum Facility SFs to arrive at a portfolio value of SF
  2. Remove clause 4.26.2
     - The Market Rules (3.21.4) require that all forced outages be reported to System Management
     - Forced outages are subject to capacity cost refunds (4.26.3)
     - If all forced outages are reported there is no need for SF
  3. Amend clause 4.26.2
     - Remove reference to RCOQ of interruptible and curtailable loads in the calculation of CAPA
     - Explicitly remove the contribution of intermittent generators to the portfolio MSQ and DSQ values

Initial Assessment

- Facility Level Calculation:
  - Some elements of CAPA only exist at the portfolio level (net contract position, STEM Bids, STEM Offers)
  - Not possible to implement without completely re-defining CAPA
- Remove clause 4.26.2
  - Undesirable solution as any forced outages that go unreported will no longer attract appropriate refund cost
- Amend clause 4.26.2
  - Provides potential solution without creating loophole for capacity refunds
  - Further detailed assessment of this solution necessary before formal rule change can be submitted

Way forward

- IMO welcomes feedback on
  - Proposed solution
  - Other potential alternatives
- IMO's initial view is that solution 3 better facilitates the intended outcomes and can be implemented without widespread change to the Market Rules
- IMO will develop the proposed solution further if no other alternatives are presented
- IMO intends to present a formal rule change proposal to the next MAC to address issue