

A decorative banner at the top of the slide. It features a red wavy ribbon on the left side. Below the ribbon, there is a blue and white flame-like graphic on the left, transitioning into a landscape with green grass, a blue sky with white clouds, and several white wind turbines on the right.

The IPSP and Implications for Industrial Gas Users

IGUA Seminar

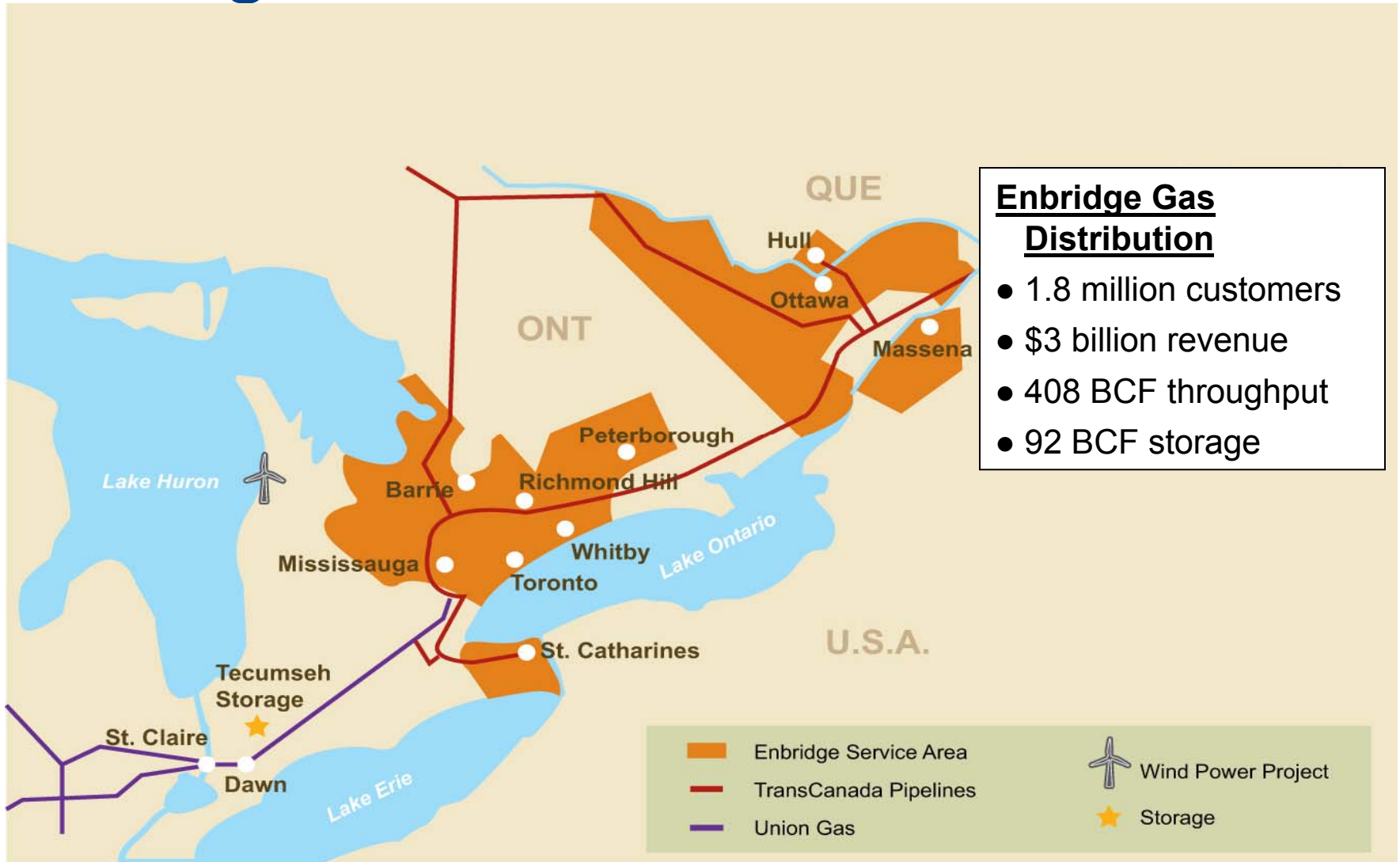
Gatineau, May 08, 2008

Malini Giridhar, Enbridge Gas Distribution

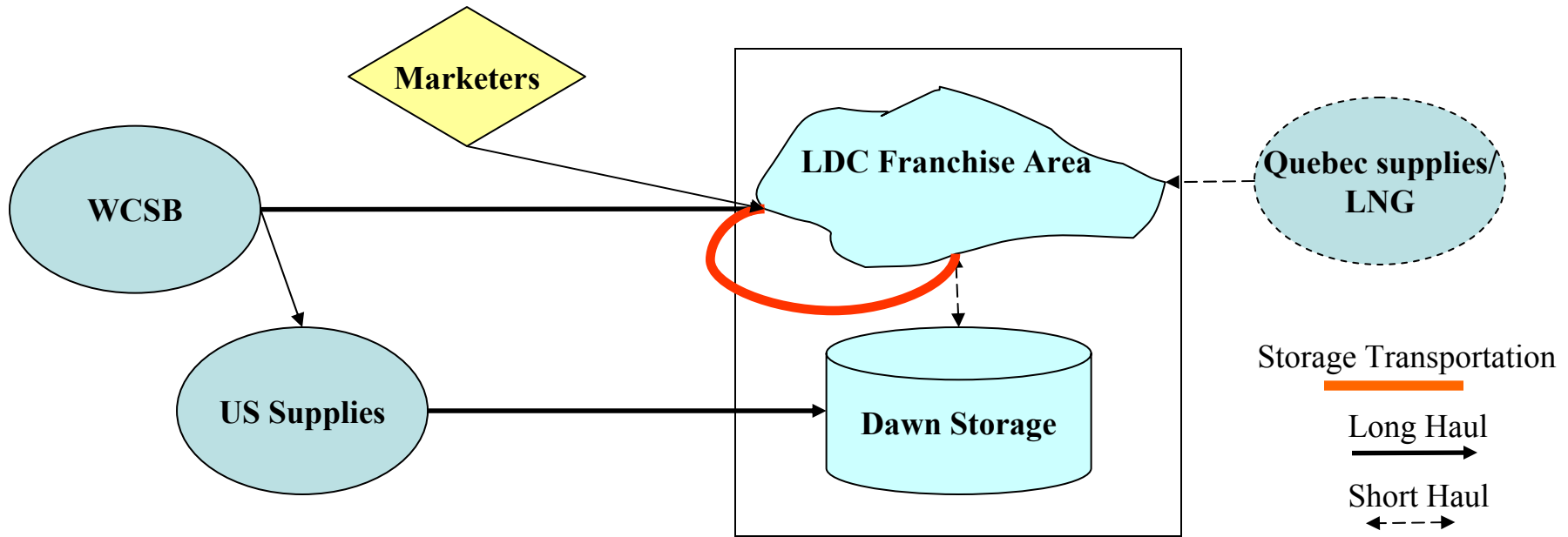
Agenda

- **Section 1 Gas Industry in Ontario**
- **Section 2 The Integrated Power System Plan (IPSP)**
 - **Gas Fired Generation (GFG) Demand Outlook**
 - **Supply Response**
 - **Implications for Industrial and other users**
- **Section 3 Q&A**

Enbridge in Ontario

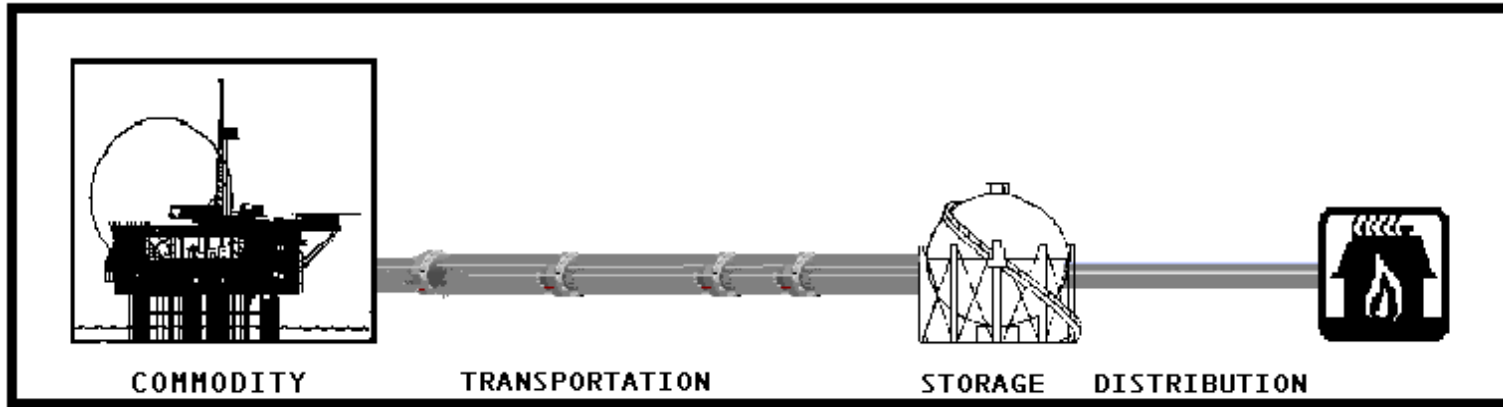


Evolution of Gas Supply for Ontario



- Ontario will have access to new supply from Rockies, Texas, Gulf and new shale gas developments.

Service options offered by Ontario LDCs



Service Name	Take up of Enbridge Service
Commodity	~ 60% of customers/40% of volume
Transportation	~ 70% of customers/45% of volume
Storage & Balancing	~100% of customers
Distribution	All customers

Ontario has a competitive natural gas market that responds to customer need

The Supply Mix Directive and the IPSP's GFG Forecast

The Ontario Government's Supply Mix Directive for Electricity:

“Maintain the ability to use natural gas capacity at peak times and pursue high efficiency and high value use of the fuel”

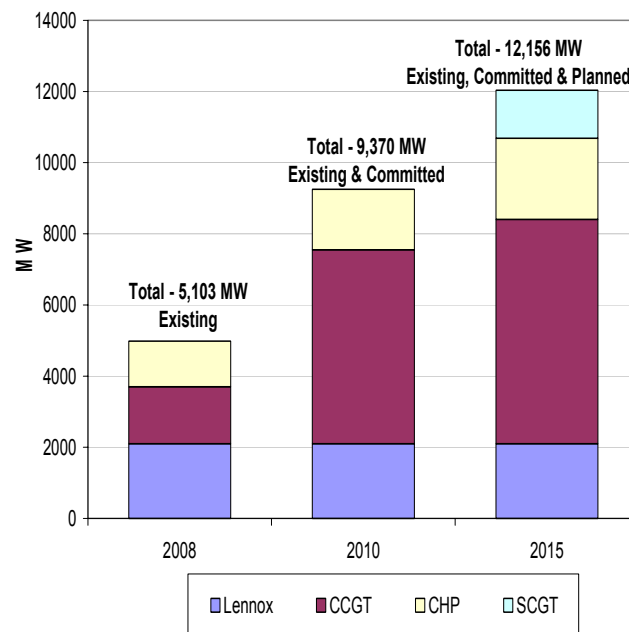
Terms	OPA interpretations
Peak times	14% of the hours with the highest demand
High Efficiency	Cogeneration (CHP) and combined cycle
High Value	Lower cost, enhanced flexibility, avoided transmission facilities, shorter lead times, local reliability and voltage support and enhanced environmental performance with renewables

GFG Additions and Attributes

- Government committed to 4267 MW of GFG by 2010
- Planned GFG ~2700 MW by 2015
- GFG Installed Capacity as a proportion of total forecast to double
- GFG Energy Production as a proportion of total forecast to increase by 33%
- Lower utilization factors implies lower impact on gas demand

GFG Attributes	2008	2010	2015
GFG Installed Capacity / Total	16%	23%	29%
GFG Energy Production / Total	9%	10%	12%
Utilization Factor			
Combined Cycle	20%	9%	17%
Simple Cycle	0%	0%	2%
CHP	42%	43%	41%
Existing NUG	77%	77%	77%

Growth in Installed Capacity – 2008 -2015

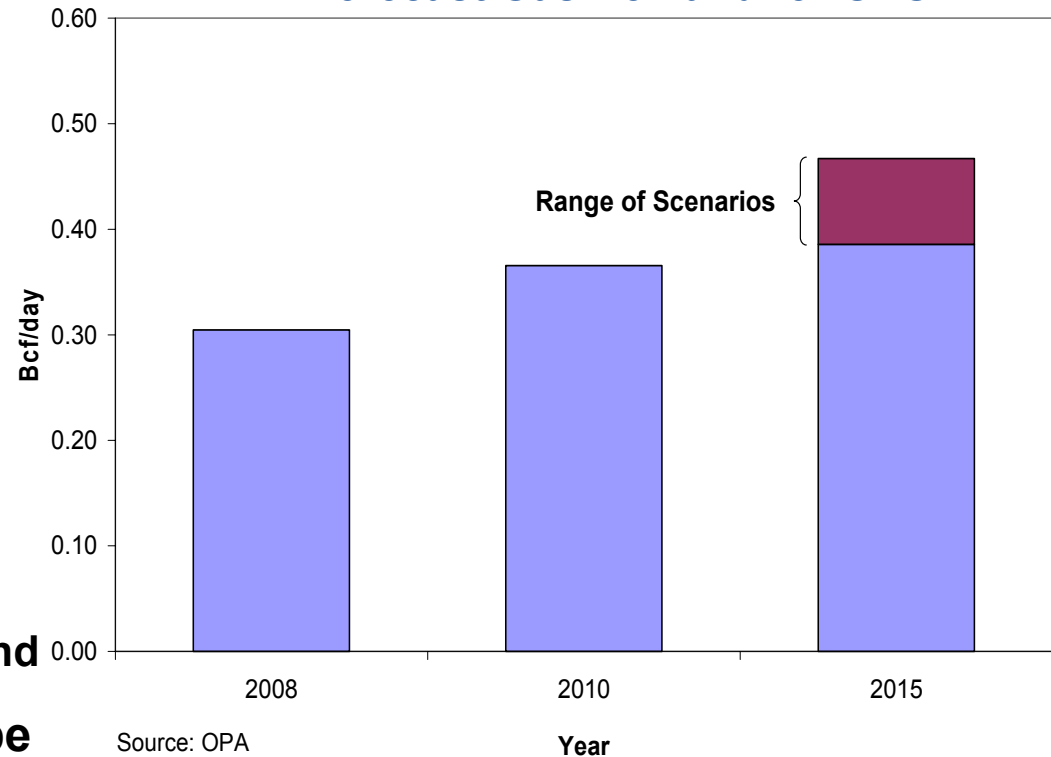


Source: OPA

GFG Average Gas Demand Ranges (2008 -2015)

- Long term demand impacted by other sources of supply (conservation, nuclear, and renewable)
- Demand forecast to grow by up to 0.2 Bcf/d from 2008
- Volume growth represents
 - ~8% of total demand in Ontario
 - ~4% of total flows into Ontario
 - ~0.3% of North American demand
- Peak Day flows expected to be higher

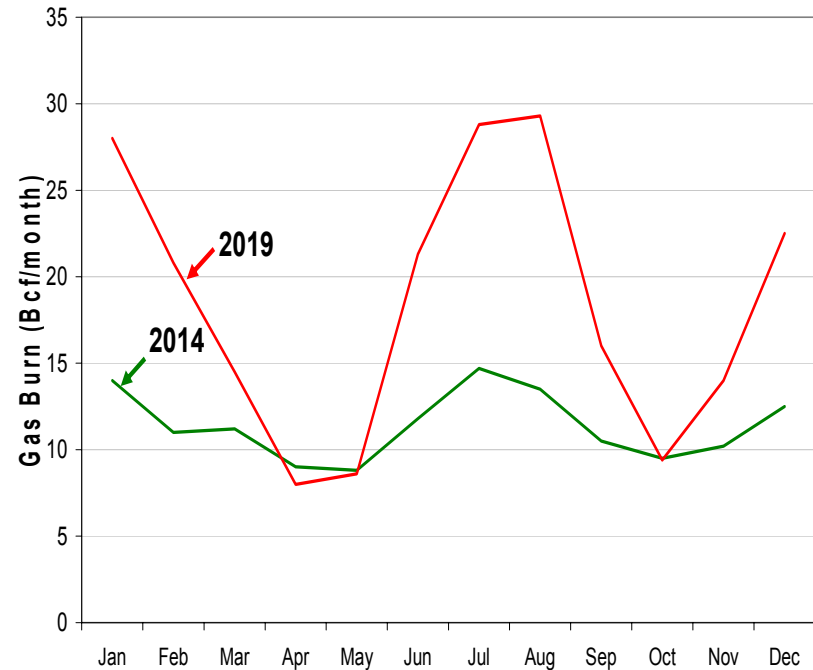
Forecast Gas Demand for GFG



Seasonality of Natural Gas Consumption in Ontario (2014–19)

- Summer peaks likely to exceed winter peaks
- Seasonal peaks forecast to grow after coal is decommissioned in 2014
- Seasonal profile impacted by other sources of supply (conservation, nuclear, and renewable)

Forecast Seasonal Gas Burn



Source: OPA Scenario 1A

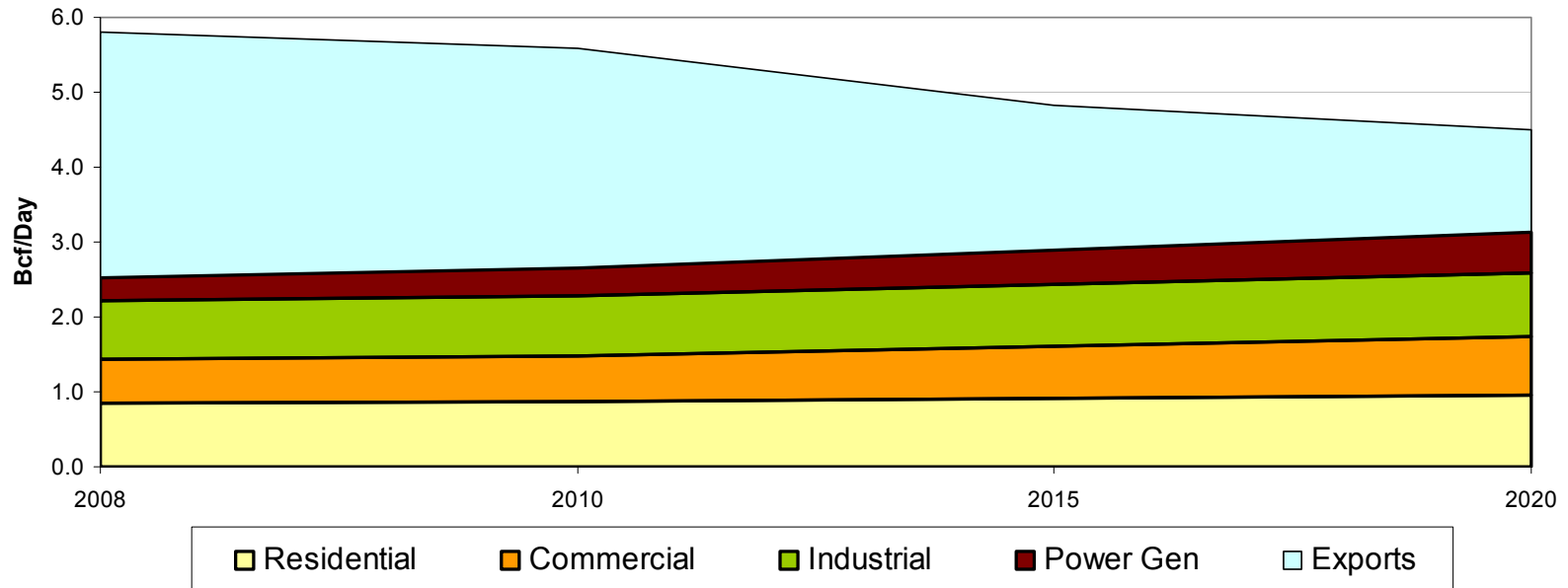
GFG Additions and its implications

- Incremental Supply
- Incremental Infrastructure
 - Load Balancing
 - Distribution
- LDC Operations
 - Scheduling Flow
 - Communication protocol with upstream gas operators and downstream generator
 - Communication with Electricity Operator (IESO)
 - Maintaining service quality and reliability for other users

Differences In Service Requirements Between GFG And Traditional Markets

	Power Generation	Traditional Markets
Type of service	Mostly unbundled	Mostly bundled
Supply	Dawn	Western Canada Chicago, Dawn
Transport	Short haul	Long & Short haul
Storage	Daily Balancing	Seasonal Balancing
Demand Driver	IESO requirements	Weather/Industrial Demand
Scheduling	Frequent intraday changes Reservation of capacity	Day ahead with few intraday changes

Supply Response - Ontario Supply, Demand and Exports (Bcf/d)



Source: Natural Resources Canada, OPA, Enbridge Forecasts

- GFG sector is driving demand growth
- Adequate supply to meet demand growth
- Decline in exports from Ontario

Service and Infrastructure Response for GFGs

Delivery Points	Dawn	Parkway	City Gate	Generator
Service Enhancements	<ul style="list-style-type: none"> • High Deliverability (HD) Storage 	Union Short Notice Transport and Balancing	TCPL Short Notice Transport and Balancing	EGD Balancing and Distribution
Infrastructure Enhancements (2007-2009)	<ul style="list-style-type: none"> • Vector 0.3 Bcf/d • Rockies pipeline projects & Michigan storage • Enbridge HD 0.2 Bcf/d • Union HD 0.4 Bcf/d 	Union expansion 1.2 Bcf/d	As needed	As needed

LDC Operational response

- **Enable short notice services with third party providers**
 - Match nomination windows offered by upstream pipe and storage operators
- **Provide no notice balancing services to GFGs when system conditions permit**
 - Winter: Limit draft and accommodate pack
 - Summer and Fall: Limit pack and accommodate draft
- **Establish clear communication protocol between gas industry operators, generator and IESO**
- **Exercise contractual provisions to preserve system integrity**
 - curtail/shut down generator if their unauthorized actions endanger service to other customers

Enbridge's Perspectives

- **Impacts on traditional gas users contained:**
 - Ontario supply adequate to meet GFG demand
 - Ontario gas industry responsive to need for new services and infrastructure
 - Gas industry operators and IESO working on establishing communication protocols
 - Process for changes to rates and services based on operating experience
- **Critical success factors for the longer term:**
 - Generators continue to contract for *firm* supply and deliverability
 - Ensure regulatory climate encourages adequate infrastructure growth
 - Preserve access to liquid markets and competitive services



Questions?

