



# New Generation Construction Division

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June 2012

# Manitoba Hydro Profile

- ❖ Crown corporation
- ❖ 6,251 employees
- ❖ 537,000 electric & 265,000 natural gas customers
- ❖ Lowest domestic electricity rates in Canada
- ❖ 2010-11 export sales - \$398 million

# Manitoba Hydro Profile – cont'd

- ❖ 14 generating stations – including 2 thermal
- ❖ 3 HVdc converter stations
- ❖ Existing 5,499 MW generating capability (2011)
- ❖ New projects - 2,380 MW generating capability

# Generating Stations and Interconnections

2010/11 – Energy

80% Nelson R.

12% Wpg. R.

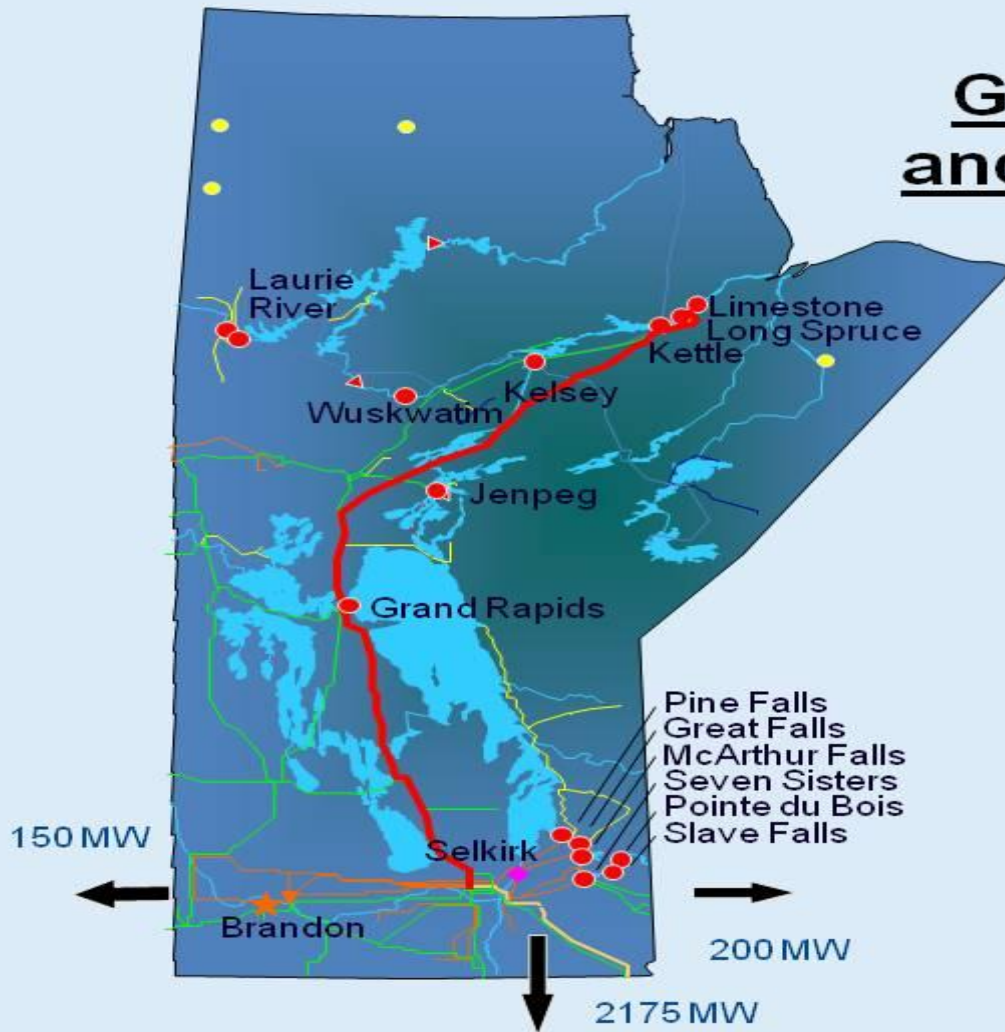
6% Sask. R.

1% Wind

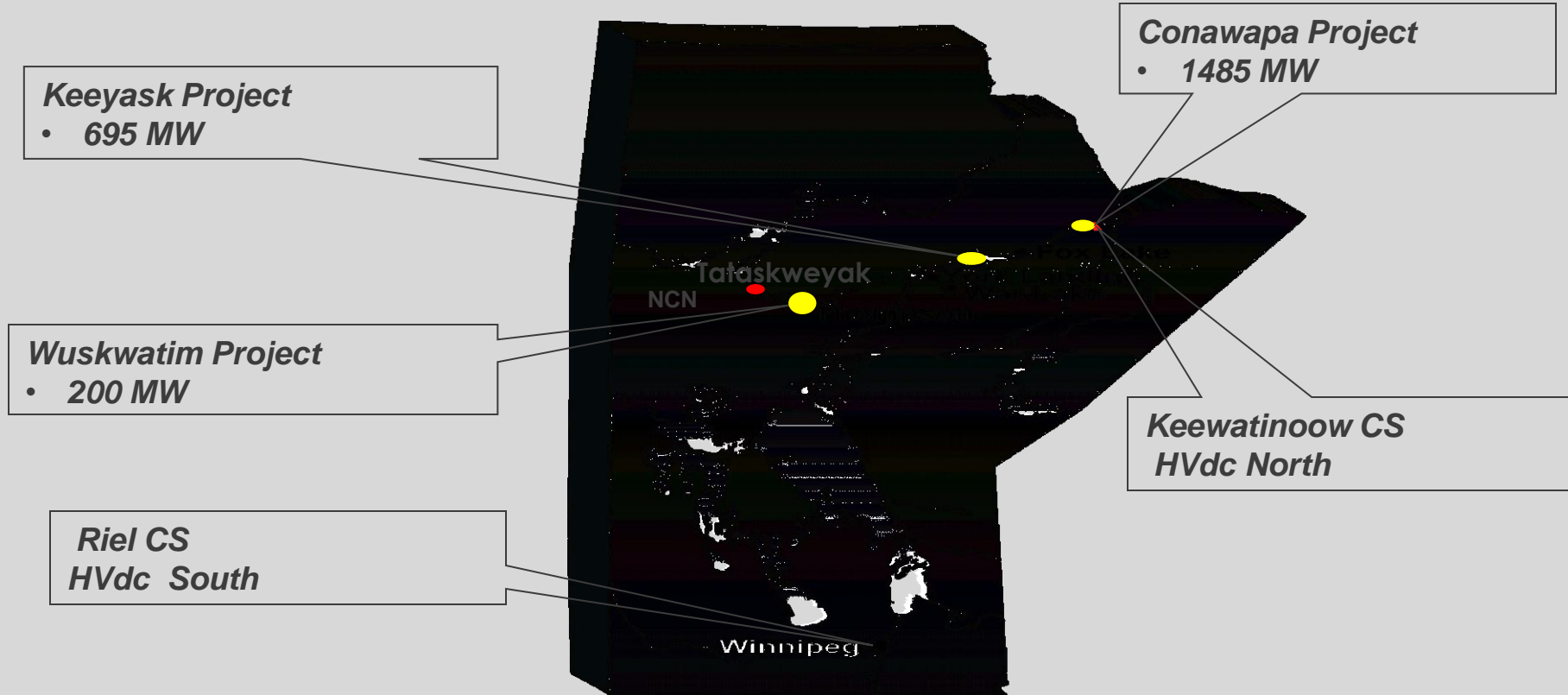
1% Thermal & Imports

— HVDC  
— Other Transmission

- ◆ Selkirk -Natural Gas
- ▼ Brandon – Coal
- ★ Brandon – Gas Comb. Turbine
- ▲ Control Structures
- Diesel Sites
- Hydraulic G.S.'s



# Major Projects Overview



# Wuskwatim Generating Station



September 2011



# Wuskwatim

- ❖ Installed Capacity: 200 MW
- ❖ Rated Head: 21 m
- ❖ Rate Discharge Capacity: 1,100 m<sup>3</sup>/sec
- ❖ Start of Construction: 2007
- ❖ First Unit ISD: 2012

# Wuskwatim – Generating Units

- ❖ Number of Units: 3
- ❖ Generators: 86 MVA
- ❖ Turbine Type: Vertical fixed-blade propeller
- ❖ Speed: 95 RPM
- ❖ Transformers: 13.8 kV/230 kV
- ❖ Transmission: 230 kV



# Wuskwatim - Spillway

- ❖ Type: 3 Bay
- ❖ Gates: Fixed roller vertical lift @ 9 m wide
- ❖ Capacity: 2,700 m<sup>3</sup>/sec

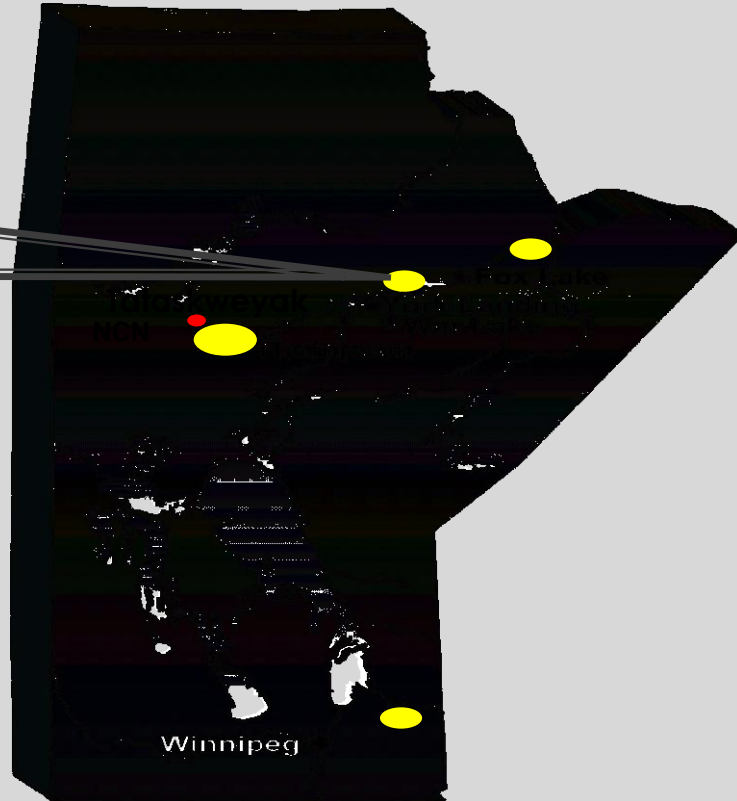
# Wuskwatim - Quantities

- ❖ Excavation:
  - ❖ Unclassified: 730,000 m<sup>3</sup>
  - ❖ Rock: 835,000 m<sup>3</sup>
  
- ❖ Concrete
  - ❖ Powerhouse: 90,000 m<sup>3</sup>
  - ❖ Spillway: 9,500 m<sup>3</sup>
  - ❖ Auxiliary Structures: 7,500 m<sup>3</sup>

# Keeyask Generating Station

## *Keeyask Project*

- 695 MW
- ISD 2019



# Keyask Generating Station



Artists Rendering



Current View

# Keeyask

- ❖ Installed Capacity: 695 MW
- ❖ Rated Head: 18.3 m
- ❖ Rated Discharge Capacity: 4,000 m<sup>3</sup>/sec
- ❖ Start of Construction: 2014
- ❖ First Unit ISD: 2019

# Keeyask – Generating Units

- ❖ Number of Units: 7
- ❖ Generators: 117 MVA
- ❖ Turbine Type: Vertical fixed-blade propeller
- ❖ Speed: 69 RPM
- ❖ Transformers: 13.8 kV/135 kV
- ❖ Transmission: 138 kV

# Keeyask – Spillway

- ❖ Type: 7 Bay
- ❖ Gates: Fixed roller vertical lift @ 13 m wide
- ❖ Capacity: 11,300 m<sup>3</sup>/sec

# Keeyask - Quantities

## ❖ Excavation

- ❖ Unclassified: 3,100,000 m<sup>3</sup>
- ❖ Rock: 2,000,000 m<sup>3</sup>

## ❖ Concrete

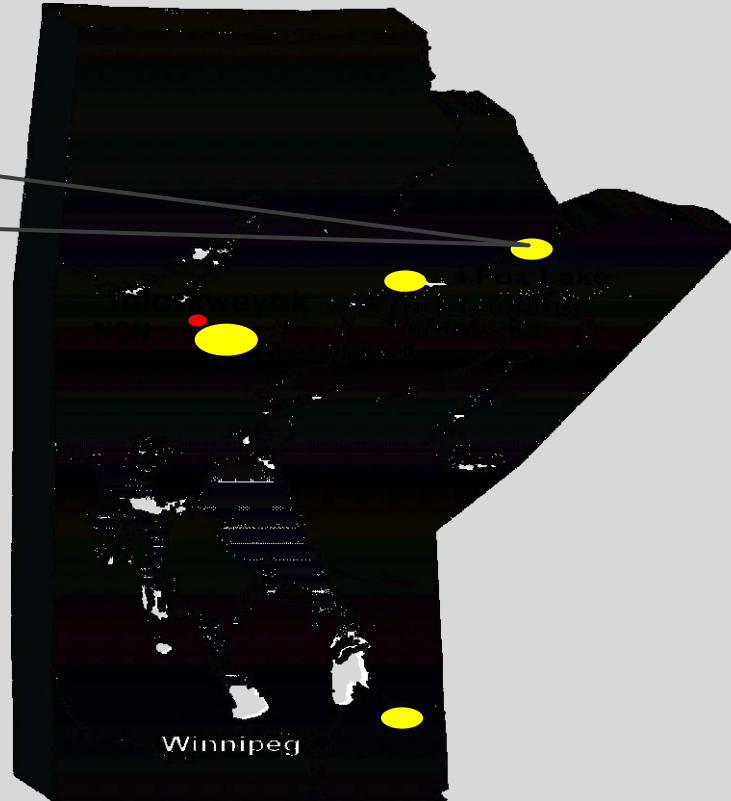
- ❖ Powerhouse: 320,000 m<sup>3</sup>
- ❖ Spillway: 42,000 m<sup>3</sup>



# Conawapa Project

## *Conawapa Project*

- *1485 MW*
- *ISD 2025*



# Conawapa Generating Station



# Conawapa

- ❖ Installed Capacity: 1,485 MW
- ❖ Rated Head: 31 m
- ❖ Rated Discharge Capacity: 5,300 m<sup>3</sup>/sec
- ❖ Start of Construction: 2016
- ❖ First Unit ISD: 2025

# Conawapa – Generating Units

- ❖ Number of Units: 10
- ❖ Generators: 176 MVA
- ❖ Turbine Type: Vertical fixed-blade propeller
- ❖ Speed: 92 RPM
- ❖ Transformers: 13.8 KV/230 kV
- ❖ Transmission: 230 kV

# Conawapa - Spillway

- ❖ Type: 7 Bay
- ❖ Gates: Fixed roller vertical lift@13 m wide
- ❖ Capacity: 11,550 m<sup>3</sup>/sec.

# Conawapa - Quantities

- ❖ Excavation

  - ❖ Unclassified: 5,167,000 m<sup>3</sup>

  - ❖ Rock: 1,310,000 m<sup>3</sup>

- ❖ Concrete

  - ❖ Powerhouse: 253,000 m<sup>3</sup>

  - ❖ Spillway: 199,000 m<sup>3</sup>

  - ❖ Auxiliary Structures: 148,000 m<sup>3</sup>

# BiPole III Plan

- $\pm 500$  kV HVDC Transmission Line of approximately 1384 km

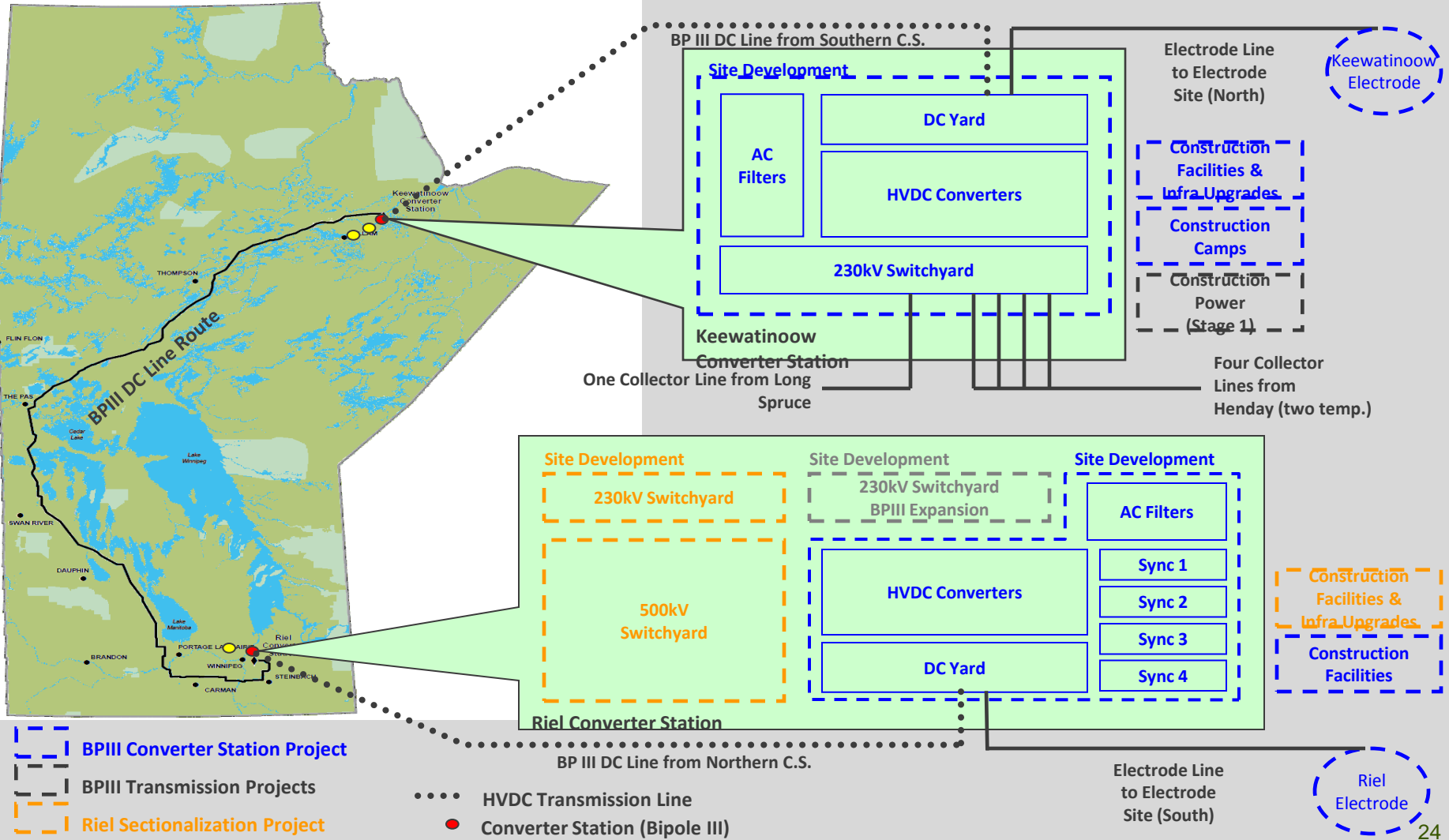
- Keewatinoow 2000 MW converter station

- Riel 2000 MW converter station

- Hearing in early fall with licence to follow

- ISD 2017







# Delivery Strategy

- ❖ KCS 230kV AIS Switchyard
  - ❖ Requires integrated civil & electrical design & construction
  - ❖ Construction driven; majority of risk is in construction
  
- ❖ EPC Contract

# Delivery Strategy

- ❖ HVdc Converter Equipment
  - ❖ Two technologies (LCC vs. VSC); very different in terms of scope & risks
  - ❖ Design, supply, installation oversight & commissioning must be done by single vendor
  - ❖ Equipment must be a single package for KCS and RCS

# Delivery Strategy

- ❖ RCS Synchronous Condensers
  - ❖ Requirement for synchronous condensers not known until after HVdc technology decision
  - ❖ Sync technology will be determined at time of proposal evaluation (air vs hydrogen cooled)

Merci