

Operating Reserves Market Redesign Project Update

March 4, 2010

Market Services Stakeholder Session

Kris Aksomitis

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Agenda

- Goals of the Operating Reserves Market Redesign
- Current Operating Reserves Market Design
- Recommendation for Redesign
- Changes from January 2009 Recommendation
- ISO Rules for Operating Reserves

Goals for the Operating Reserves (OR) Market Redesign



- Reduce AESO influence in the market
 - AESO is the only buyer in the market
 - AESO has discretion particularly in the Standby market
- Improve transparency
 - Most volume is on NGX but some volume trades Over-the-Counter (OTC)
 - Lack of clarity for what is a ‘winning bid’ in Standby
- Create better alignment with the energy market
 - Different price mechanisms, Standby activation price not aligned with energy market
- Simplify the market design
 - Relatively small market compared to energy yet much more complex
- Create appropriate ISO Rules for the OR market
 - Very limited rules exist today – remnant from Transmission Administrator structure prior to formation of the AESO

Current Design Overview



- Market Timing
- Volumes
 - Block Volumes
 - Shape Volumes
- NGX Market Design
 - Trades Active Block Products and Standby Products
- OTC Market

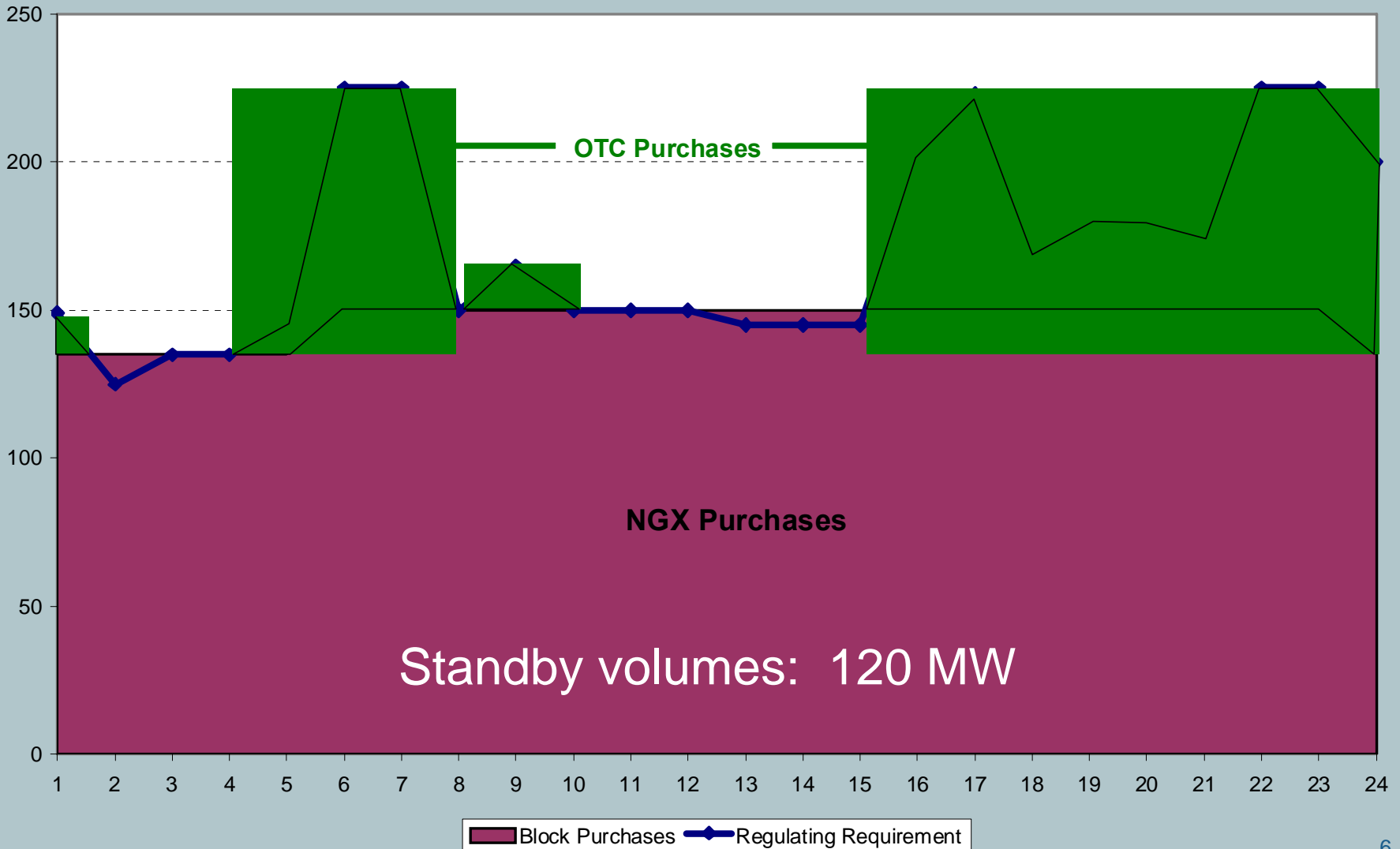
Current Design



- NGX markets operate from 8am to 10am for D-1 products
 - Active markets close sequentially
 - Standby reserve procured concurrently with Active reserve
 - OTC opens when NGX closes (10am generally)
 - OTC complete at about 11am
- NGX markets reopen for D-5 to D-2 products 2pm to 3pm
- Market is open approximately 4 hours, 5 days per week
- Spinning and Supplemental Volumes: About 7% of load
- Regulating: about 140 MW to 250 MW

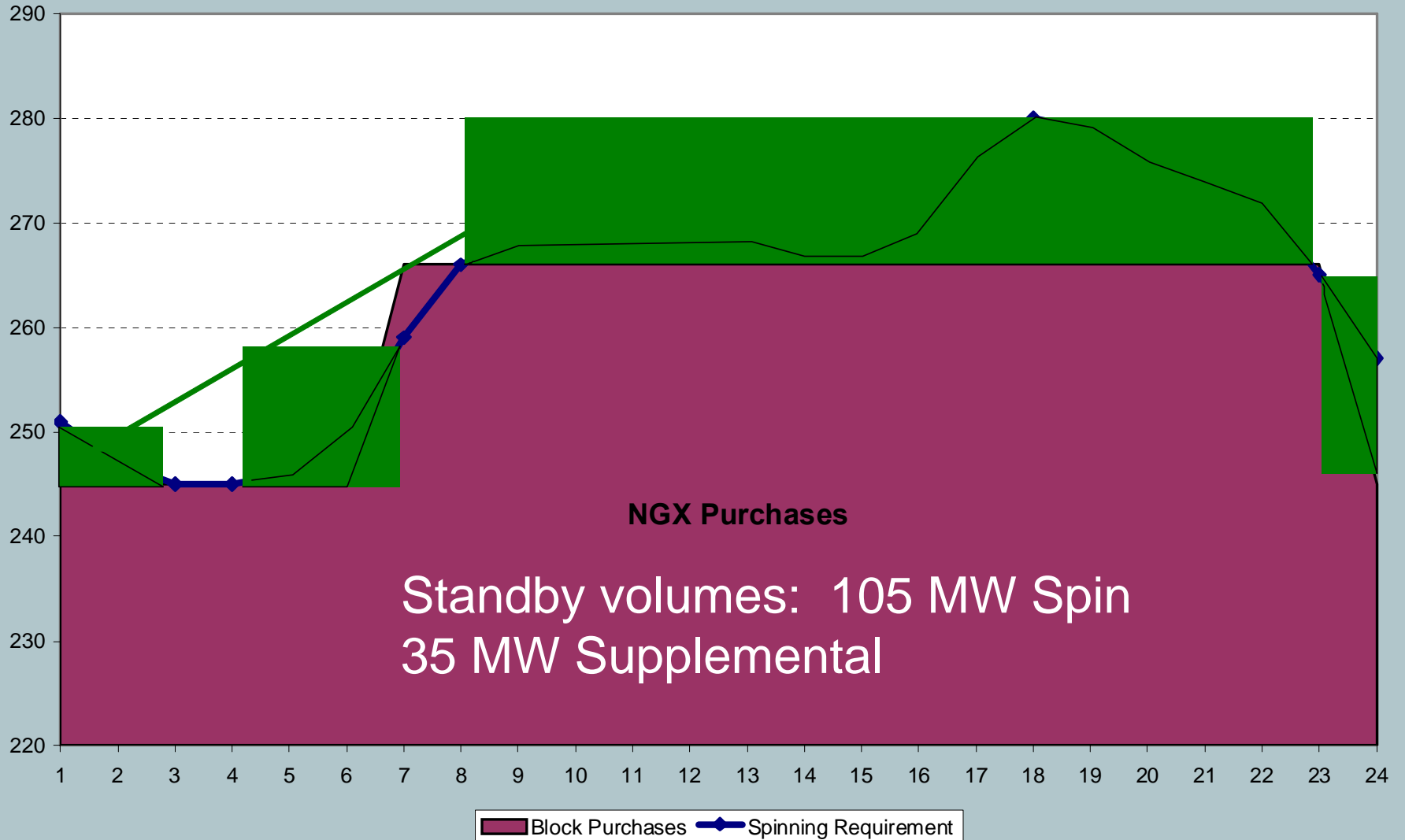
Regulating Reserve Market Volumes

Regulating Reserve Requirements (Dec 9 2009)



Spinning Reserve Market Volumes

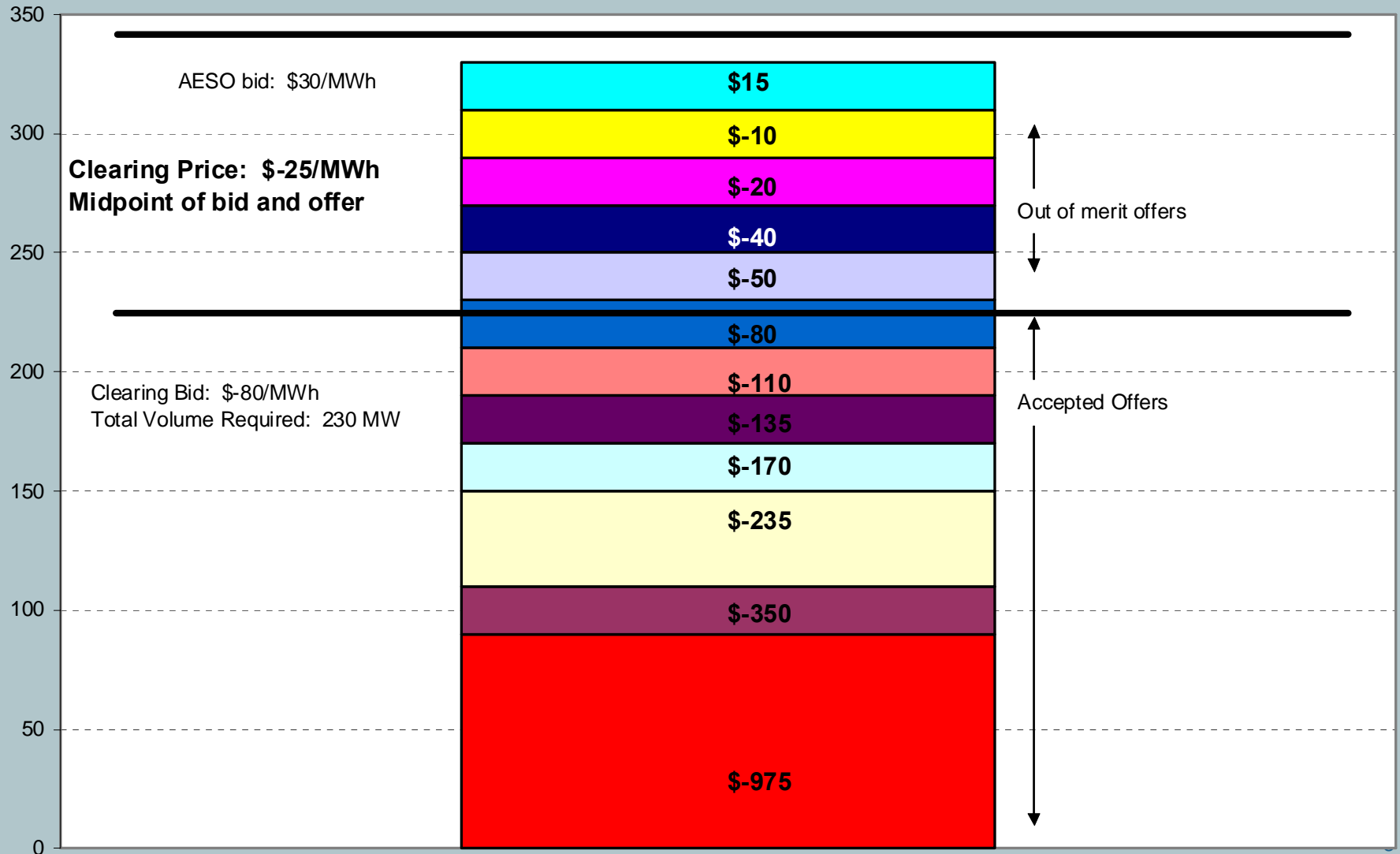
Spinning Reserve Requirements (Dec 9 2009)



Standby volumes: 105 MW Spin
35 MW Supplemental

Active NGX Market – Current Design

Active OR Market Design



Standby Market Design (current)

Sellers

AESO Bid



Issues: AESO must create a bid

No transparent way to pick between seller #1 and #2

Design unique to small standby market

Market operates before, during and after Active market

Proposed Redesign Elements



- Market Timing
- Active Market Design
- Standby Market Design
- Phased Implementation

Active NGX Market – Proposed Design

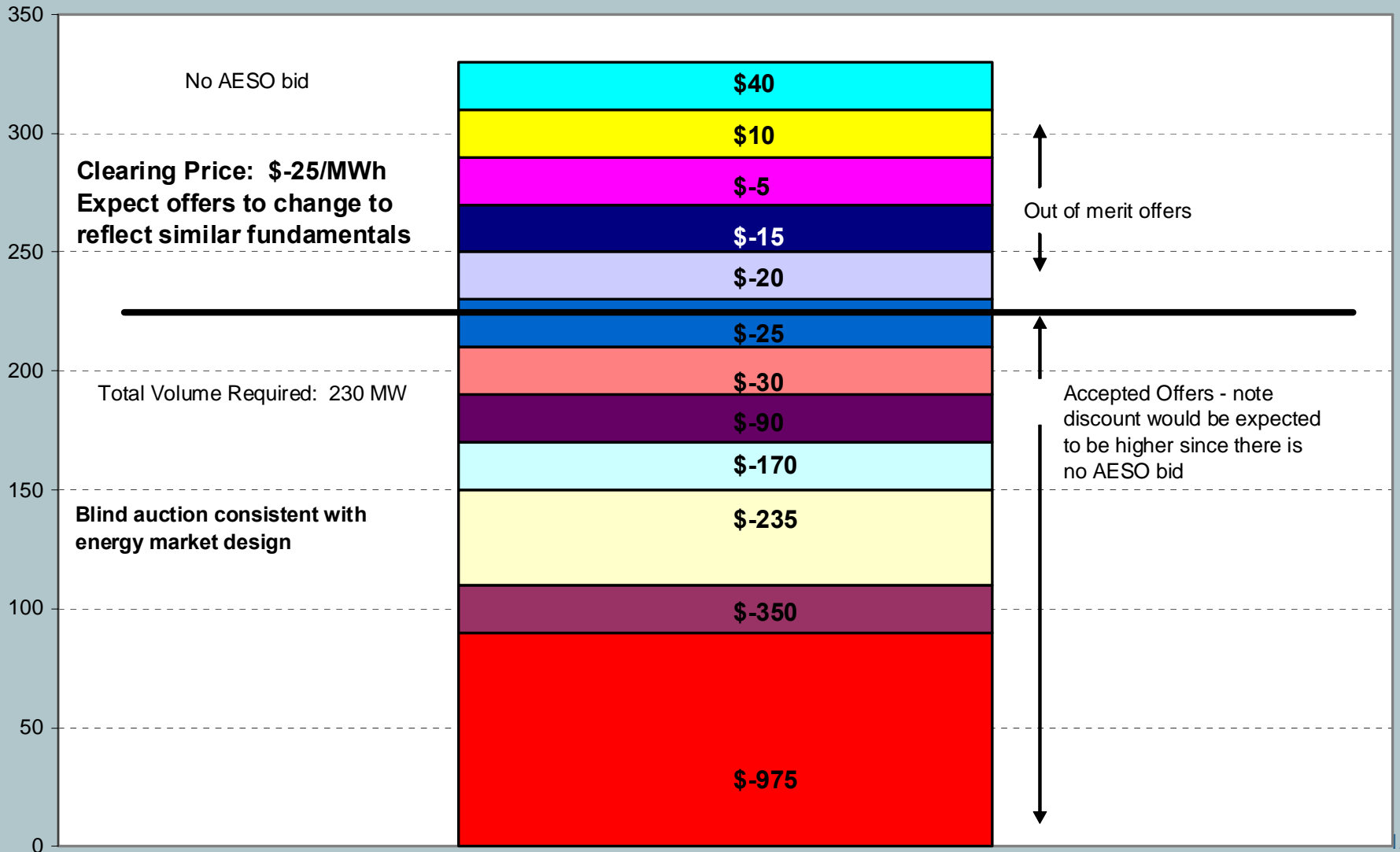


- All markets open – AESO posts volume requirements
- 9:00 am to 9:20 am Active Baseload Markets Close
- 9:40 to 10:20 Active Hourly Markets Close
- 10:30 to 10:50 Standby Markets Close
- 11:10 to 11:50 Standby Hourly Markets Close (If required)

No Afternoon or OTC session

Active NGX Market – Proposed Design

Proposed Active OR Market Design



Hourly Active Market - Proposed

- Create hourly market for Active to operate after block market is complete
- Clearing price for each hour for small volume that cannot be purchased in a block
- Could increase block size slightly to “zero” more hours

<u>HE</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>
RR Volume	0	15	0	0	0	0	0	0	50	73	20	30	30	25	75	90
Spin	0	2	2	2	2	2	1	1	3	10	14	13	10	8	6	0
Supplemental	0	2	2	2	2	2	1	1	3	10	14	13	10	8	6	0

<u>HE</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>24</u>
RR Volume	14	0	0	0	11	90	90	65
Spin	6	2	0	0	0	5	14	12
Supplemental	6	2	0	0	0	5	14	12

RR to manage morning Ramp

HE 8 to 16 could be zeroed

Key Active Elements



- No AESO Bid
 - Pure clearing price model consistent with energy market
 - 100% of volume traded at D-1
 - Blind auction as per energy market
- Hourly Market for Shape Needs
 - Model consistent with baseload Active market
 - Unique price for each hour on shaping needs
 - Maximum flexibility for participants
- No OTC market
 - Conscription if there is insufficient volume, i.e. no fallback to OTC
- Price cap will be required: \$1000/MWh total OR compensation recommended cap

Standby NGX Market – Proposed Design

Proposed Standby Premium Market Auction



Key Standby Elements



- Activation price set at baseload Active clearing price
 - Activation is not an incremental cost to AESO relative to Active
 - Fixes transparency problem with a two part price
 - Removes AESO influence – AESO sets only volume requirement
- Recommend clearing price for premium
 - Encourages efficient bidding through the blind auction
 - Consistent with the rest of the market design
- Merit order for activation based on premium
 - Lowest premium activated first when appropriate
 - Most efficient as activation should be regarded as a cost and efficient market should activate least cost first
- Incremental change – retains Standby as an insurance/option market rather than a complete redesign

Phased Implementation - Proposed



- Changes to the existing model
 - Move all procurement to D -1
 - Publish OTC price index daily
- Implement clearing price model for block products
 - Relatively small change for NGX
- Implement new Standby pricing model
- Implement hourly market for Active and Standby
 - Drop OTC market at this point

Key Changes From January 2009 Recommendations



- Shaped Active product dropped – hourly markets added
 - Shaped product was bought based on ‘selling logic’ that used volume before price similar to current OTC market
 - Recommendation is to have hourly product with clearing prices for all hours with requirements over baseload volumes
 - Participants free to offer individual hours
 - Represents about 5% to 10% of total volume
- Shaped Standby product also replaced with hourly product
 - ‘Last chance’ market solution before conscription
- Allowance for OR providers <5 MW and future role for aggregators
- Standby premium – pay as bid changed to clearing

ISO Rule Development



- Current ISO rules include framework, offers, terms for energy market but not OR market
 - Rules rewrite to provide market structure overview for all markets (energy, OR, contract AS, and DDS)
- Current ISO rules include only real time protocols for dispatch of OR
 - Rules rewrite to include overview of products, bid volume process, offer process, pricing, settlement, creation of merit order (and roles for NGX and ISO)

ISO Rule Development



- Current ISO rules outline records and compliance for energy market only
 - Rewrite rules to clarify roles for NGX and for ISO on OR products and delivery
- Current ISO rules do not include procedure and technical requirements for OR
 - AD and ID reconciliation to clarify obligations and technical specifications
- Rules will ensure OR compliance is in the right location
 - Contract issues with NGX
 - Dispatch and delivery with ISO and MSA
 - Potential double jeopardy issues will be addressed

- More AS products
 - Wind may require new products
 - Should fit into proposed design
- Long term may need to develop real-time Ancillary Services market
 - Wind uncertainty may mean day ahead is not efficient
- Alter Off Peak Definition?
 - Either drop HE 24 or add to HE 1 to 7 for following day
 - Reduce # of seams between Ancillary Services market timeframes

Supply Surplus Initiative

March 4, 2010

Market Services Stakeholder Session

Ruppa Minhas

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Agenda



- Supply surplus discussion paper components
- Purpose of rule review
- Historical analysis
- Overview of factors that contribute to supply surplus conditions
- Current procedures – OPP 103
- Short term and long term options for consideration
- Risks if supply surplus conditions are not managed appropriately
- Minimum Operating Limit (MOL) vs. Minimum Stable Generation (MSG)
- Discussion / Questions

Supply Surplus Discussion Paper Components

- Provides a background and assessment of:
 - Existing rules and procedures
 - Previously proposed protocols
 - Options for managing supply surplus conditions
- Discussion paper proposes a short term solution and initiates discussion on the long term options

Purpose of Rule Review

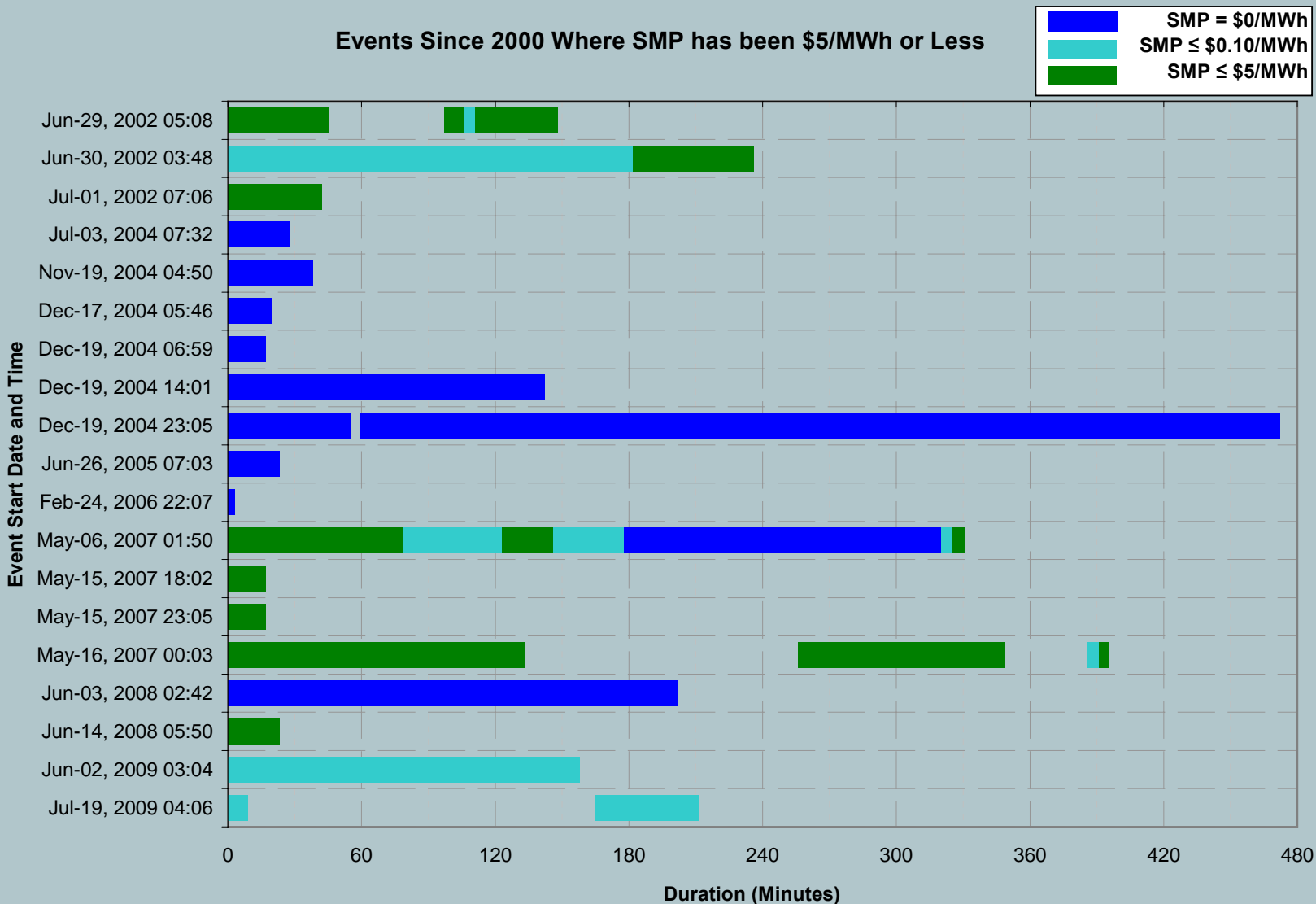


- Supply surplus was originally included as part of the Market and Operational Framework for Wind (“MOF”)
- Stakeholder comments on the MOF recommendation paper for wind suggested that further and broader consultation was required
- Ensure that the rules and procedures are updated so that all generators are treated fairly
- Ensure the rules and procedures are adequate for managing supply surplus situations appropriately as the frequency may increase due to:
 - Projected increase of wind generation
 - Commissioning of large baseload generation

Historical Analysis



Events Since 2000 Where SMP has been \$5/MWh or Less

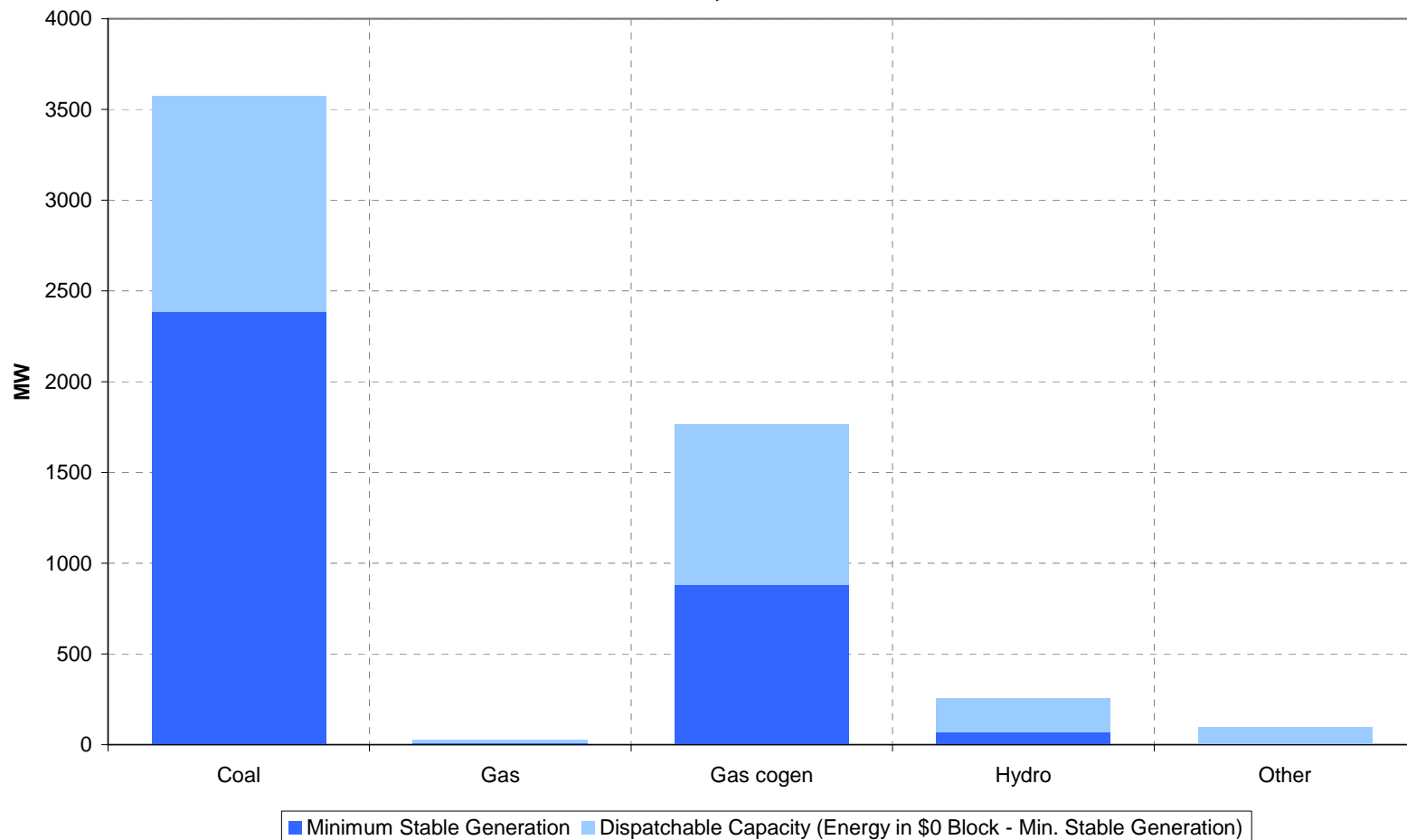


Factors that Contribute to Supply Surplus Conditions

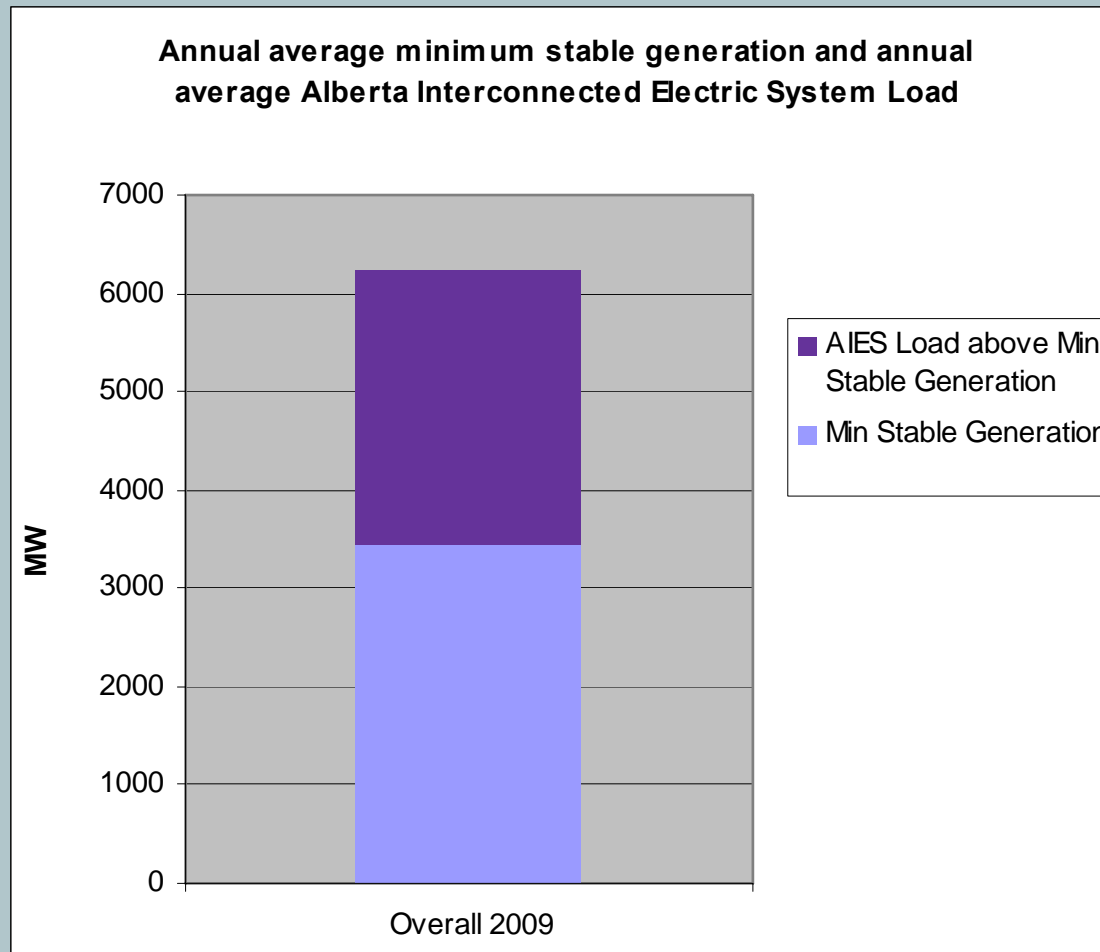
- Low levels of demand
- High levels of base-load generation
- High levels of imports
- Low levels of exports
- High levels of wind generation
- Increased hydro availability during spring run-off

Factors that Contribute to Supply Surplus Conditions

**Stated Minimum Stable Generation (MSG) & Generation Offered at \$0/MWh
above MSG by Fuel
November 26, 2009 HE 18**



Annual Average Minimum Stable Generation and Annual Average AIES Load



OPP 103 – Current Procedures



- Use of pro-rata curtailment
- Generators are directed to their declared minimum stable generation level
- Wind and cogeneration are exempt
 - The fairness and appropriateness of allowing such an exemption is evaluated as all other generators are subject to these procedures

Options for Consideration

- Short term:
 - No exemption for wind
 - No exemption for co-generation
 - Scheduling of exports within T-2 or within the delivery hour
 - Voluntary generator curtailment request (VGCR)

- Long term:
 - Adaptation of market rules for wind generation (adaptation of Must Offer / Must Comply for wind)
 - Voluntary generator curtailment program (VGCP)

Short Term Options - No Exemptions for Wind & Cogeneration “Pros”



- Fairness:
 - All generators are subject to supply surplus protocols
 - All generators are subject to curtailment
- Section 2 of the Electric Utilities Act provides direction regarding electric energy produced and consumed solely on site
- Policy direction
- Wind generators have the ability to limit the amount of wind generation

Short Term Options - No Exemptions for Wind & Cogeneration “Cons”



- For cogeneration:
 - May have an operational and financial impact

- For wind generators:
 - May be more procedurally complicated due to the lack of offer visibility

Short Term Options – Voluntary Generator Curtailment Request



- System Controller would send a request to the market for generators that have the ability to curtail supply
- Would be a step within the supply surplus procedures

Pros:

- Comparable step in supply shortfall procedures
- May result in enough energy curtailment to avoid having to curtail generators more significantly impacted

Cons:

- No obligation therefore there may be no MW curtailed

Short Term Options – Exports within T-2



- Maximize the export ATC limit within the current hour to allow for exports during supply surplus conditions

Pros:

- Comparable step in supply shortfall procedures
- Including this step early in the procedure may help reduce the impact, or avoiding curtailment of generators under supply surplus procedures

Cons:

- May have only a minimal impact in the current hour

Long Term Options

Option	Pro	Con
Adaptation of Must Offer / Must Comply for wind generation	Subject to similar rules as all other generators Visibility of wind energy in the merit order	Depends on a reliable forecast

Long Term Options (cont'd)

Option	Pro	Con
<ul style="list-style-type: none"> • VGCP • Compensated by generators • May be the last step in supply surplus procedures 	<ul style="list-style-type: none"> • Decreased risk of curtailment for other generators • Comparable step in supply shortfall procedures • In market solution 	<ul style="list-style-type: none"> • May provide perverse incentives for generators to wait until this step in the procedure • May not make sense to pay a generator to curtail, when market economics reflect \$0 • Fair mechanism to determine payment for generators required; may result in a VGCP “market” based on merit order dispatches • VGCP may not even be required, we may not ever reach this step in the procedure

Risks if Supply Surplus Conditions Not Managed Appropriately

- Challenges maintaining supply-demand balance
- Potential for control area violations
- Impact on generators and load from over-supply



MOL vs. MSG

- MOF recommendation paper for wind proposed a new term: Minimum Operating Level (MOL)
- Both MOL and Minimum Stable Generation (MSG) are physical limits, determined by the participant
- The current definition of MSG may benefit from some refinement
- AESO questions the need for both MSG and MOL

Intertie Capacity Restoration Project Update

March 4, 2010 Market Services Stakeholder
Session

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Agenda

- Policy Questions
- Import Capacity Restoration
- Export Capacity Restoration
- Next Steps

- AESO is obligated by Transmission Regulation and policy to restore the intertie
 - Policy suggests 1000 MW of exports and 800 MW for imports
 - AESO has determined that 935 MW is the reliability limit for exports and 715 MW for imports under the current system configuration given sufficient support services (approximate limits)
- Cost Allocation?
 - Exact design will be determined in working groups but Alberta government policy is quite explicit (**see next slide**)
 - Variable costs for opportunity services charged to users – tariff principle
- Solution should not interfere with the market
 - Must-run generation not a solution, i.e. Transmission Must Run not considered due to T-Reg (**see next slide**)

Policy Background

• *“Since the ability of inter-ties to exchange electricity in both directions (i.e. import and exports) is essential to a robust wholesale market and a reliable electric system, the cost for internal reinforcements and RAS arrangements to allow the inter-ties to function as designed will be allocated to load.” – 2003 TDP, Page 9*

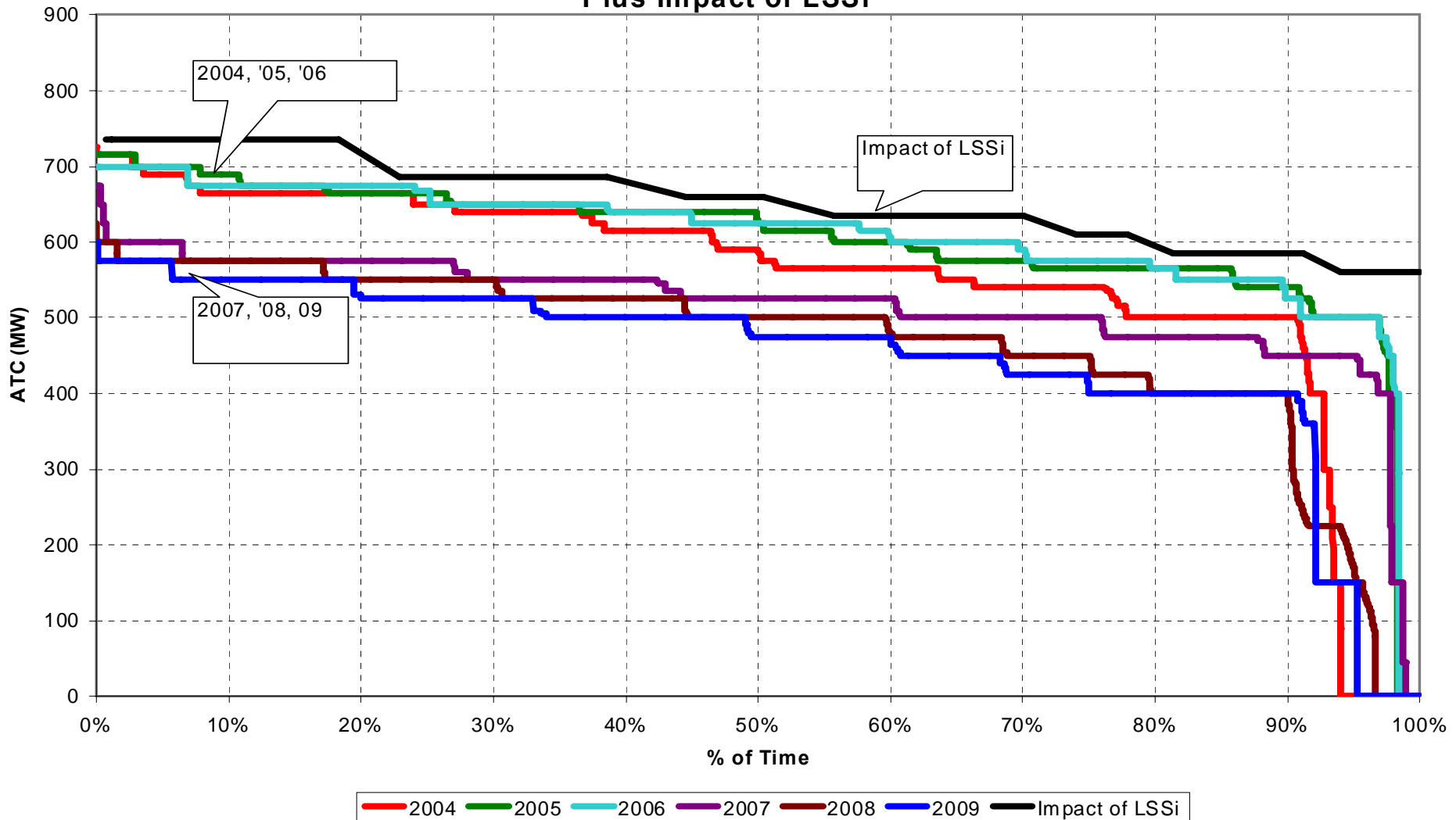
• **16(2)** *The plan to restore interties to their path ratings must specify how the ISO intends to restore and maintain each intertie to, or near to, its path rating without the mandatory operation of generating units. – AR 86/2007 (T-Reg)*

Import Restoration

- Current maximum for imports is 600 MW
- Recommend development of Load Shed Service for Imports (LSSi)
 - Armable LSS product that allows more LSS on the system than current limit of 150 MW
- LSSi can increase the ATC limit to 715 MW
- Up to 480 MW of LSSi is effective in increasing the import limit
 - 480 MW of LSSi would put the import limit at 565 MW in low load hours and 715 MW in high load hours
 - 150 MW to 200 MW of import capacity added across the ATC duration curve

Impact of Load Shed Service for Imports

BC Import ATC Duration Curve 2005 - 2009 Plus Impact of LSSi

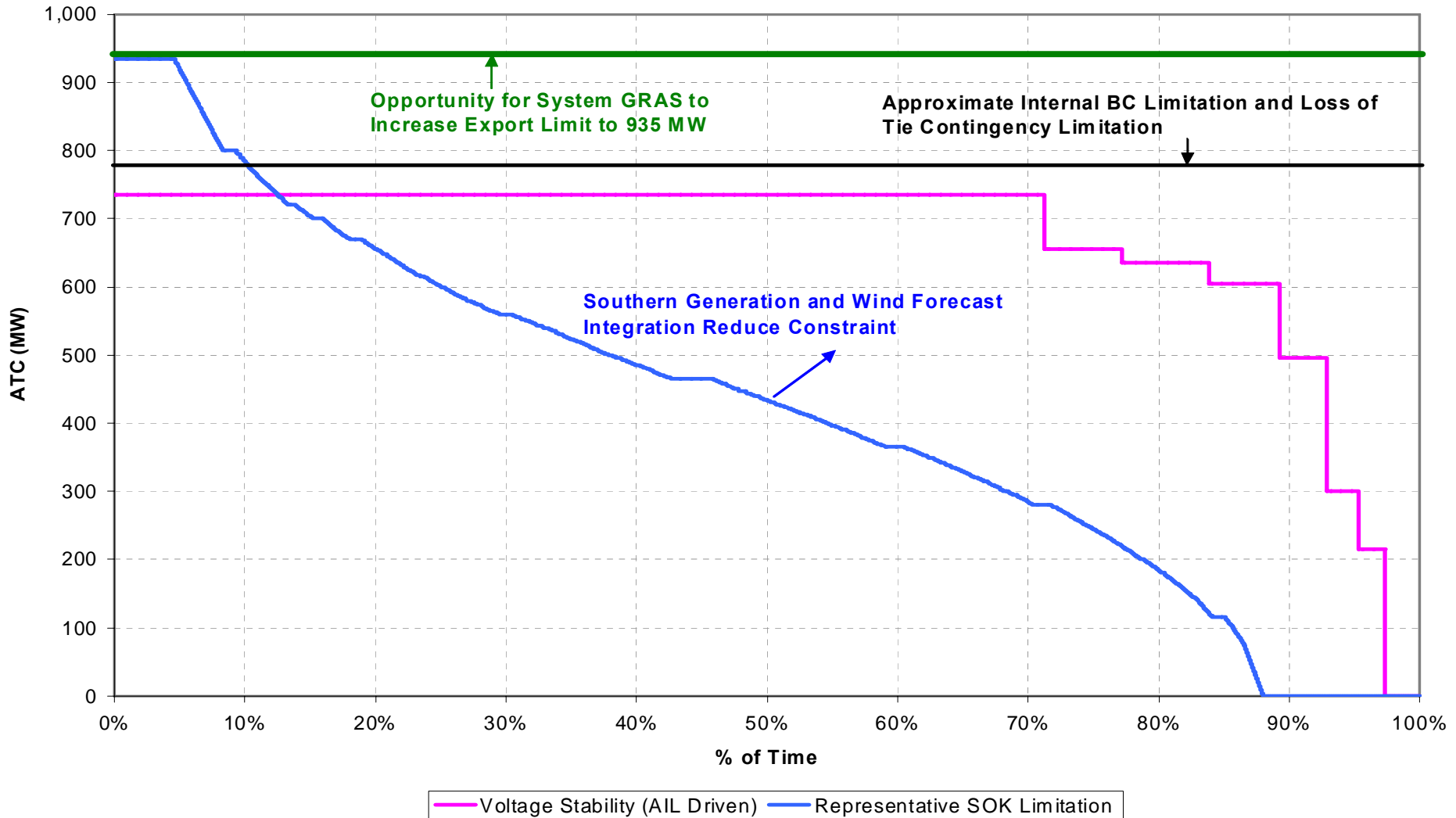


Export Restoration

- Current maximum for exports is 735 MW
- Recommend development of Generator Remedial Action Scheme (GRAS) to potentially move maximum ATC to 935 MW
 - Product will need to be armed for both Alberta and BC contingencies to achieve the maximum benefit
 - Alberta load will not pay to resolve BC issues, i.e. solution will need to be coordinated with BCTC
- GRAS is not recommended to resolve SOK limits
 - Not clear this is technically feasible with recent and expected transmission infrastructure
 - Short-term benefit only since North/South upgrade resolves this limitation
- Integrating wind forecast into ATC calculation expected to increase export ATC 'for free'

Export ATC Limitations

Representative Export ATC Limits and Opportunities



Next Steps

- Release Discussion Paper
- Form Working Groups to design and implement products
 - LSSi Working Group
 - GRAS Working Group
 - Groups are independent
- Working Groups to consult on:
 - Product design – contract vs market, price mechanism, use in the market, details for cost allocation
 - Technical standards are a function of reliability requirements
- Designing and implementing LSSi and GRAS is a priority for Market Services in 2010