

Simulation Analysis of Impact of Change to 3X Ramp Rate

Presentation to MPWG

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Derek Olmstead

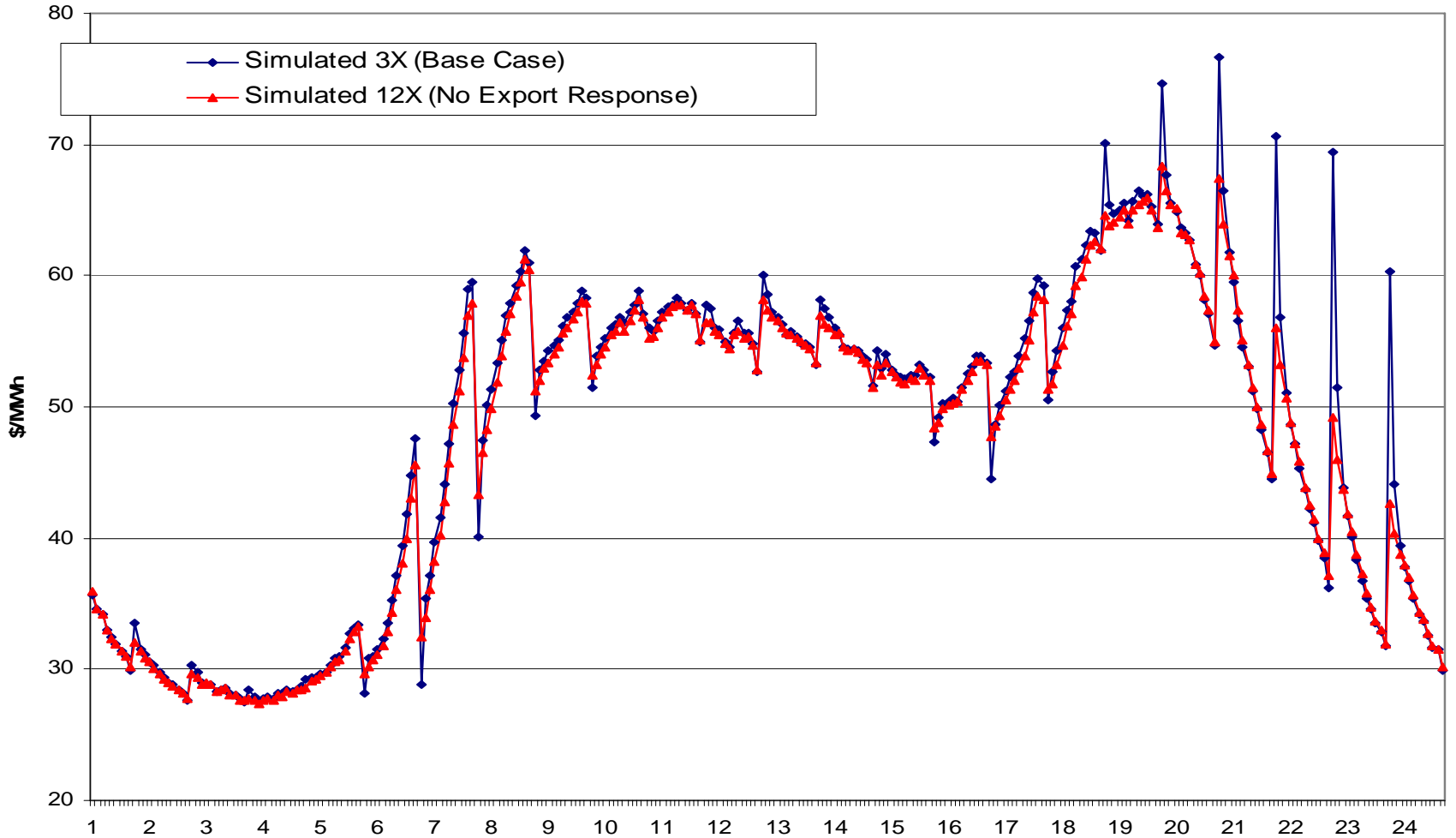


- Review
- Price simulations with no behavioural response
- Comparison of simulated prices in a ramping-up and a ramping-down hour
- Role for export demand and the effect of export response
- Issues in incorporating export response
- Next steps

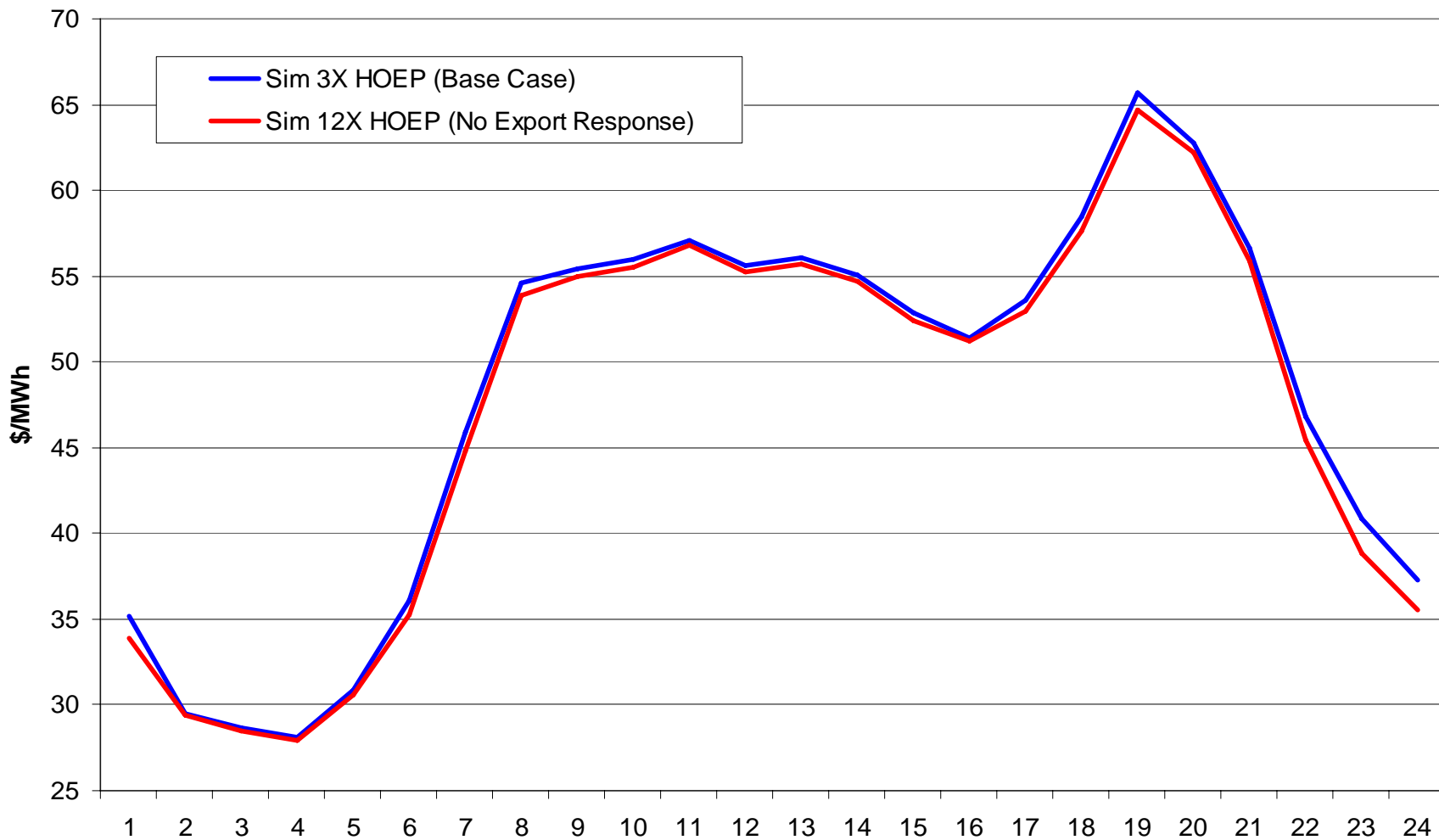
- Previous simulation period: November 1, 2005 to April 30, 2006
- With no behavioural change in either demand or supply, the simulated average price increase resulting from a switch from 12X to 3X ramp rates was \$1.50/MW
 - Represented a 2.6% increase of HOEP (which was \$57)
- Forecast that upward pressure on HOEP would induce a response from exports – higher HOEP, less exports.
 - Upward pressure on HOEP would reduce degree of “inefficient exports” – exports that buy from Ontario at HOEP when actual shadow price (cost of supplying export) is greater than the delivered price to New York.
 - Export response would mitigate some of upward pressure on HOEP – expect at least 50 percent of \$1.50 simulated price to be mitigated with actual price impact of 3x less than \$0.75.
- 3x would create better alignment of C and U schedules which would reduce CMSC and IOG payments.

- Price simulations under 3X and 12X cover the period September 12, 2007 to May 31, 2008
- Simulations do not allow behaviour responses and hence **do not** represent a projection of the equilibrium price
- Basic observations:
 1. Price differences (MCP) between 3x and 12x largest in the first interval of each hour with:
 - 3x MCP lower than 12x MCP in hours when demand is ramping up; and
 - 3x MCP higher than 12x MCP in hours when demand is ramping down
 2. Average 3x HOEP higher than 12x HOEP in all hours over study period
 3. With no behavior response, average simulated HOEP for period is \$0.68 or 1.5% higher with the 3X ramp rate as compared to 12X

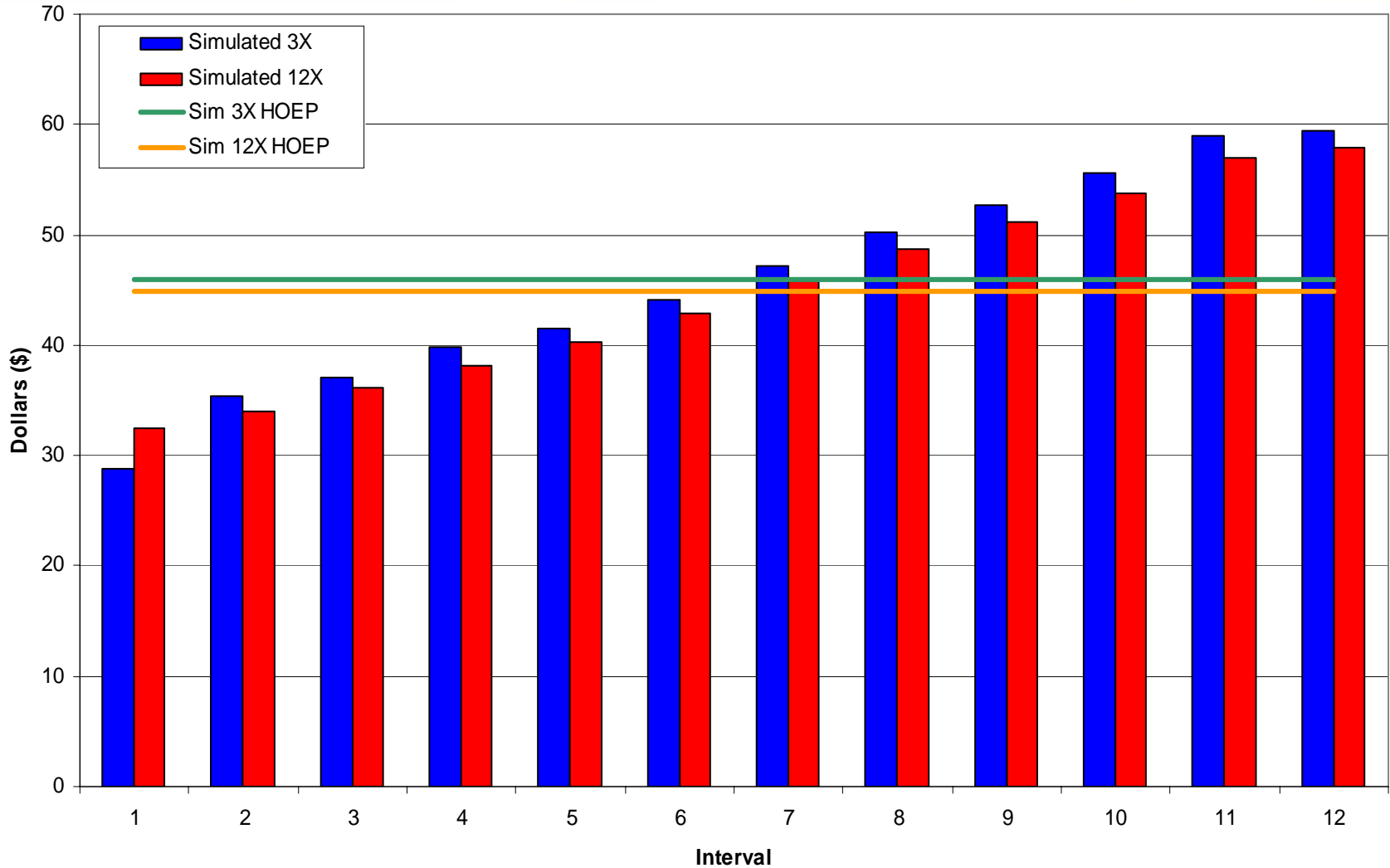
Comparison of Average MCP Simulations with No Behaviour Response



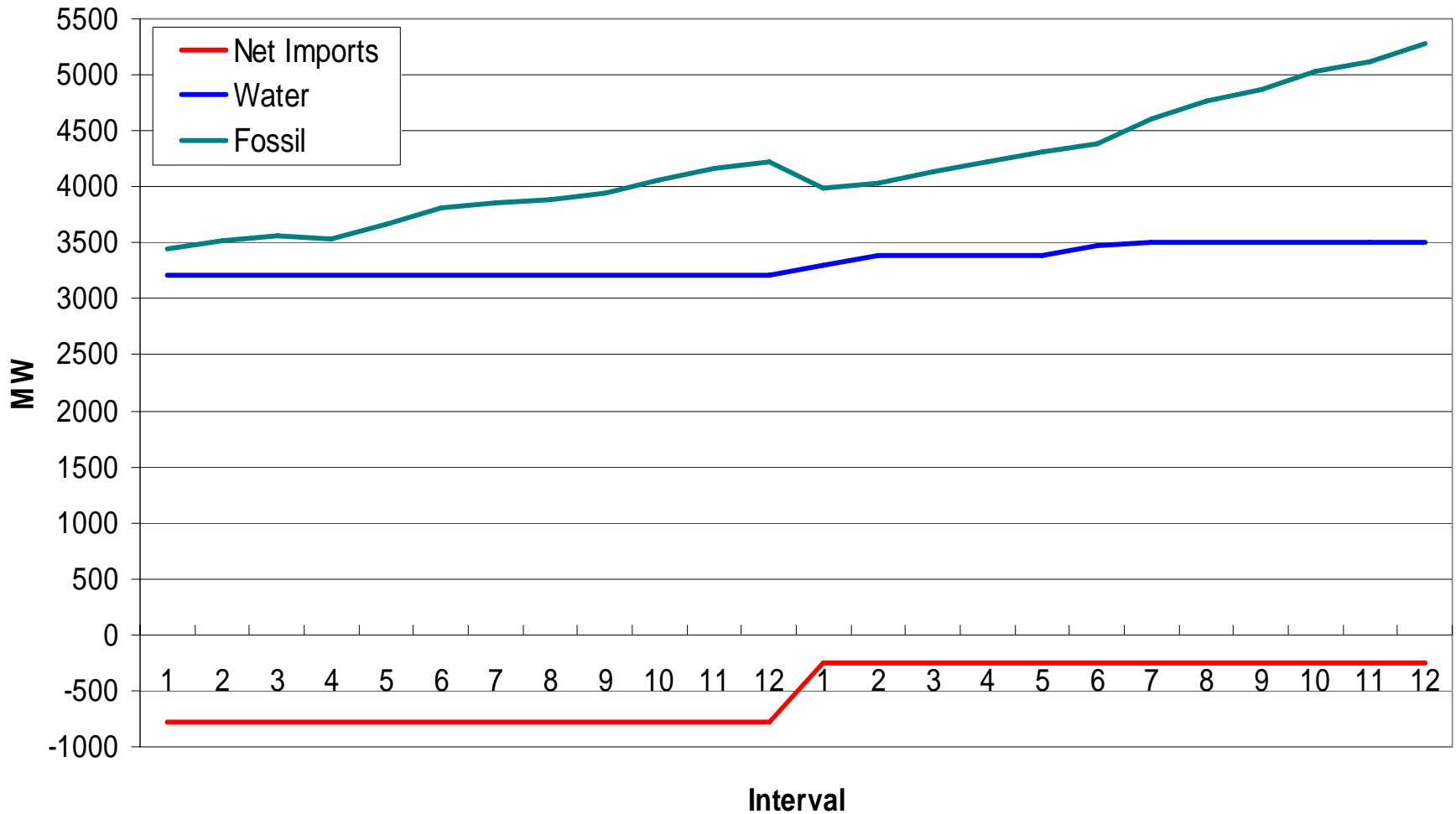
Comparison of Average HOEP Simulations with No Behaviour Response



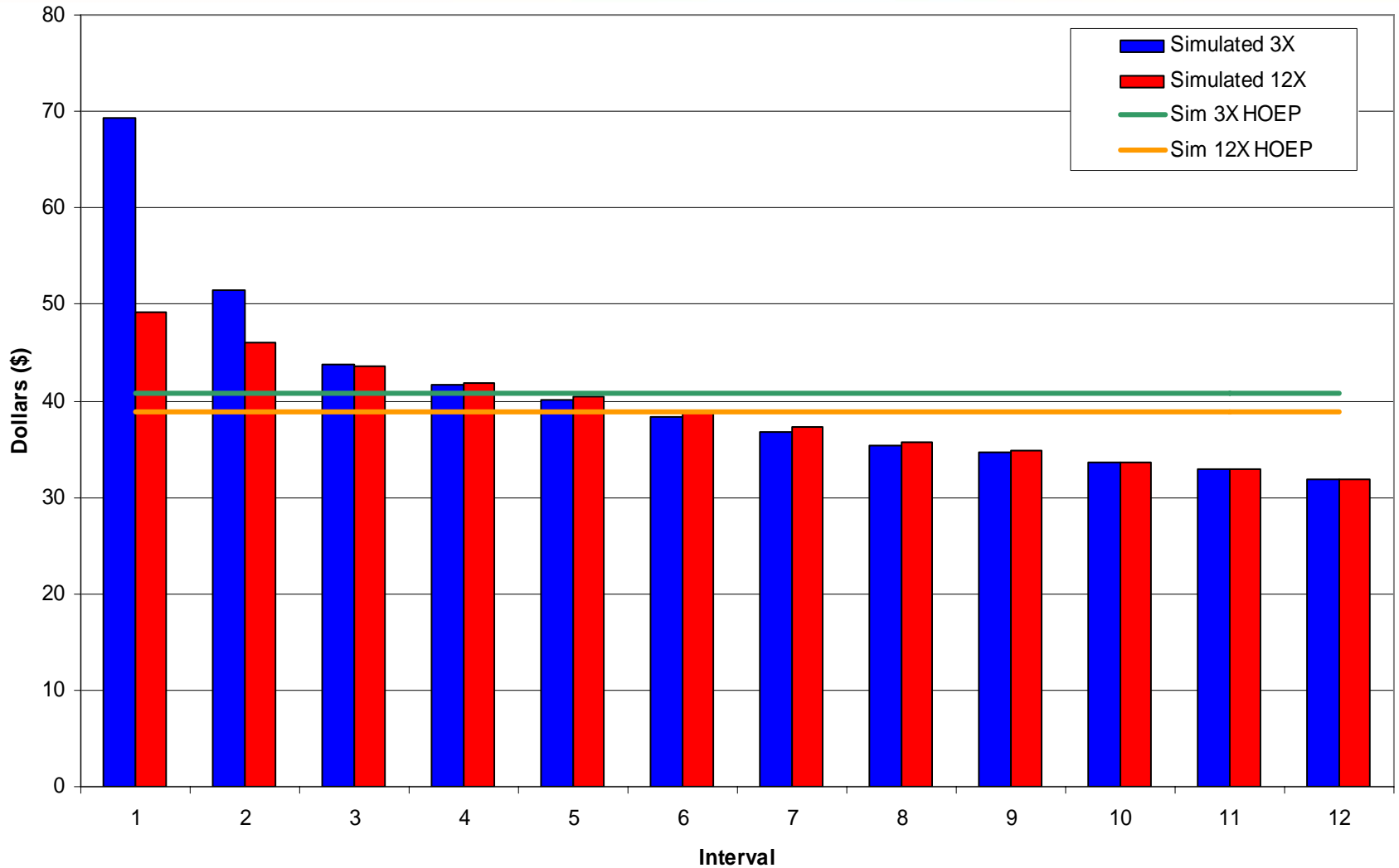
Comparison of 3X and 12X MCP & HOEP for HE 7



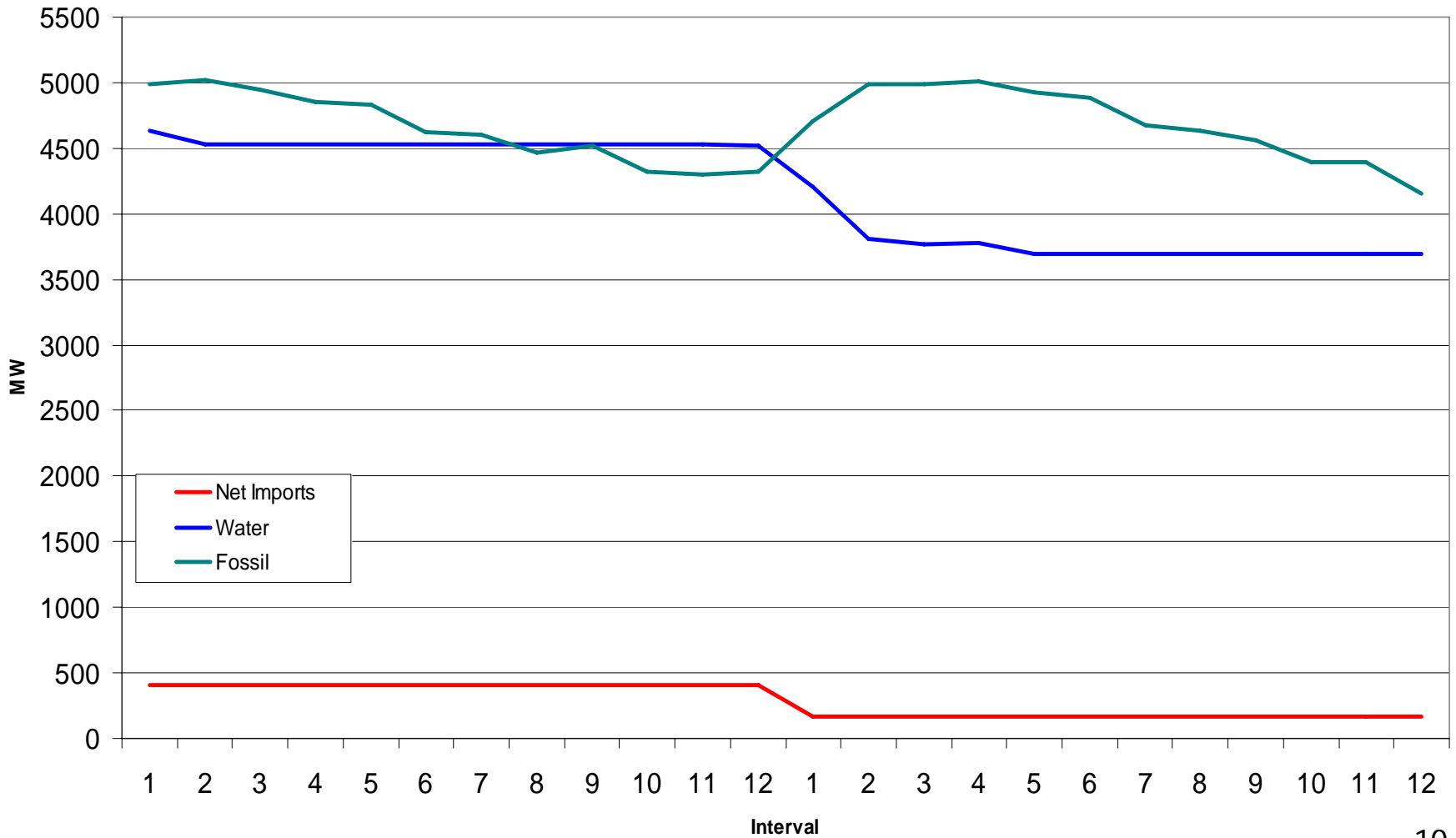
Example: Interval-by-Interval Generation Mix, HE6 & HE7, November 22, 2007



Comparison of 3X and 12X MCP & HOEP for HE 23



Example: Interval-by-Interval Generation Mix, HE22 & HE23, November 22, 2007

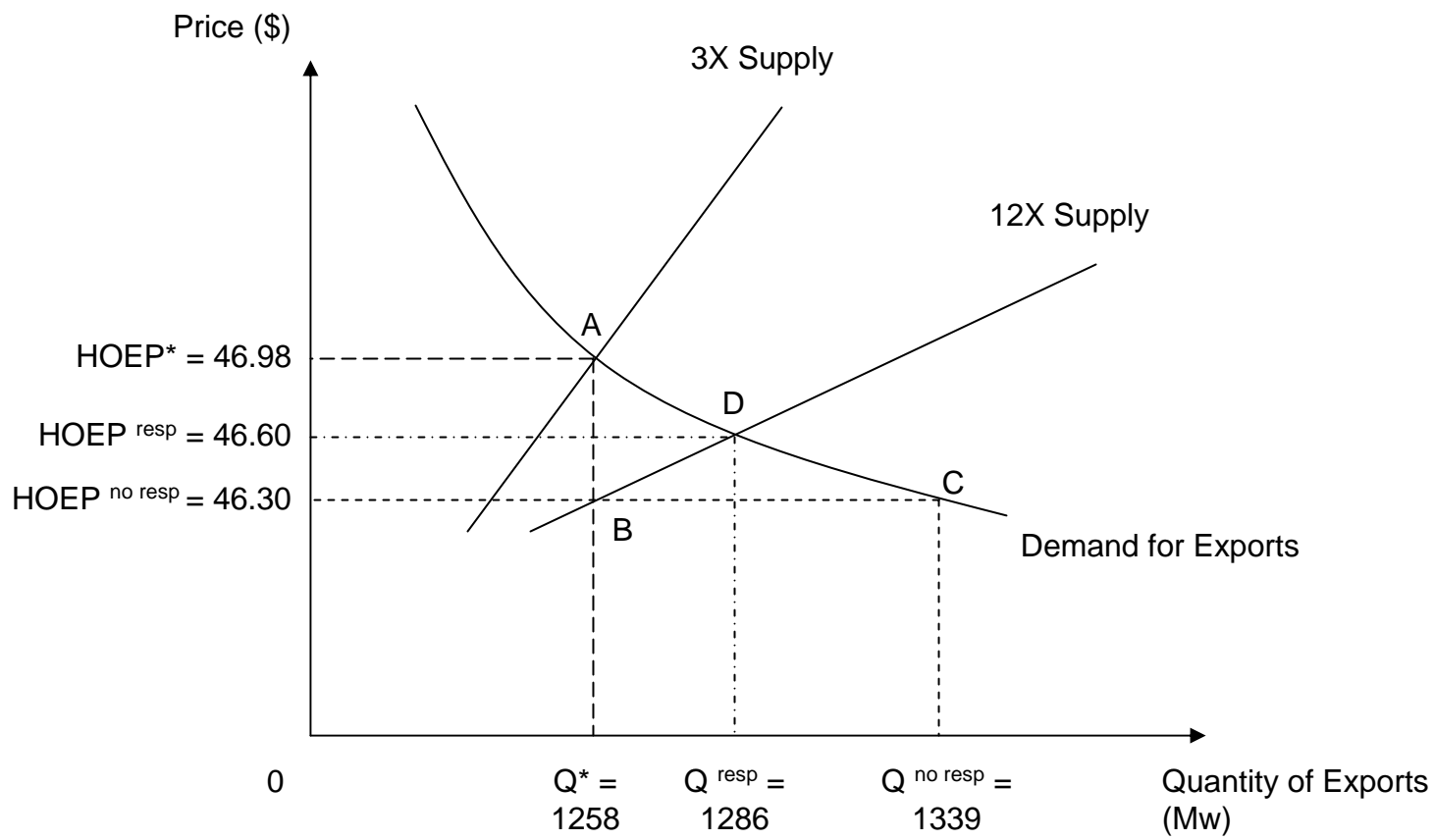


- Empirical evidence of highly elastic demand for exports
- Expect that any upward pressure on HOEP would result in a reduction in the amount of exports.
- Export response would mitigate simulated price increase
- Estimated demand function for exports:

$$\ln(\text{Exports}) = C - e * \ln(\text{HOEP})$$

- where C is a constant and e is the elasticity of export demand
 - Estimate $e = 4.3$ for off-peak periods
 - Estimate $e = 5.6$ for on-peak periods

- Simulated HOEP increase of \$0.68 with move from 12X to 3X is overstatement of price increase
- What is actual price increase once export response is included?



- Point A: observed outcome in the market since September 12, 2007
- Point B: simulated outcome under 12X assumption without export response
- Point D: outcome under the use of a 12X ramp rate with export response, *i.e.*, equilibrium under 12X ramp rate
 - Precise result, accounting for export response, depends on the particular measure of elasticity of demand and the form of the supply curve. Also depends on the relative supply and demand elasticities in the surrounding markets.

- Estimate of elasticity
 - Single estimate of elasticity of export demand
 - Based on monthly data
 - Only considers exports to New York
- Interaction of Pre-Dispatch and Real-Time
- Increased importance of linked wheels over study period relative to previous work
- Degree of intertie congestion

- IESO is considering econometric study of impacts of move from 12x to 3x ramp rate
 - Preliminary work is underway
- Study impact on:
 - Prices (HOEP and relevant Shadow Prices)
 - Amount of Exports
 - Uplift charges – CMSC and IOG
- To provide results in March 2009