

Use of a Variable Peak/Average Forecast and Adequacy Report Updates

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Objective

- Review and discuss the following proposed changes:
 - Improvements to the Adequacy Report
 - Implement various updates to improve and clarify the information presented to market participants
 - Align demand forecast with changing system conditions
 - Provide a more accurate representation that is reflective of the current supply mix

Agenda

- Proposed Changes to the Adequacy Report
- Proposed Changes to Peak Demand Hours
- Implementation Schedule
- Next Steps

Proposed Changes To Adequacy Report

Proposed Changes to the Adequacy Report

- New Adequacy Reports implemented June 2016
- Three improvements were identified:
 1. Demand Forecast
 2. Variable Generation Forecast Publishing Method
 3. Reporting of Regulation Requirement

Adequacy Report – Demand Forecast

- Current: Publish Peak and Average Demand
 - Separate forecasts currently published in report
 - Peak or Average forecast used for scheduling
 - Not transparent when forecast is manually adjusted
- Proposed: Publish Forecast Ontario Demand
 - Use of variable peak/average forecast
 - Additional row to represent value that is used for scheduling (peak or average forecast)
 - Different only if manually adjusted
- Benefit:
 - Use of forecast more reflective of system need
 - Improved transparency to market

Adequacy Report – Variable Generation Forecast

- Current reporting method
 - Published forecast varies across timeframes
 - 18 Month Outlook and Day 8-34 – forecast based on contribution factor
 - Day 0-7 – forecast provided by centralized forecaster
 - Forecast reflects most accurate data available
 - Wind contribution factor or centralized forecast
 - Increased error when forecasting variable generation a week in advance
 - Impacts overall forecast of adequacy and operational decisions

Adequacy Report – Variable Generation Forecast

- Proposed: New reporting method
 - Change to forecast logic used for Days 2-7
 - Use lesser of centralized forecast and contribution factor forecast
 - Implement penalty of 10% on forecasts under 500 MW
 - No change to forecast logic for other periods
 - Day 8-34: Continue use of forecast based on contribution factor
 - Day 0-1: Continue use of centralized forecast
 - Benefits
 - More certainty in variable generation forecast
 - Reduced occurrences of over-forecasting
 - Improved transition between forecast periods

Adequacy Report – Regulation Requirement

- Current:
 - Changes to regulation requirement published via advisory notice when amount exceeds minimum
 - Increased variability of regulation requirement results in additional workload to provide notification
- Proposed:
 - Hourly regulation requirement to be published in the Adequacy Report
- Benefit:
 - Reduced IESO workload
 - No change to transparency

Proposed Changes To Peak Demand Hours

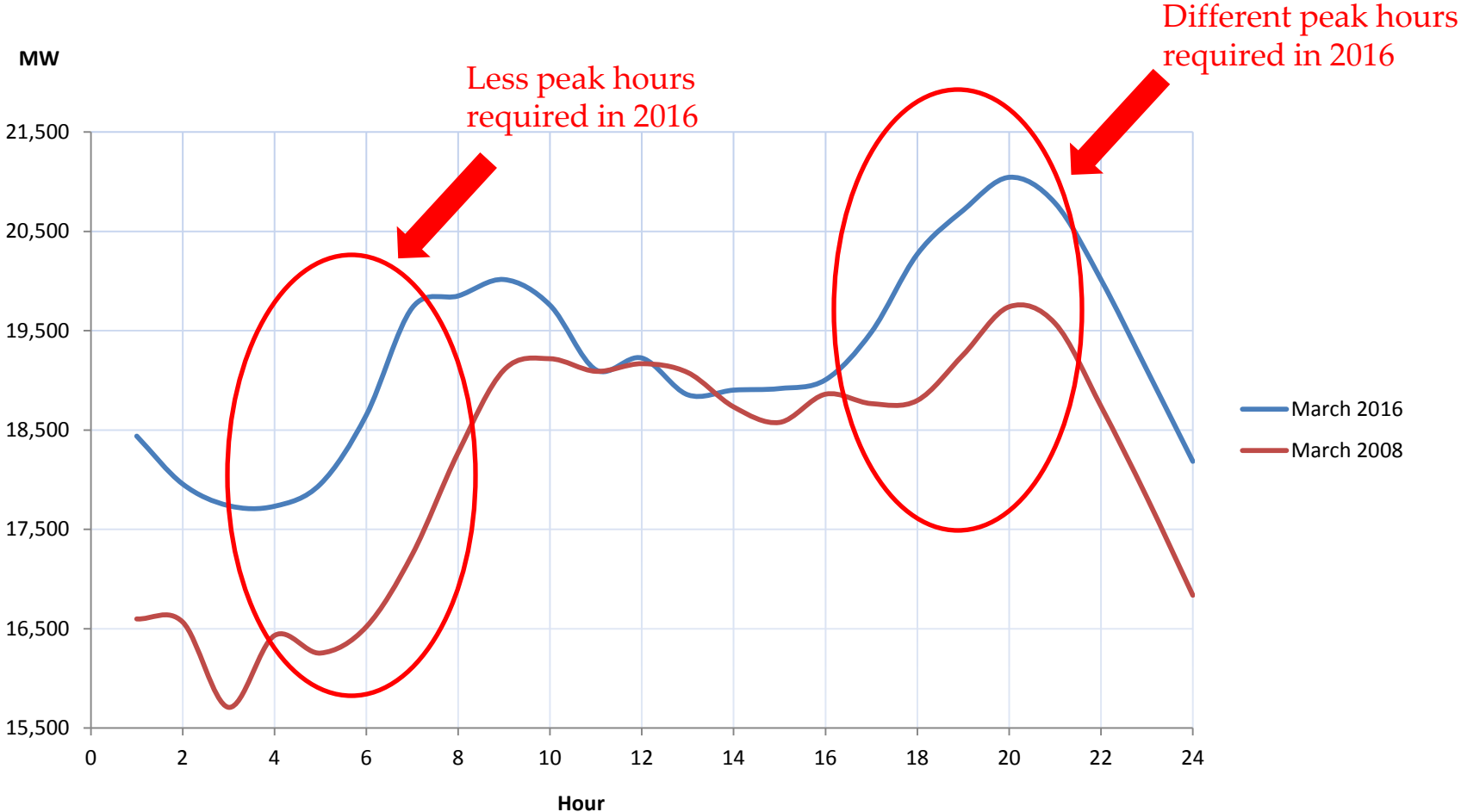
Proposed Changes to Peak Demand Hours

- Background:
 - Prior to 2008, resources were scheduled using a peak demand forecast for all hours
 - SE-54
 - Identified efficiency gains by using average demand forecast for all hours
 - Determined that for reliability, peak demand would be used for ramp hours only

Proposed Changes to Peak Demand Hours

- Current:
 - Ramp hours determine use of peak demand forecast
 - Fixed set of hours that varies by season
 - Defined in Market Manual 4.2
 - Pre-dispatch schedules to peak demand during ramp hours
 - Ensures sufficient resources are scheduled
 - Issue:
 - Selection of ramp hours based on demand curve from 2008

Proposed Changes to Peak Demand Hours



Proposed Changes to Peak Demand Hours



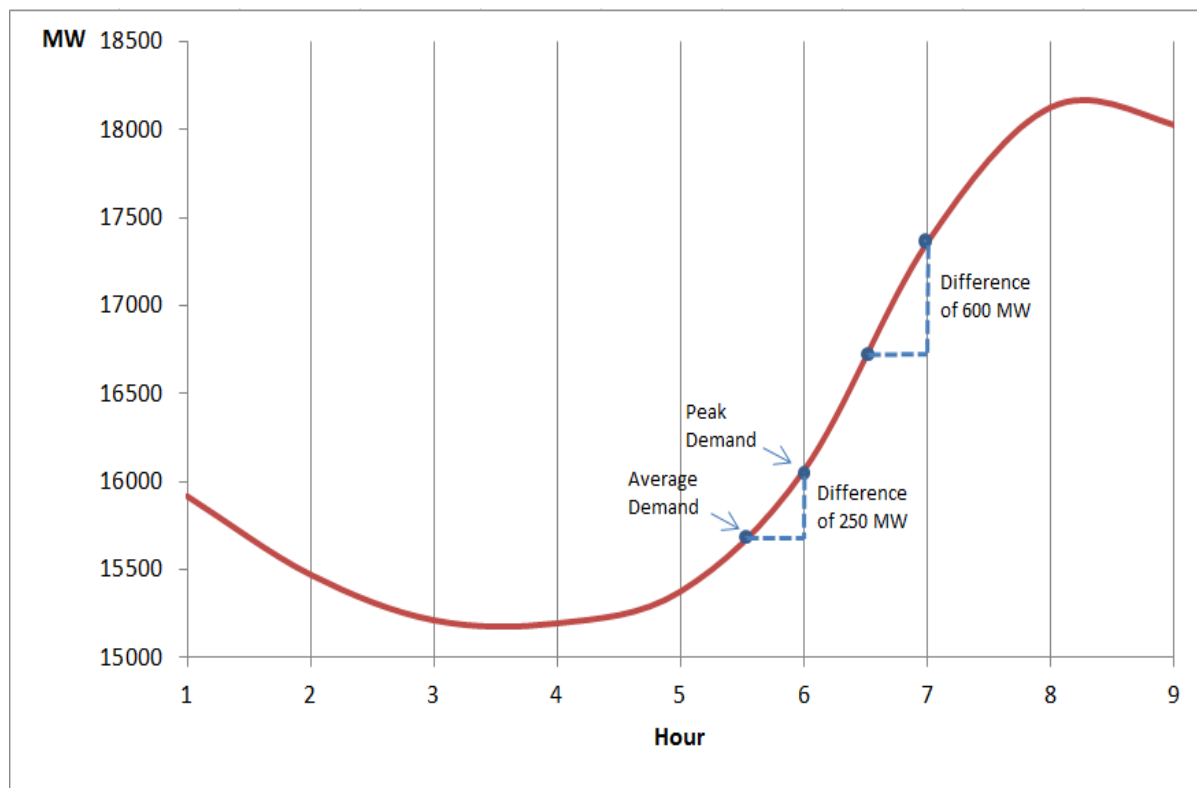
Proposed Changes to Peak Demand Hours

- Why is this an issue?
 - Improper scheduling of imports in pre-dispatch
 - Under-scheduling imports during hours with steep ramps
 - Over-scheduling imports during hours with low ramp need
 - Use of defined hours reduces operating flexibility

Peak Demand Hours - Proposal

- Dynamic selection of peak hours:
 - Day-ahead selection of peak demand forecast using threshold
 - Peak > Average by at least 300 MW
 - Day-at-hand adjustments to peak demand forecast
 - Align demand forecast in pre-dispatch with changing system conditions
 - No change to current procedure

Peak Demand Hours - Proposal



HE6 – Average demand used for scheduling

HE7 – Peak demand used for scheduling

Peak Demand Hours - Proposal

- Benefits of dynamic peak hours:
 - Ensures sufficient resources are scheduled in pre-dispatch
 - Provides flexibility in hours designated as peak

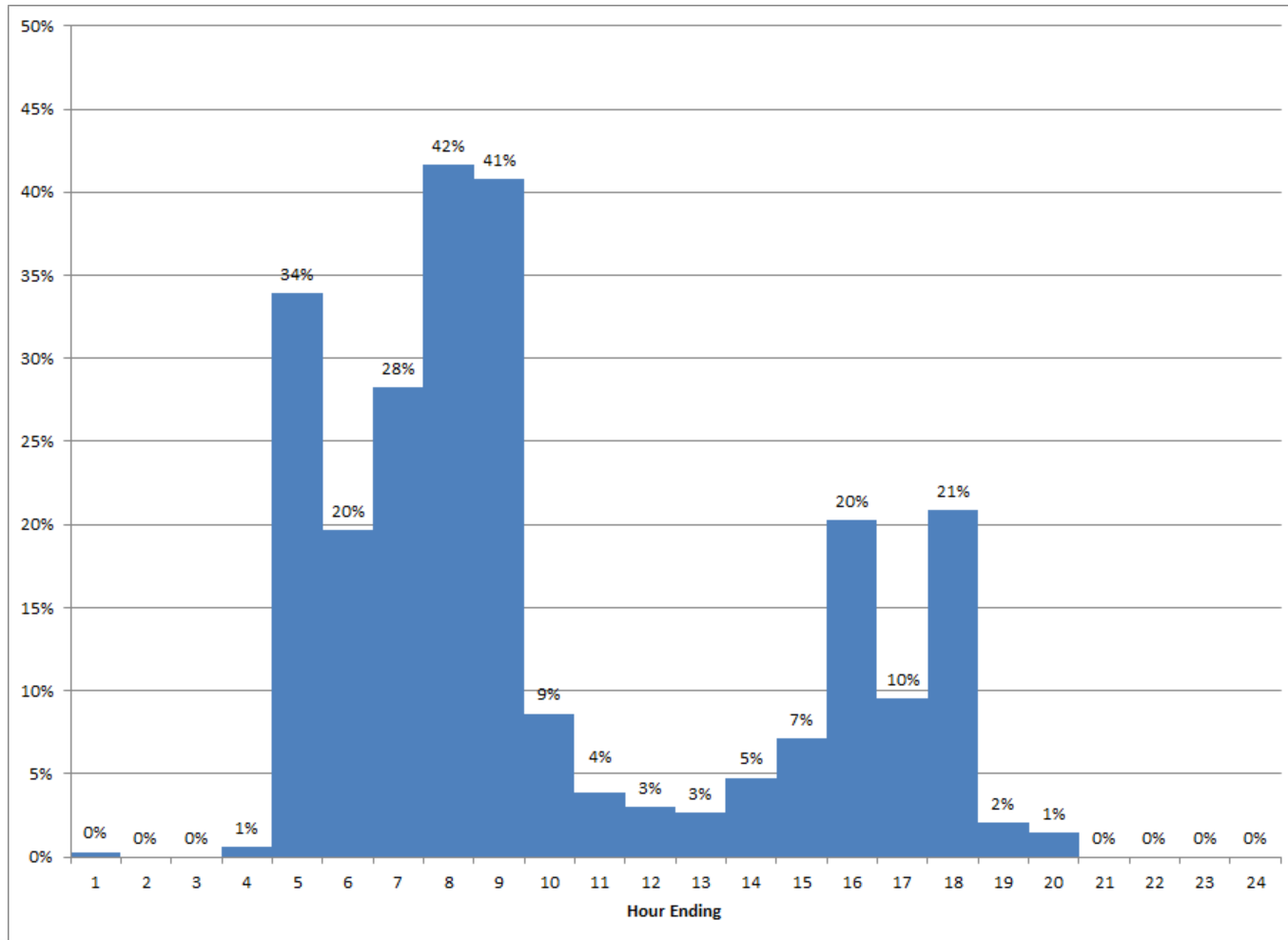
Impact of Using a Variable Peak/Average Forecast for Pre-Dispatch

- Impact assessed using IESO pre-dispatch and real-time market simulators
- Pre-dispatch simulator determines intertie schedules as inputs for the real-time simulator
- Real-time simulator calculates unconstrained MCP for energy and OR
- Period of October 2015 to September 2016 assessed
- Historical bids and offers used as inputs

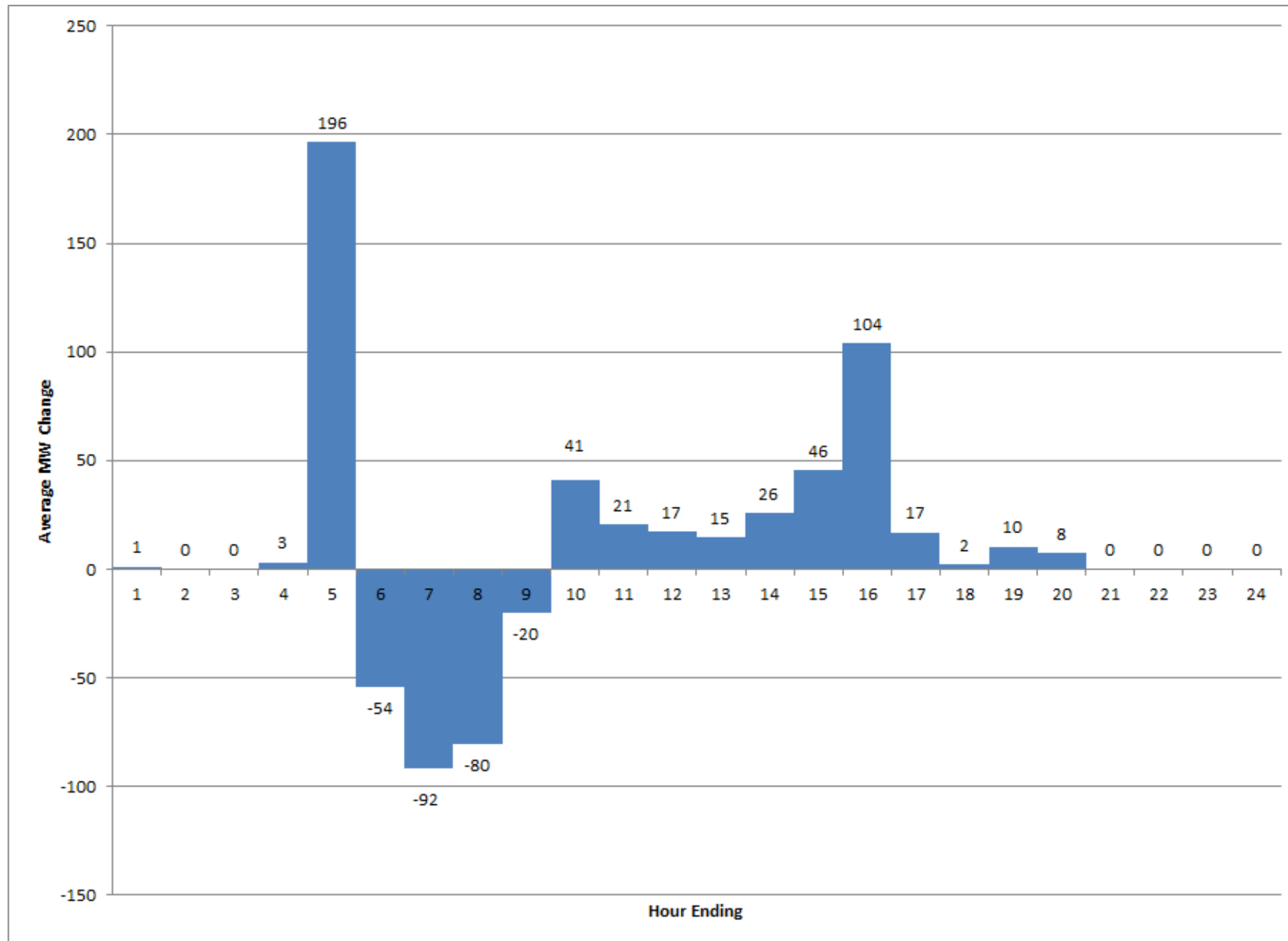
Number of Hours Affected

- If the proposed forecast change was applied to the study period, the pre-dispatch forecast for about 1200 hours would have been affected
 - 500 hours changing from using average forecast to peak forecast
 - 700 hours changing from using peak forecast to average forecast

Frequency of Affected Hours in Study Period



Average Pre-Dispatch Demand Change Over Study Period

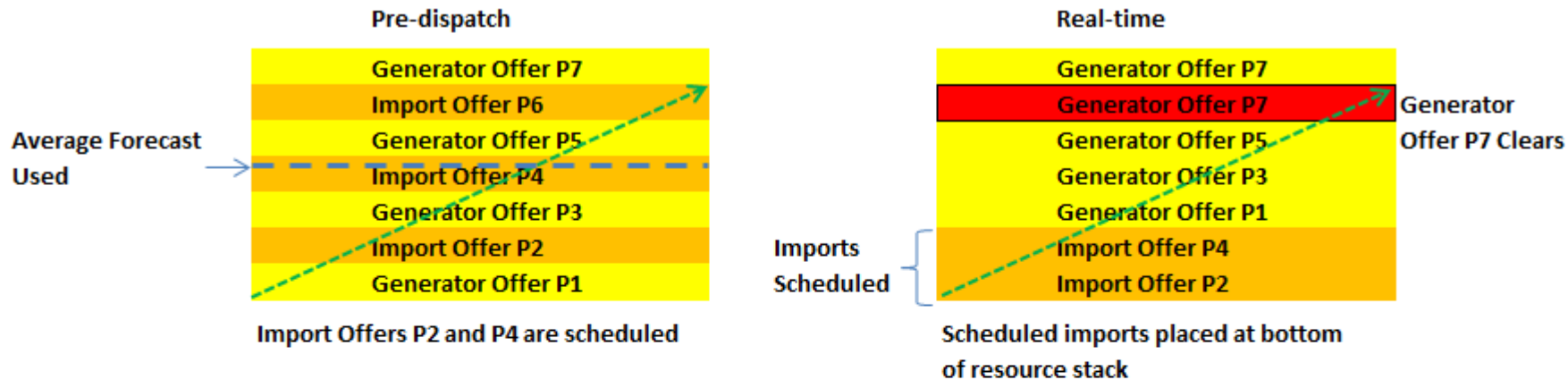


How the Proposed Change Affects Pre-Dispatch Scheduling and Real-time Dispatch

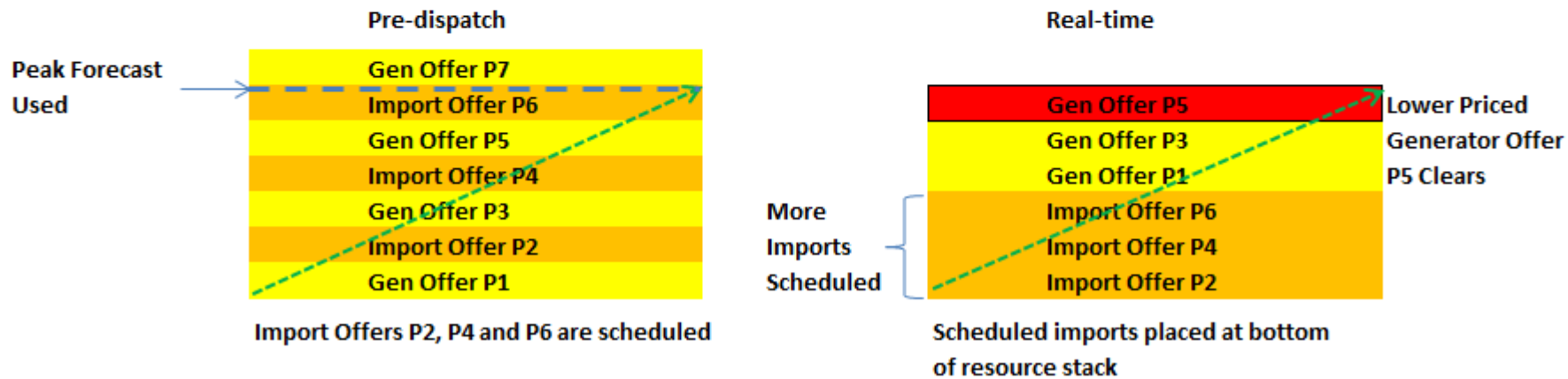
- For an hour changing from using an average forecast to peak forecast
 - Generator and import pre-dispatch schedules increase
 - The additional imports scheduled in pre-dispatch are placed at the bottom of the real-time supply stack
 - Lower real-time MCPs clear
- For an hour changing from using a peak forecast to average forecast
 - Generator and import pre-dispatch schedules decrease
 - The reduction in imports scheduled in pre-dispatch is made up for by generators in real-time
 - Higher real-time MCPs clear

Changing from Average to Peak Forecast

Status Quo: Average Demand Used

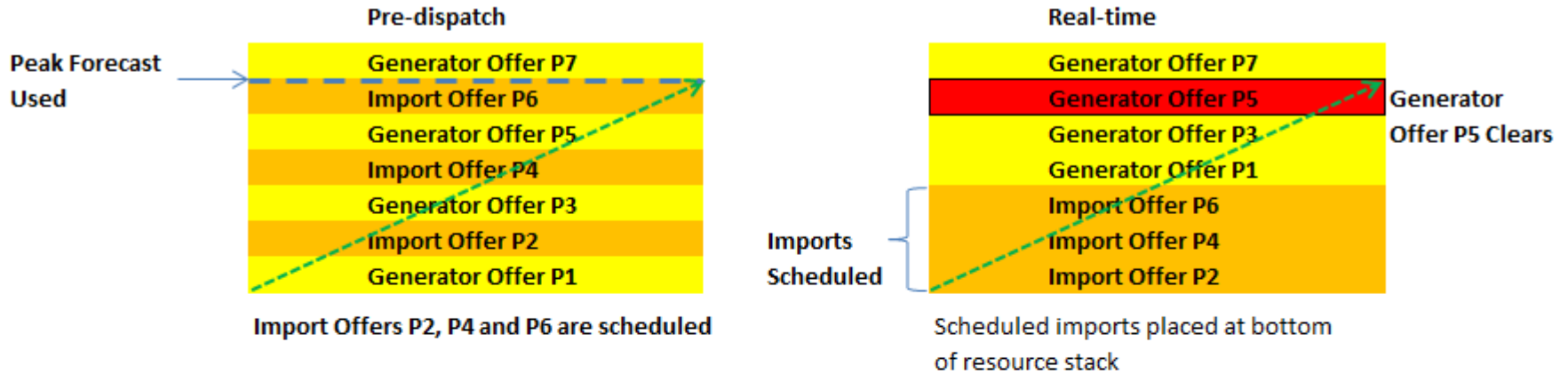


Proposed: Peak Demand Used

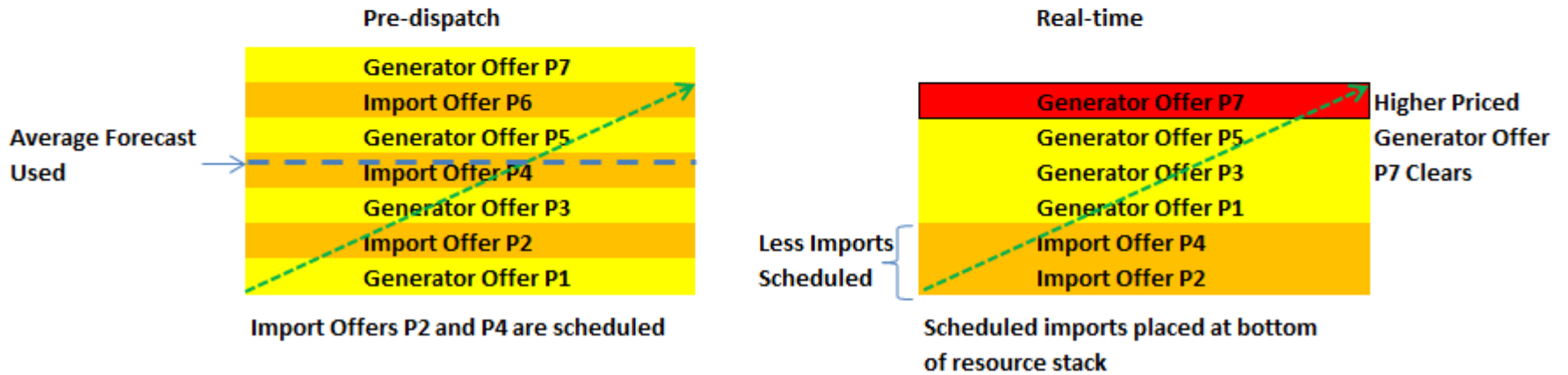


Changing From Peak to Average Forecast

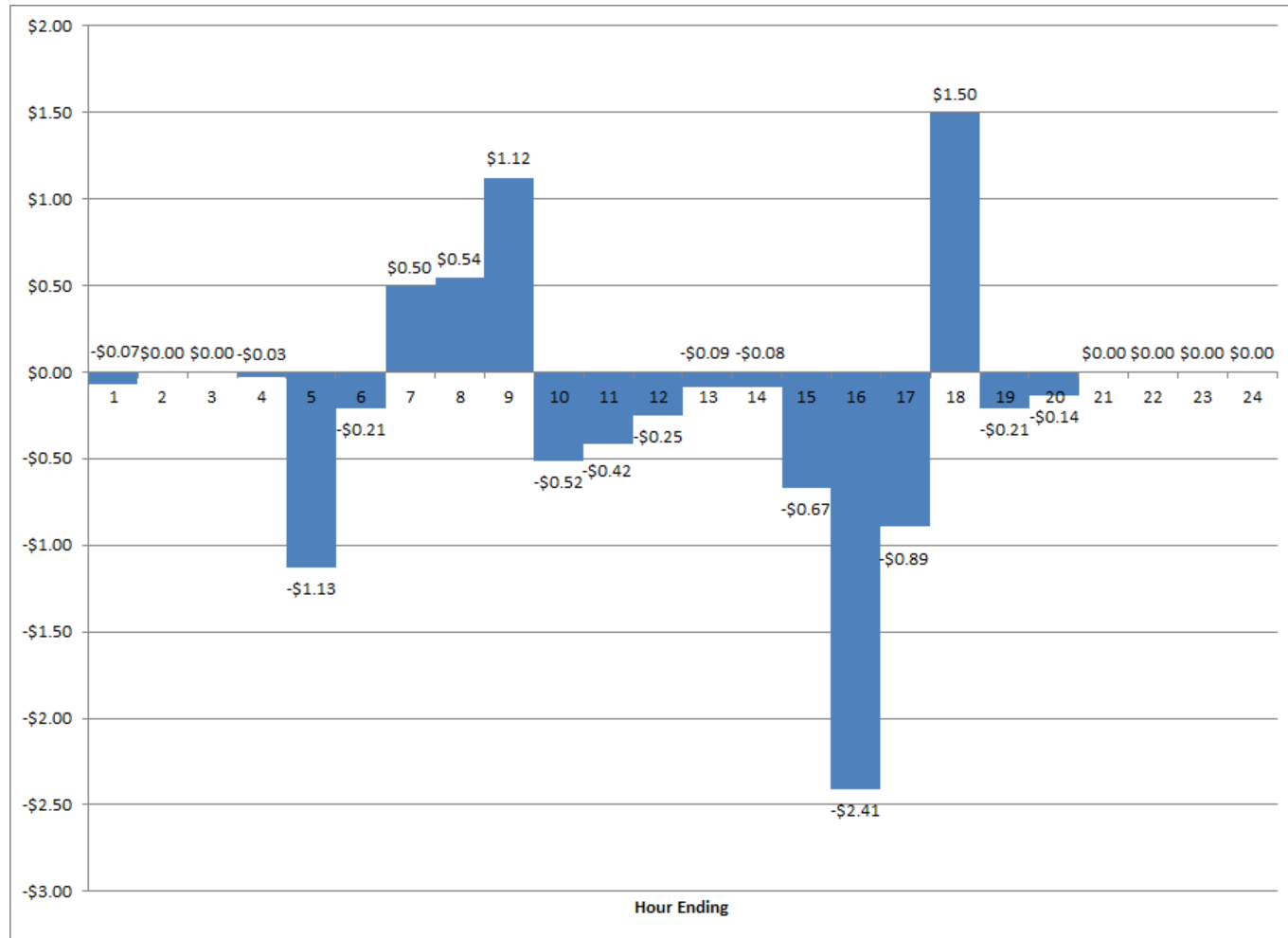
Status Quo: Peak Demand Used



Proposed: Average Demand Used



Average Change to HOEP Over Study Period



Implementation Schedule And Next Steps

Implementation Schedule

Date	Milestone
Nov 16	Preliminary Release Plan published
Nov 25	Webinar for Market Participants
Dec 13	Sample Adequacy Report available on IESO website
Dec 14	Target Release Plan published
Jan 11	<ul style="list-style-type: none">• Final Release Plan published• Adequacy Report changes in Sandbox
End Jan 2017	Adequacy Report changes in Production

Next Steps

- Stakeholder Feedback (due December 9th) via engagement@ieso.ca:
 - Changes to Peak Demand Hours
 - Changes to the Adequacy Report
 - Implementation Schedule
- IESO Response (due December 16th)