Stikeman Elliott

Stikeman Elliott LLP
Barristers & Solicitors
5300 Commerce Court West
199 Bay Street
Toronto, ON Canada M5L 1B9

Main: 416 869 5500
Fax: 416 947 0866
www.stikeman.com

Patrick G. Duffy
Direct: +1 416 869 5257
PDuffy@stikeman.com

January 15, 2025

By Email and RESS

File No.: 1019261173

Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto ON M4P 1E4

Attention: Nancy Marconi, Registrar

Dear Ms. Marconi:

Re: Independent Electricity System Operator
Application by NQS Generation Group for Review of Amendments to Market Renewal Program
Response to Undertaking JT1.1
Ontario Energy Board File No. EB-2024-0331

In response to undertaking JT1.1, we enclose a copy of the IESO's presentation at the September 24, 2019 stakeholder session related to the MRP Business Case. Others documents related to session are available on a web archive of the IESO's Stakeholder Engagements webpage. The IESO is working to reactivate the link to the recording of the webcast.

Yours truly,

Patrick G. Duffy

PGD/sb
Enclosure
cc. All parties to the proceeding

Energy Stream Benefits Review

September 24, 2019

ieso
Connecting Today.
Powering Tomorrow.

Purpose

- Provide technical details on how the efficiency benefits to be used for the MRP energy stream business case were calculated
- Quantified efficiency benefits are from
  - More efficient unit commitment
  - Improved intertie pricing
  - Locational pricing incentivizing increased resource competition

General Approach to Calculating Benefits

- Assess inefficiencies of current market commitment process and intertie pricing that will be eliminated with the MRP energy stream in place
  - Calculate costs incurred
  - Project the reduction of these costs in the future
- For benefits from improved competition
  - Calculate through simulation of market outcomes

MORE EFFICIENT UNIT COMMITMENT

RT-GCG Commitments

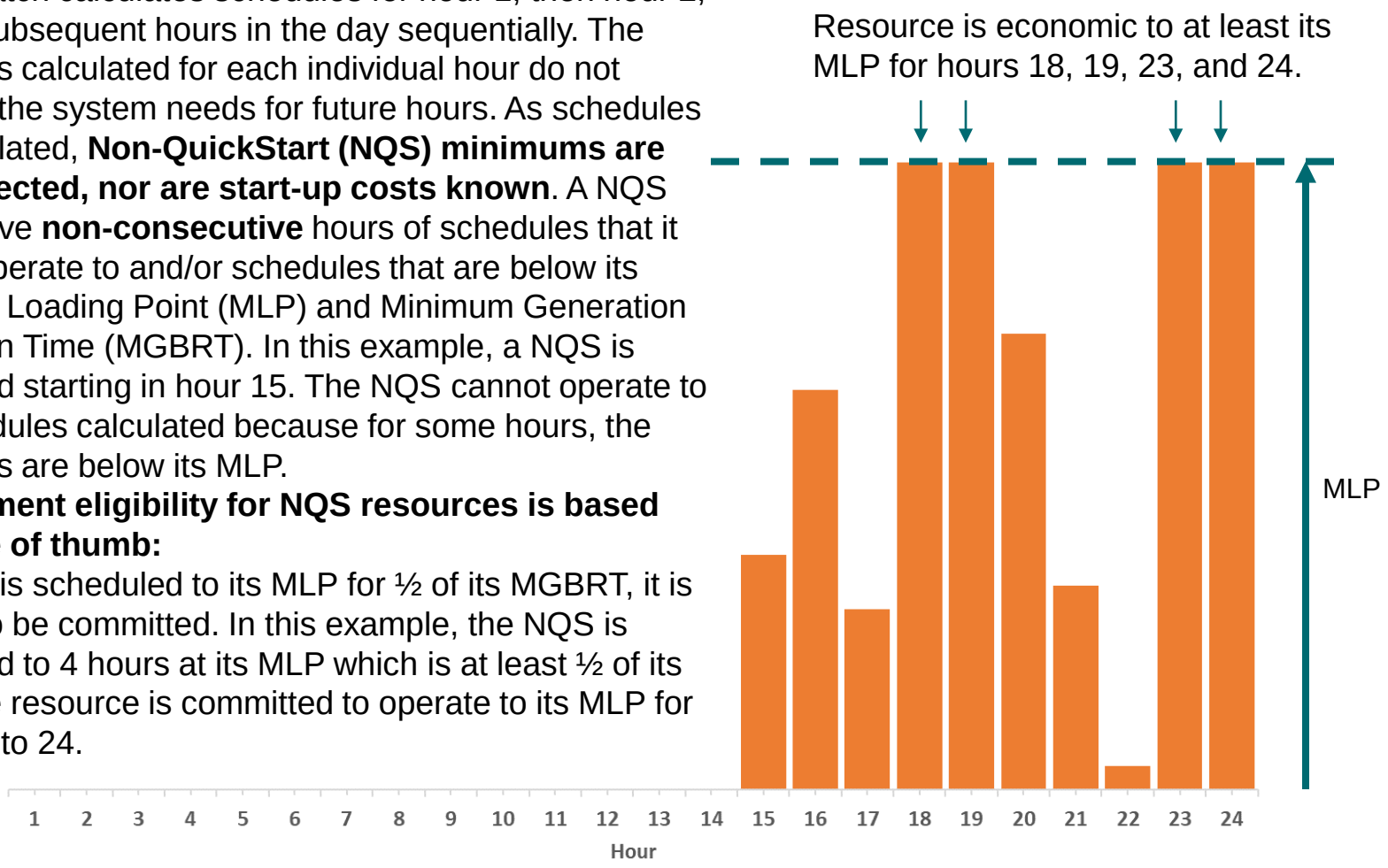
- We know the current Real-Time Generator Cost Guarantee (RT-GCG) commitment process is inefficient for two main reasons
  1. Ignores start-up costs
  2. Only looks at scheduling resources one hour at a time and does not consider the needs of the system over multiple hours
- For 1, we can calculate the inefficiency
- For 2, a pre-dispatch model with look-ahead optimization is needed and not currently available

Actual RT-GCG Example

Pre-dispatch calculates schedules for hour 1, then hour 2, and for subsequent hours in the day sequentially. The schedules calculated for each individual hour do not consider the system needs for future hours. As schedules are calculated, **Non-QuickStart (NQS) minimums are not respected, nor are start-up costs known**. A NQS can receive **non-consecutive** hours of schedules that it cannot operate to and/or schedules that are below its Minimum Loading Point (MLP) and Minimum Generation Block Run Time (MGBRT). In this example, a NQS is scheduled starting in hour 15. The NQS cannot operate to the schedules calculated because for some hours, the schedules are below its MLP.

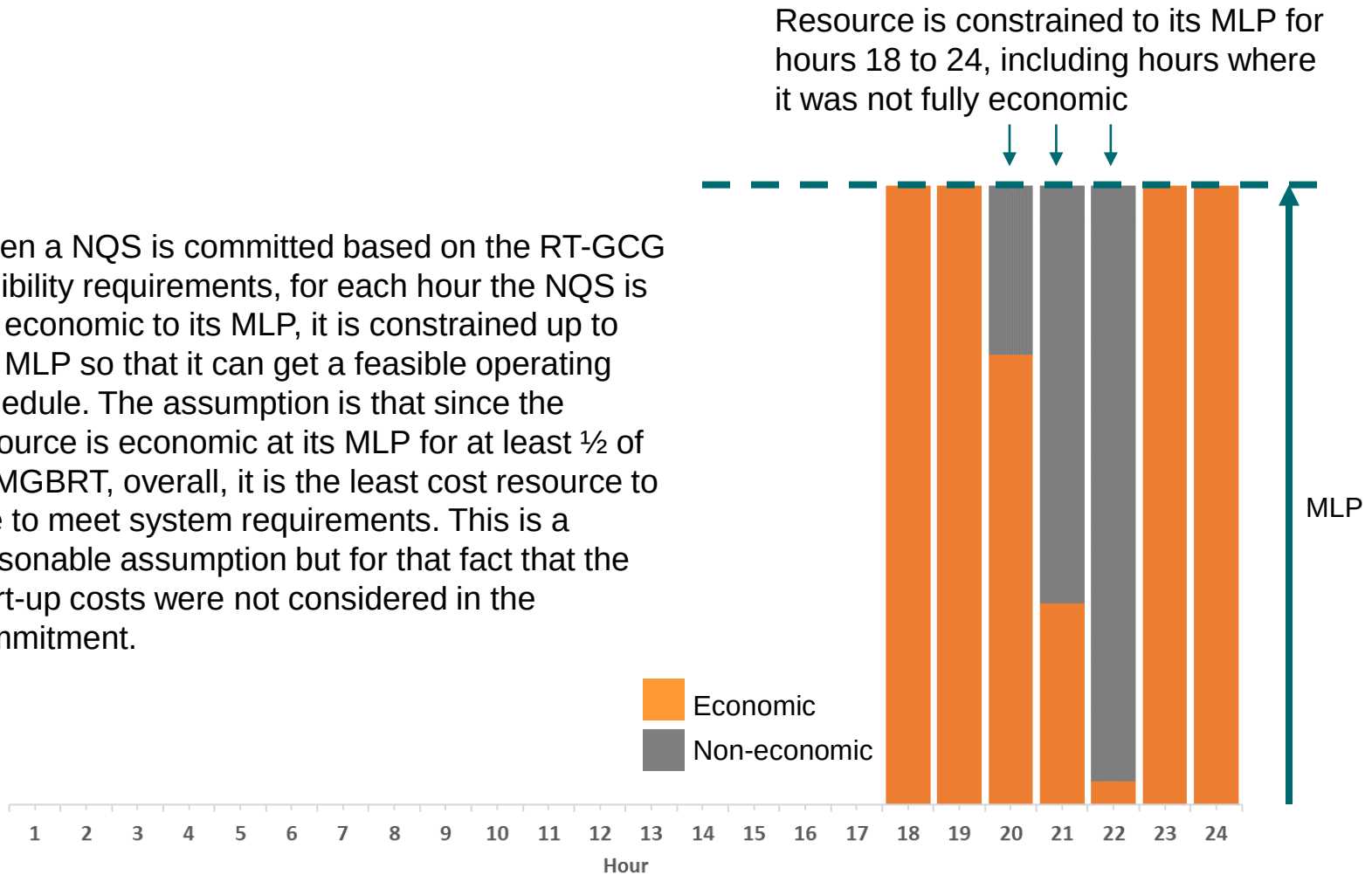
Commitment eligibility for NQS resources is based on a rule of thumb:

If a NQS is scheduled to its MLP for ½ of its MGBRT, it is eligible to be committed. In this example, the NQS is scheduled to 4 hours at its MLP which is at least ½ of its MLP. The resource is committed to operate to its MLP for hours 18 to 24.



RT-GCG Commitment Based on Energy Offers

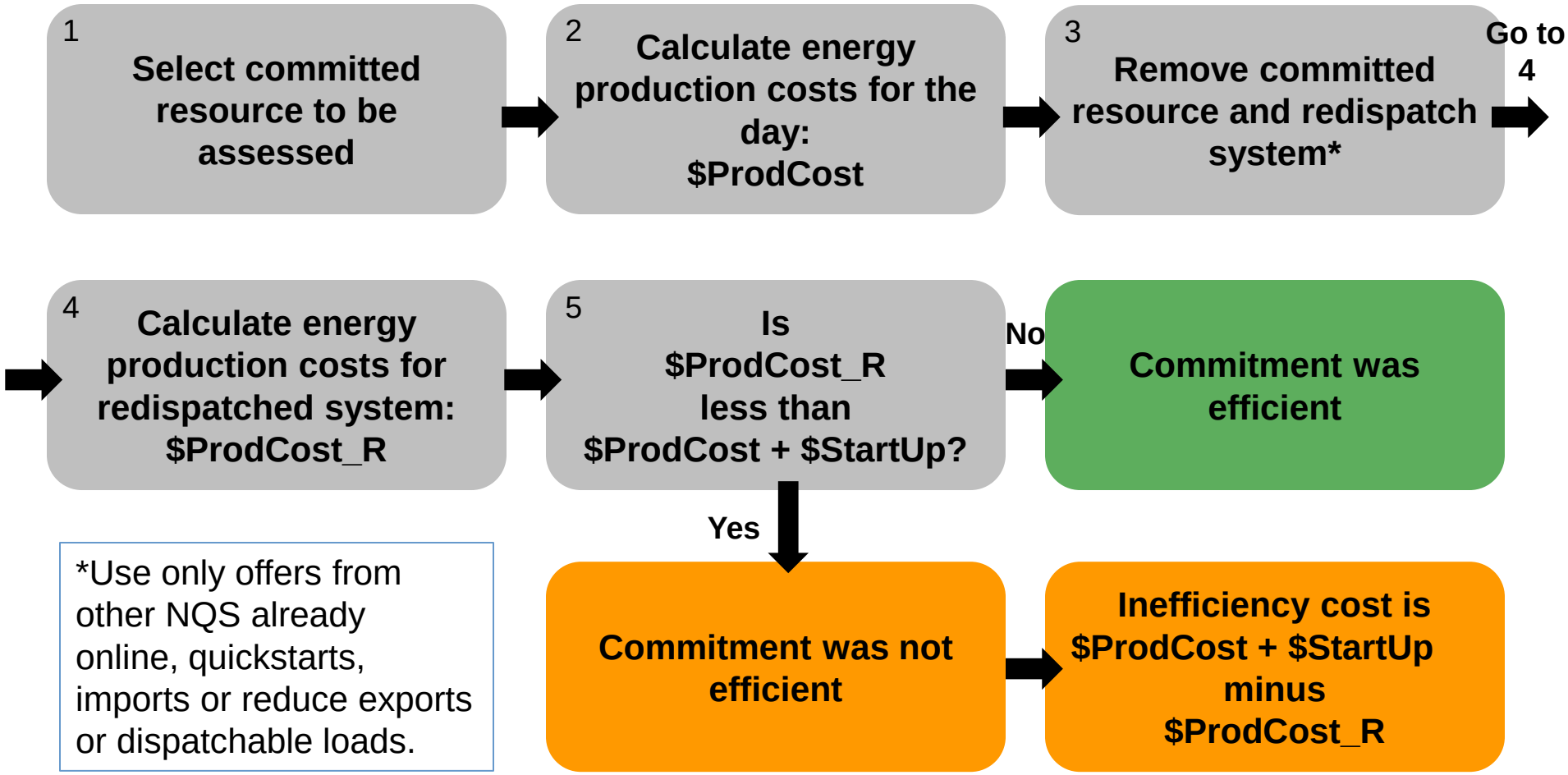
When a NQS is committed based on the RT-GCG eligibility requirements, for each hour the NQS is not economic to its MLP, it is constrained up to the MLP so that it can get a feasible operating schedule. The assumption is that since the resource is economic at its MLP for at least ½ of its MGBRT, overall, it is the least cost resource to use to meet system requirements. This is a reasonable assumption but for that fact that the start-up costs were not considered in the commitment.



Test for Inefficient Commitments

- We can check whether a NQS commitment was efficient by removing the energy it provided for the day and redispatch the system using other available resources not previously scheduled
  - A resulting lower production cost from the redispatched case indicates an inefficient commitment
- About 1300 NQS commitments were assessed

Inefficiency Calculation



*Use only offers from other NQS already online, quickstarts, imports or reduce exports or dispatchable loads.

Summary of Benefits

- Study indicated 1 in 6 NQS commitments were inefficient
  - On average, an additional $0.80 of cost per MWh scheduled from NQS
- Based on our outlooks of market and system conditions we have a projection of the volume energy provided by NQS resources over the first 10 years with MRP
  - Annual benefits with more efficient unit commitment are calculated by [Annual NQS Energy] × $0.80/MWh
- $193M of savings in first 10 years of MRP

Benefit Calculation is Conservative

- The inefficiency estimate of RT-GCG is likely much worse
  - Commitment considering system needs over multiple hours not modeled
  - Inefficiency from under commitment of resources of not captured
- Additional benefits not quantified due to using 30-minute OR for flexibility and leveraging the commitment process to schedule NQS to meet flexibility needs

IMPROVED INTERTIE PRICING

Efficient Trade

- Efficient trade happens when power flows from a low-priced market to a high-priced market
- Imports flowing into Ontario should be such that the price paid for the imported energy is less expensive than to produce it internally
- Exports flowing out of Ontario should receive more value from the destination market than the cost to produce the energy
- Intertie pricing reflective of the incremental value to import or export ensures efficient trade occurs

Intertie Pricing

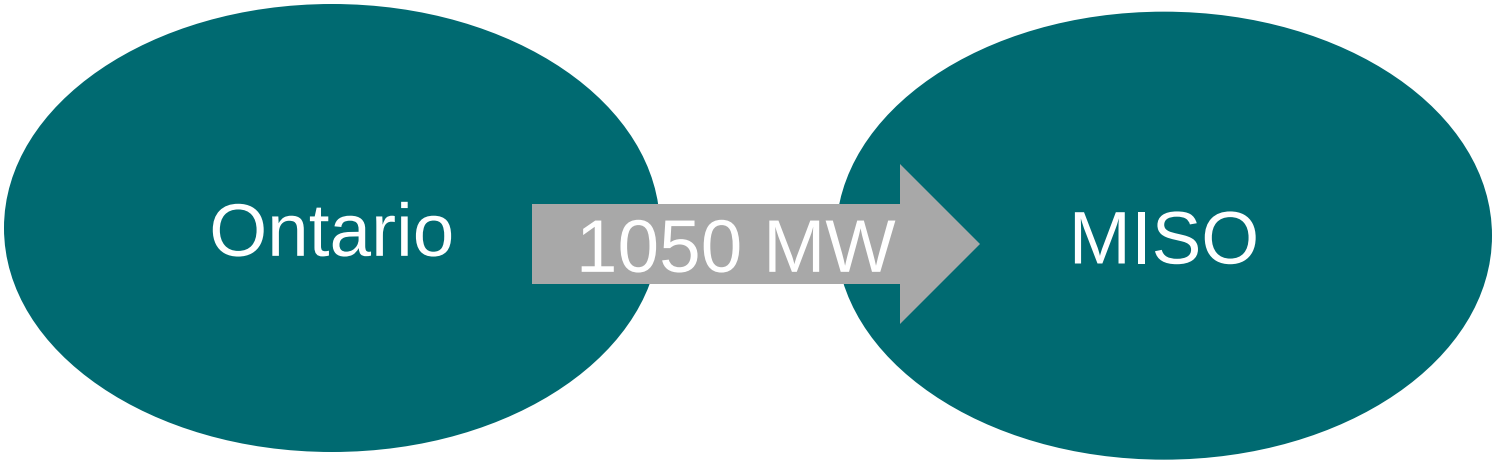
The current market sends the wrong trading price signal for imports and exports to market participants

Now: Incorrect intertie price = cost of congestion at the tie + unconstrained Ontario price

vs

MRP: Correct intertie price = cost of congestion at the tie + shadow price at the tie

Inefficient Export Example



HOEP = $10.91
LMP at intertie = $34.10
No congestion at the intertie

MISO Ontario Price = $23.84

The net exports flowing to MISO appear to be efficient based on HOEP less than the MISO price for Ontario. However, HOEP does not represent the incremental cost of energy flowing out of Ontario. The LMP at the tie is the correct price to reflect the cost. If exports were settled based on the LMP, the exports to MISO would not have occurred. In this case, the exporters paid $10.91/MWh for the energy to flow into MISO, but the cost to be recovered was $34.10/MWh. Generators had to be constrained on with CMSC uplift needed to be recovered.

Net Export Inefficiency

- The benefits from improved intertie pricing were calculated based on eliminating inefficient net exports only
- Ontario has been a net exporter over the last decade and is expected to remain a net export beyond 2030 based on our projections
- There would be inefficiencies during the hours when Ontario is a net importer – those hours would be few the and benefits were not captured for the Business Case

Inefficient Export Calculations

- Slide 15 illustrates how the costs of inefficient net exports in the form of constrained on CMSC are calculated
- The approach used is based on studies previously conducted by the MSP and discussed in 4 reports[1]
- For each hour in 2015-2018
  - Efficient net exports were assessed by comparing intertie prices against NYISO and MISO prices
  - The incurred costs where calculated using the difference between HOEP and the shadow price near the intertie
- The 4 recent years were used as the volume of net exports to NYISO and MISO varied between 15-18 TWh annually

[1]MSP Reports from June 2006, December 2006, July 2007, and July 2009

Current Intertie Inefficiencies

- Analysis indicates about 9% and 13% of net export transactions to MISO and NYISO are inefficient respectively
- The MSP also indicated that net exports through the New York intertie alone were inefficient 40%-50% of the time for the periods studied throughout 2005 - 2007
- The cost of this inefficiency is about $4.60/MWh for net exports to MISO and $3.16/MWh for net exports to NYISO
- Inefficient trade between Ontario and Quebec cannot be calculated because no external market price is available

Summary of Benefits

- The Ontario remains a net exporter over the first 10 years with MRP
- By applying the inefficiency costs to the projected volumes of annual net exports over the MISO and NYISO interties, benefits from improved intertie pricing with MRP were calculated
- For the first 10 years with MRP, improved intertie pricing is expected to save $284M

IMPROVED OPPORTUNITIES FOR COMPETITION

Efficient Pricing Signals

- Transparent market clearing prices provide the right incentives to drive efficient outcomes
- HOEP is not a transparent pricing signal because there will always be a certain degree of congestion and losses in the system not reflected in the unconstrained clearing price
- CMSC is needed to ensure resources follow dispatch when there is congestion and/or operating constraints
  - CMSC is necessary to keep resources whole to their "operating profit"

Incentives for Resources – Constrained Off

- In today's market for zones where resources are constrained off
  - There is no incentive to improve production efficiency and compete amongst market participants because CMSC is paid not to produce
  - There is the incentive to maximize CMSC by offering as low as possible to remain constrained off
- With MRP, resources will not be paid when they are not economic and not producing
  - To be economic and paid the LMP, resources are incentivized to be more efficient

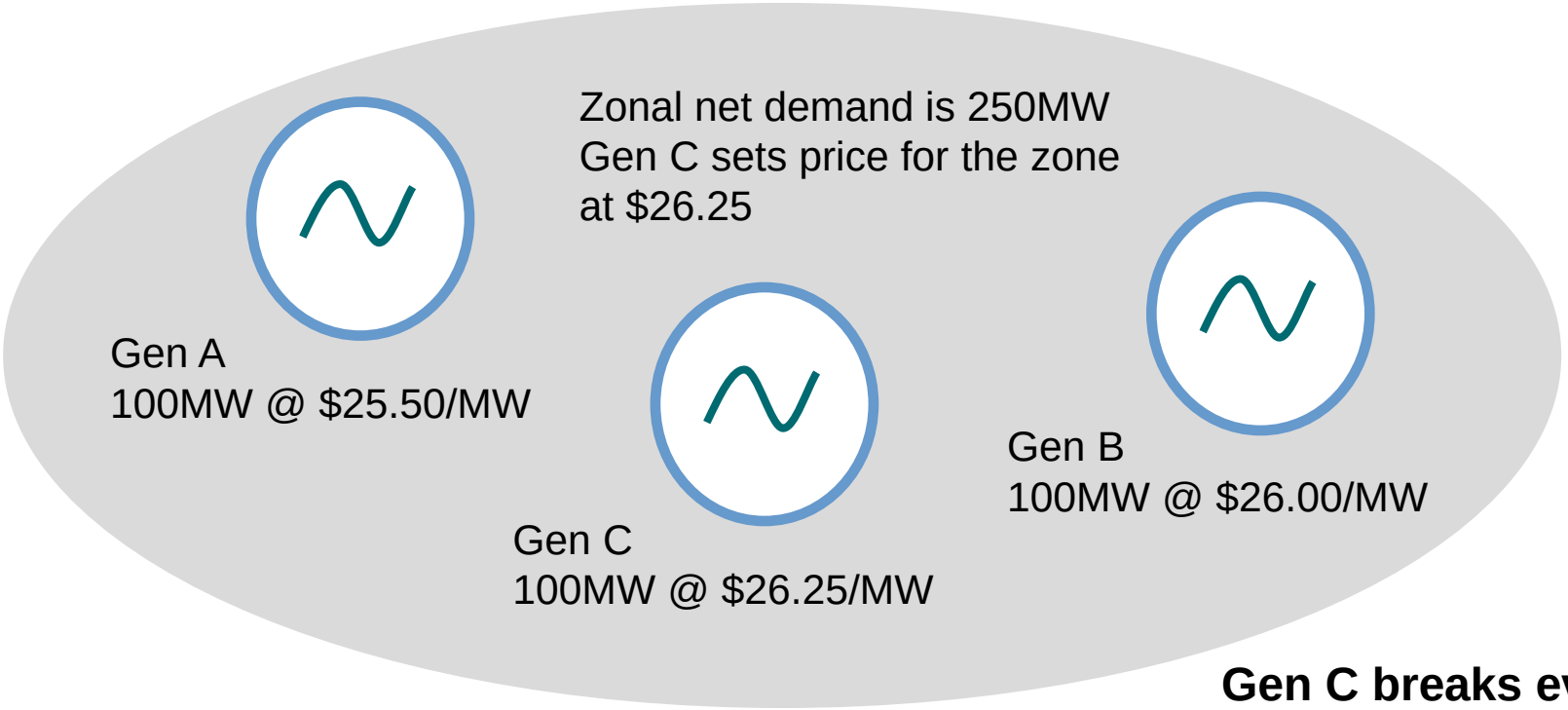
Incentives for Resources – Constrained On

- In today's market for zones where resources are constrained on
  - HOEP does not reflect the costs of congestion and losses and CMSC is paid to resources that are not economic relative to an unconstrained system
  - Resources are not incentivized to compete against others within the zone but seek to maximize CMSC by offering as high as possible to remain dispatched
- With MRP, resources will be paid the LMP and are incentivized to seek profits by improving productive efficiency

Improving Productive Efficiency

- With the Single Schedule Market (SSM) in MRP, a resource is paid LMP if it is economic, no CMSC is needed
  - Pricing is transparent
  - Dispatch and pricing will be aligned
  - Production and compensation is merit-based
- A marginal resource continually setting price in a zone will be incentivized to be more competitive and improve so that it can be inframarginal and make profits instead of just covering costs
- The literature shows strong evidence of competition growth with the formation and evolution of electricity markets

Competition Example

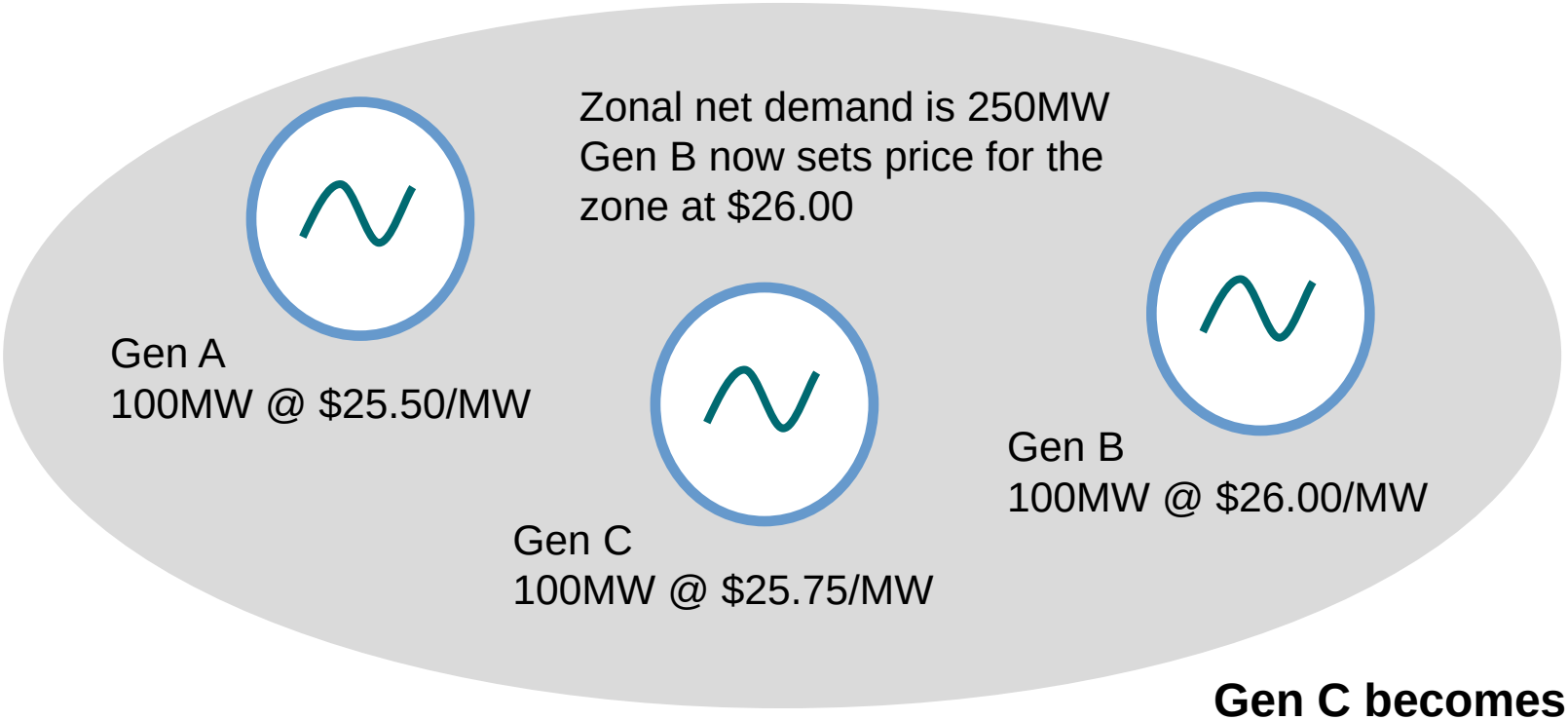


Generator	Schedule	Cost	Revenue	Profit
Gen A	100MW	$2,550	$2,625	$75
Gen B	100MW	$2,600	$2,625	$25
Gen C	50MW	$1,312.50	$1,312.50	$0

Gen C breaks even and is incentivized to be more efficient and competitive so that it can earn profits

ieso
Connecting Today.
Powering Tomorrow.

Competition Example (2)



Generator	Schedule	Cost	Revenue	Profit
Gen A	100MW	$2,550	$2,600	$50
Gen B	50MW	$1,300	$1,300	$0
Gen C	100MW	$2,575	$2,600	$25

Gen C becomes more efficient and is able to reduce its offers by ~2% to $25.75 from $26.25. It now earns profits.

ieso
Connecting Today.
Powering Tomorrow.

Benefits From Improved Competition in Ontario

- In previous slide, Gen B is marginal and breaks even, it now has a greater incentive to become more competitive
- There is empirical evidence to show that competition happens in electricity markets with locational pricing and it is not just theoretical
- The study performed on ERCOT shows a 2% overall reduction in total costs after the implementation of LMP
- To estimate the benefit of competition in Ontario with LMP, we cannot use a 2% reduction in total costs as a reference because some resources that are paid fixed rate contracts for energy would be indifferent to be settled on LMP
- Resources with deeming-type contracts under LMP would be incentivized to earn energy profit and be competitive

Calculating Benefits from Improved Competition

- Based on the experience in ERCOT, a 2% reduction in offers for a **subset** resources under deeming contracts is applied and a redispatch of the market is performed
- A comparison of the production costs between the uniform market case and MRP case measures the benefits from competition
- This is a conservative measurement of efficiency given the assumption used that less than 10% of the entire Ontario fleet is incentivized to compete

Summary of Benefits

- It is assumed that the same subset of resources continue to compete in the 10 year period with MRP
- In the 10 years, increased resource competition is expected to save $49M