

Bipole III Transmission Project

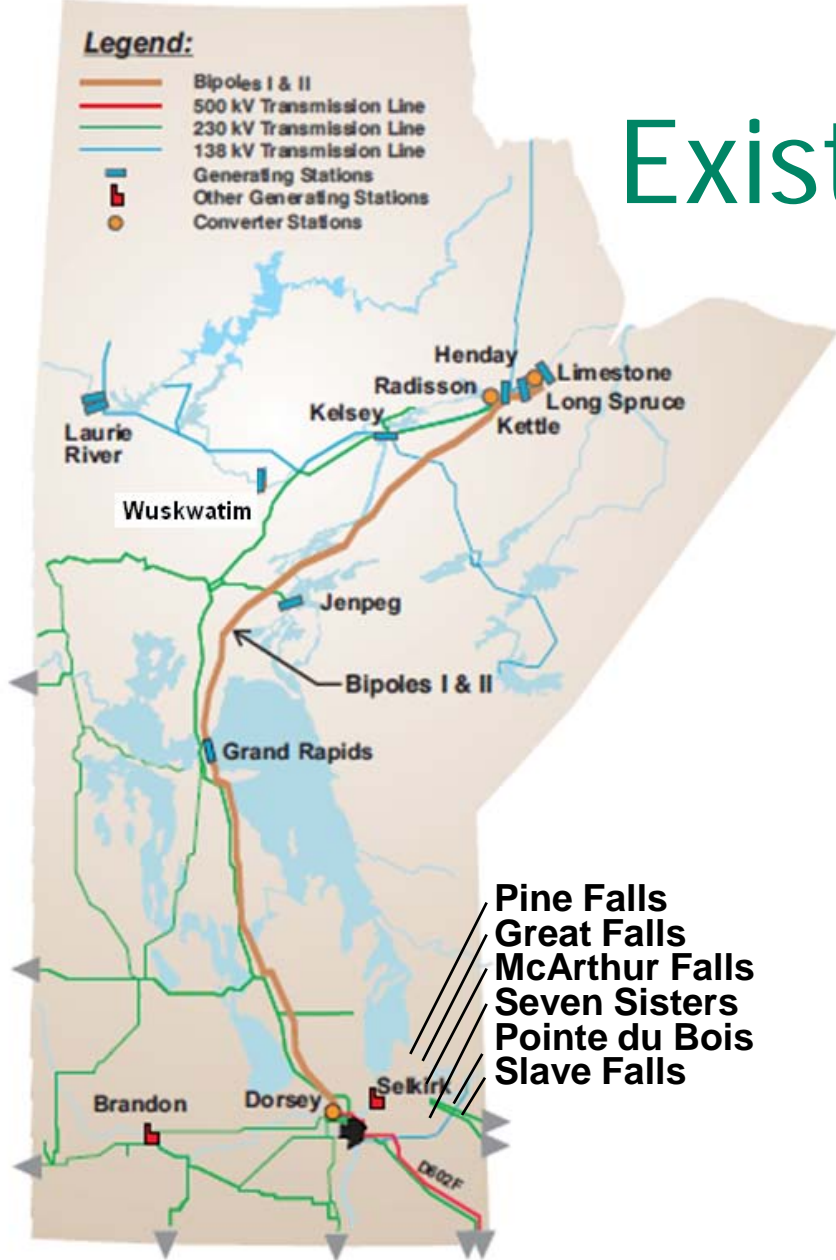
Clean Environment Commission
Public Hearings
Fall 2012

Overview

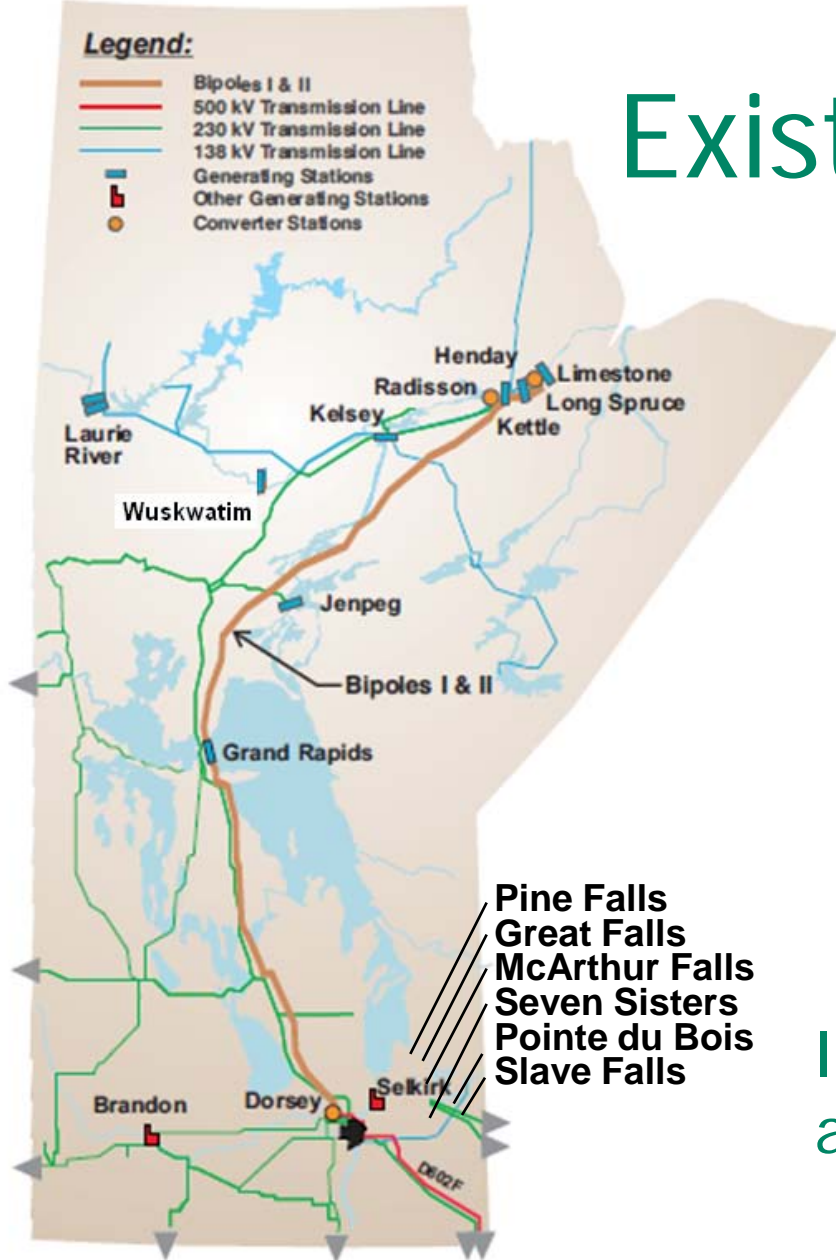
- Existing System
- Project Description
- Bipole III: Reliability
- Environmental Assessment Process
- Construction Planning

Existing System

High level - how it works



Existing System



High Voltage Transmission Lines	
• 500 kV HVDC:	1843 km –BP I & II
• 500 kV AC:	209 km
• 230 kV AC:	5000 km
• 138 kV AC:	1400 km
• 115 kV AC:	2900 km

Interconnections	
• Saskatchewan:	• 3x230 kV & 2x115 kV
• Ontario:	• 2x230 kV & 1x115 kV
• United States:	• 1x500 kV & 3x230 kV

Installed 18,500 kilometres (km) of ac transmission lines from 33 kV to 500 kV in last 60 years

Existing System

Line or Site Designation	PROJECT	Licence Number	Date Issued
KN36	Kettle - Limestone 138 kV Line	1209	1988 07 29
SK1	Seven Sisters - Star Lake 138 kV Line	1225	1988 09 09
A3R Tap to Silver	A3R to Silver 230 kV Line	1238	1988 11 18
R29H	Reston-Virden 230 kV Line	1277	1989 07 10
Nelson River Crossing	Bipole II Backup - Nelson River Crossing	1479	1991 06 10
RF58, FC56	Flin Flon Ross Lake - Cliff Lake 115 kV Line	1555	1992 05 19
KS37	Split Lake 138 kV Line (INCL Split Lake Stn & Distribution)	1579	1992 07 29
B69R, B70H	Raven Lake - Birtle - Virden 230 kV Line	1674	1993 05 25
GG64, GW62, HG61, KH38	North Central Project (138 kV) (incl Stns.)	1741	1994 02 07
H59C	Stall Lake - Flin Flon 230 kV Line	1843	1994 06 06
SG12	ST2-Beausejour East Station 115 kV Line	2045	1995 06 02
D54C	Winnipeg-Neepawa-Brandon 230 kV Line	2120	1995 10 02
VT63	St. Vital - Ile des Chenes (TCPL) 115 kV Line	2237	1996 12 20
S65R	Rosser - Silver 230kv T/Line	2347	1998 07 28
BD52, BK41	BD52 / BK41 Rebuild	2357	1998 10 01
HS 15	Flin Flon Improvements	2386	1999 03 03
D72V	Dorsey - St. Vital 230 kV T/Line	2433	1999 11 17
G82R	Glenboro - Rugby 230kv T/Line	2529	2001 11 19
W73/74H, H75P, B76W	Wuskwatim Transmission Lines	2700	2006 06 21

Environment Act proclaimed in force March 31, 1988.

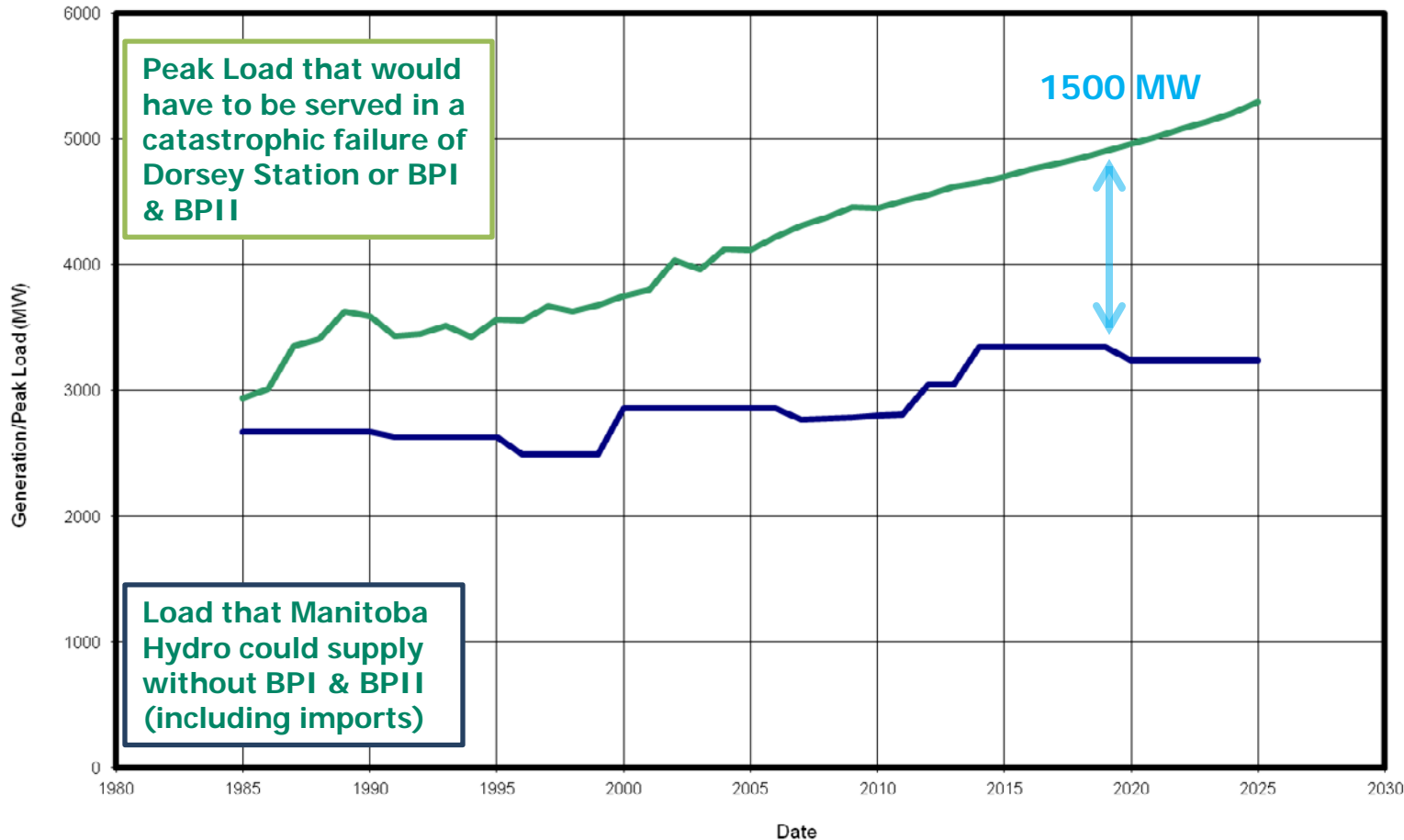
- **Requires assessment of transmission lines 115kV and over.**
- **Licensing & Environmental Assessment Dept.**
 - **10 professionals**
 - **Expert consultants**

Manitoba Hydro Act

“The purposes and objectives of this Act are to provide for the continuance of a supply of power adequate for the needs of the province ...”

Manitoba Needs Bipole III

Manitoba Load Serving Capability without Dorsey



BPIII:
solution
to our
energy
shortfall
problem

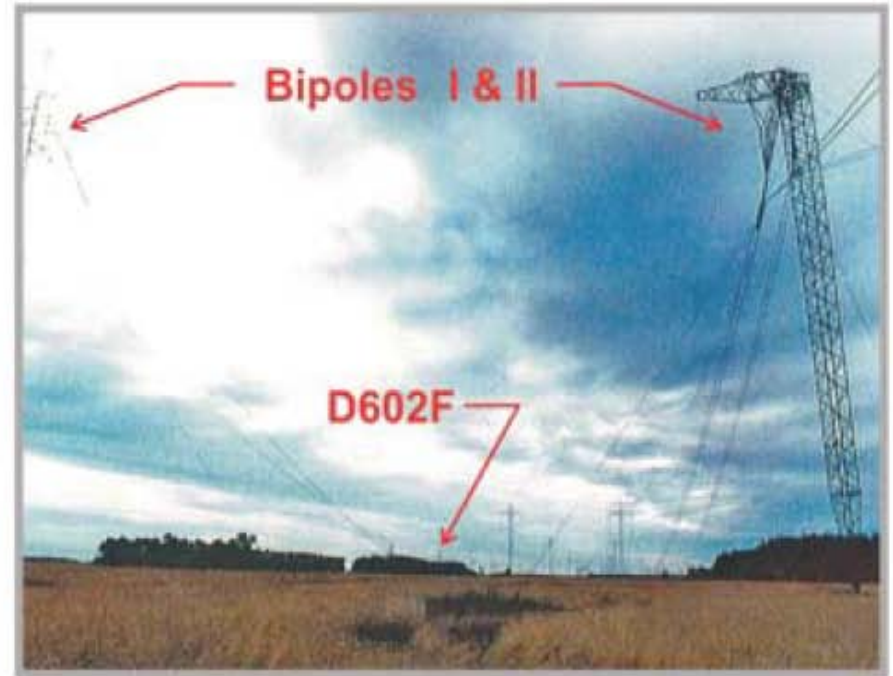
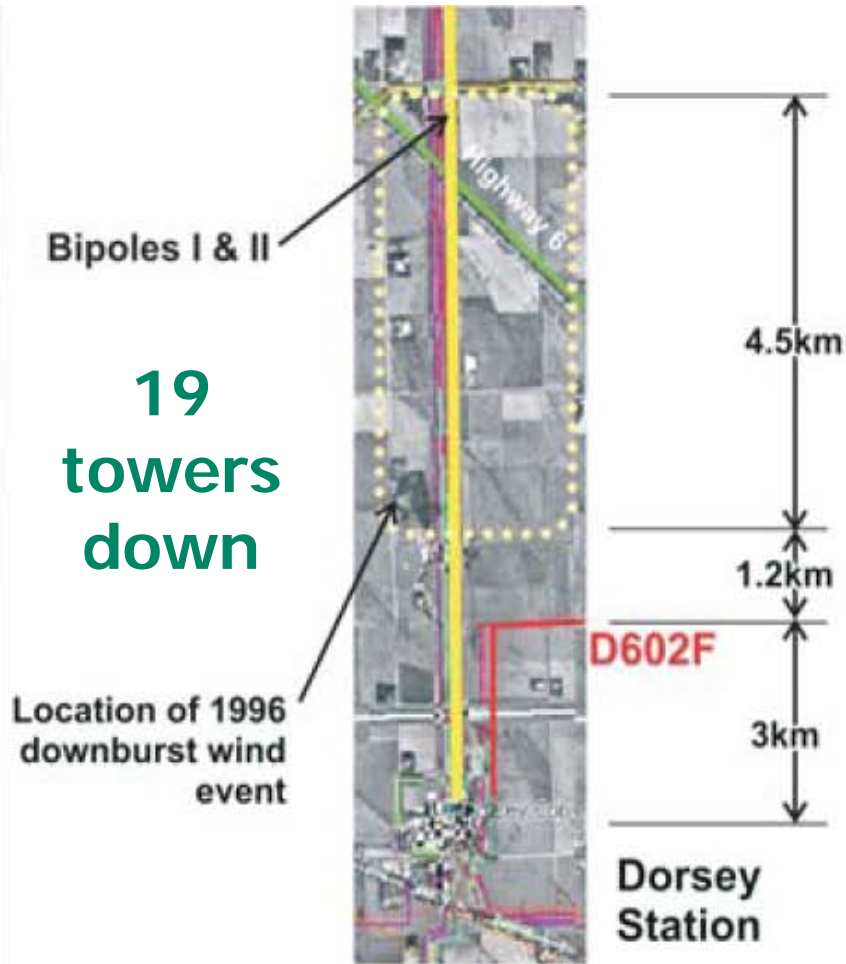
Vulnerabilities & Exposure of HVDC System

- Two Bipole lines 900kms long on same right-of-way
- Two lines and the southern Dorsey Station transmit 70% of northern hydro generation
- Dorsey has “most eggs in one basket”
- No utility in world transmits so much power through one critical facility

Near Misses & Other Events in Manitoba

- September 5, 1996 - Downburst 1.5 miles north of Dorsey
- July 17, 2006 Storms collide over Winnipeg
- June 2007 – Elie F5 Tornado
- August 9, 2007 – Storm Hits Dorsey Bipole 1
- May 2008 - Marchand Forest Fire – 500 kV AC line
- June 2008 – Buffalo Lake Forest Fire – DC lines
- January 2011 – Flood waters /Ice buildup on 117 km of DC row and structures in northern Manitoba – 50 towers and 400 guys encased in 3 feet of ice
- May 2012 – Forest Fires in SE Manitoba
- July 29, 2012 – 150 km/hr Plow Winds in St. Laurent and area

September 1996 Downburst



Sept. 5, 1996 Downburst Wind Event in which Bipoles I & II were lost

Electrode Line Damaged

June 2007 – Elie F5 Tornado



August 2007 – Storm Hits Dorsey Bipole I



- Damaged equipment
- Lost 1348 MWs of power
- 7 valve groups tripped off
- 3 transmission lines tripped

Project Description

- Northern Converter - Keewatinoow CS
 - 79 km from Gillam
 - Converts AC power to DC (rectifier)
- Southern Converter - Riel CS
 - just outside Winnipeg
 - Converts DC power to AC (inverter)
- Keewatinoow – Riel dc transmission line

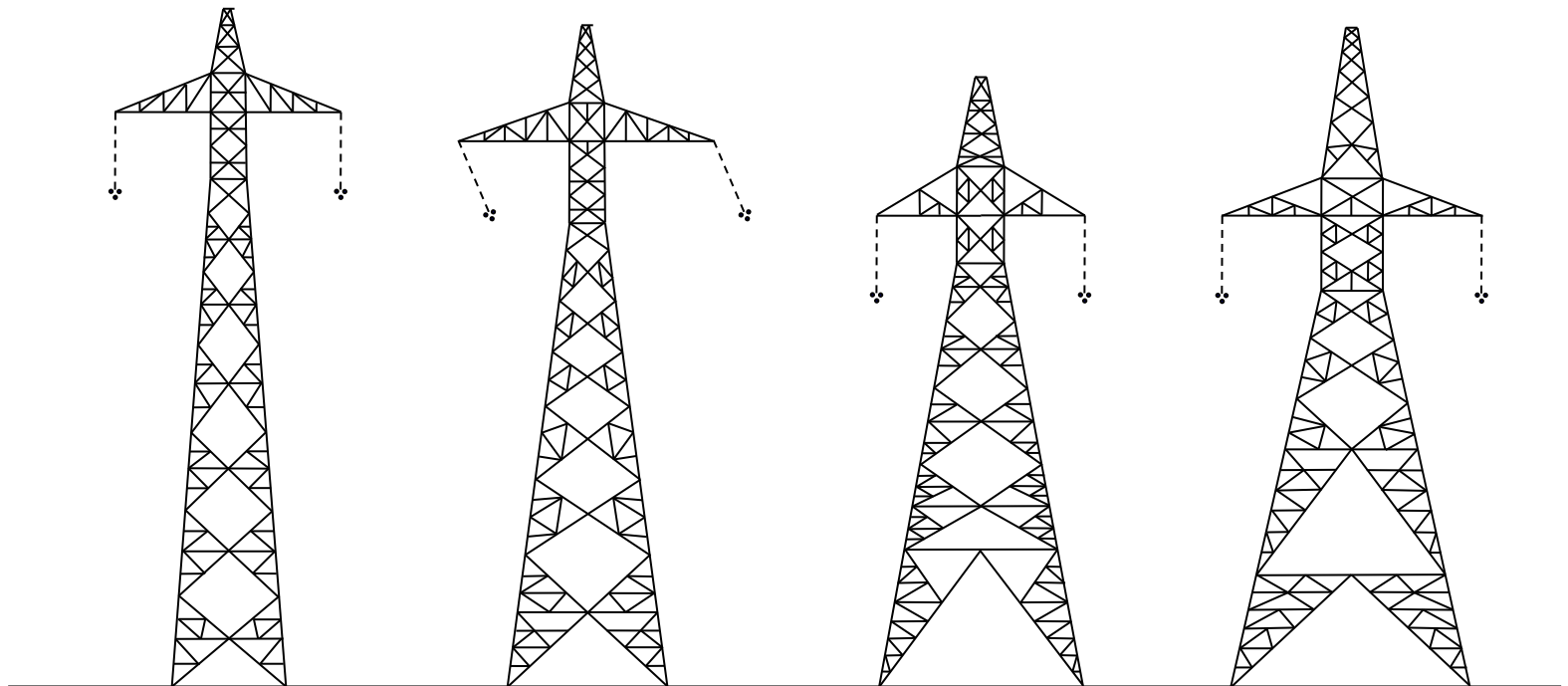


DC Transmission Lines – Northern Manitoba



Guyed towers
in non-agricultural
areas for BP3

DC Transmission Lines – Southern Manitoba



Towers:

0°-2° TANGENT
SUSPENSION TOWER
A-540

Height: 41 – 56 m

2°-7° LIGHT ANGLE
SUSPENSION TOWER
B-540

Height: 43 – 55 m

7°-25° MEDIUM ANGLE
DEAD-END TOWER
C-540

Height: 40 – 49 m

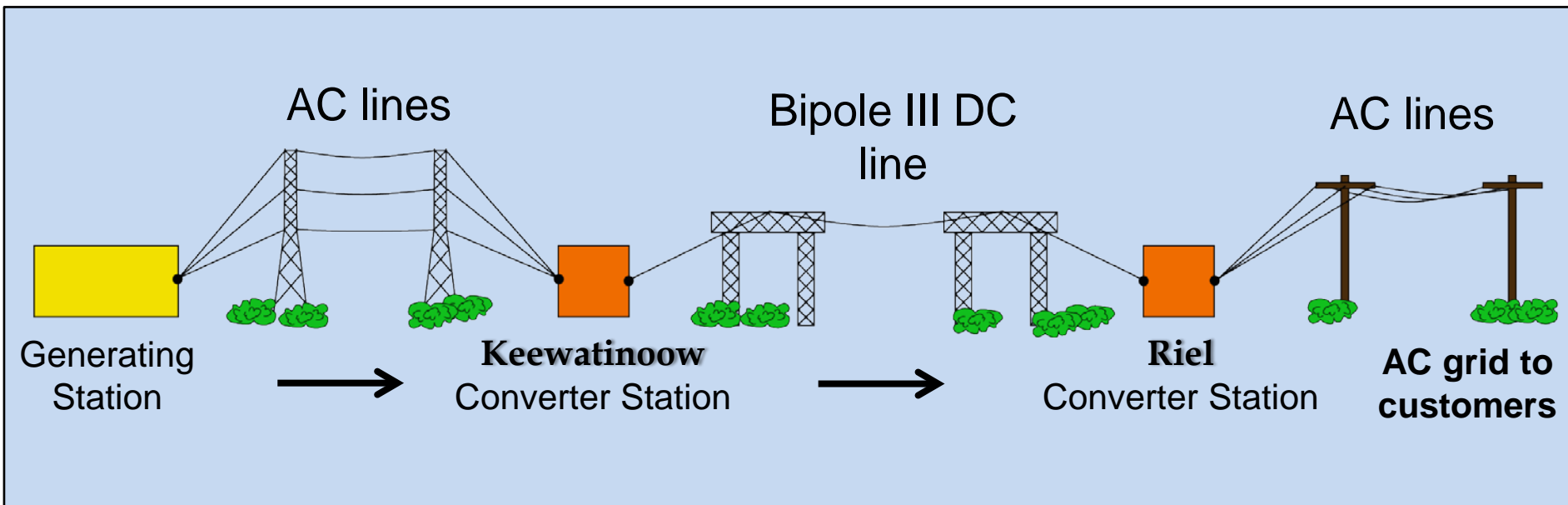
25°-92° HEAVY ANGLE
DEAD-END TOWER
D-540

Height: 44 – 53 m

Keewatinoow vs. Riel

- Keewatinoow Converter Station:
 - Developed access, but undeveloped (new) site
 - Remote construction location, requiring full scale worker accommodations
 - Under Burntwood Nelson Labour Agreement (BNA)
- Riel Converter Station:
 - Partially developed (existing) site
 - No camp requirements

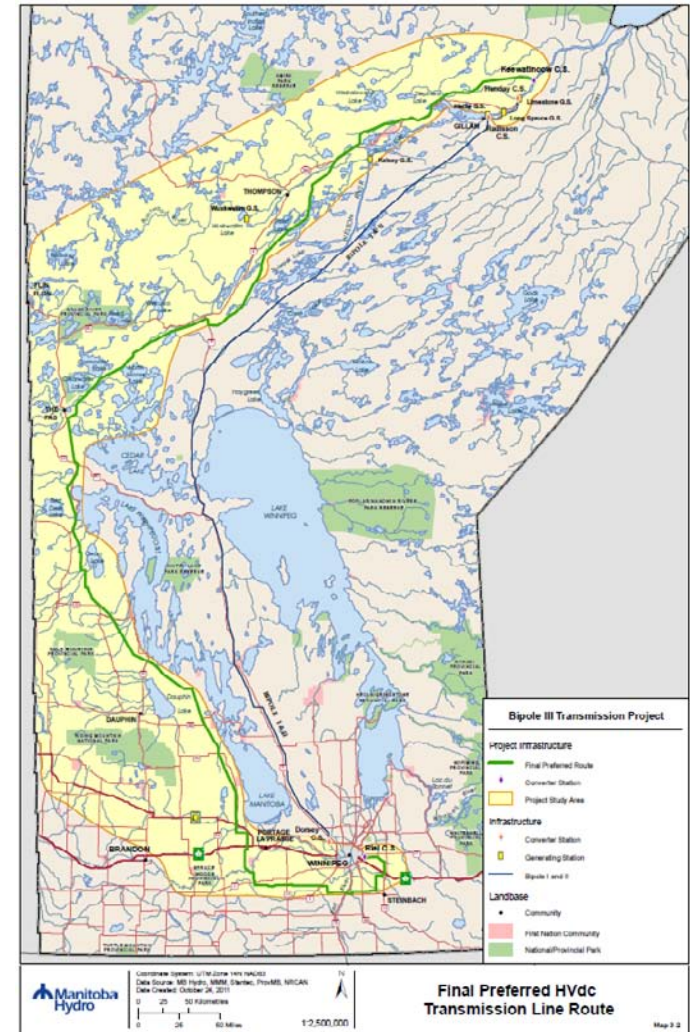
How AC Electricity Gets Converted to DC for Long-distance Transmission on Bipole III Line



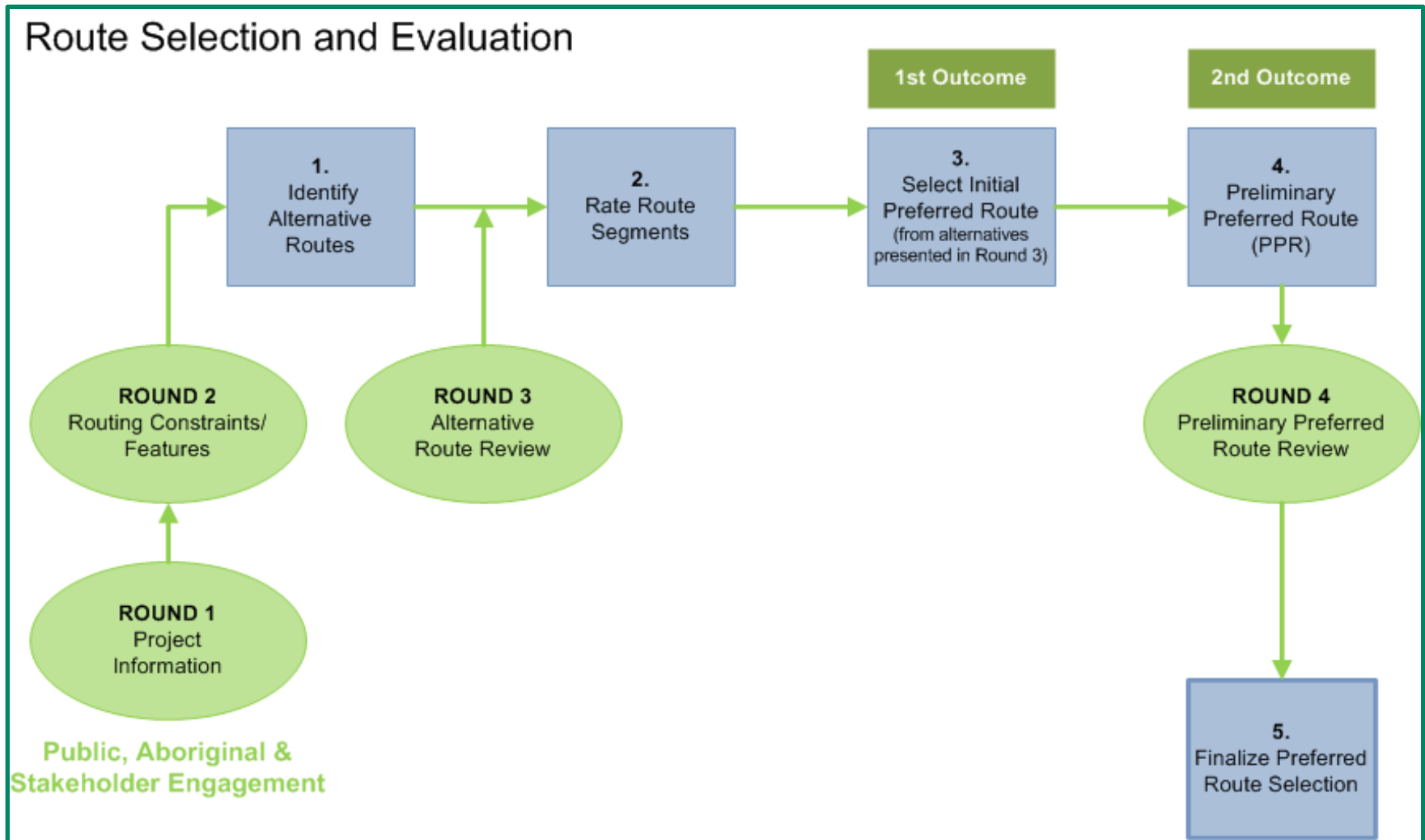
Environmental Assessment Process

Final Preferred Route

- Length of line: 1,384 km
- Right-of-way width: 66m
- Crown lands: 931 km (67%)
- Private lands: 454 km (33%)
- Approx. 436 private landowners

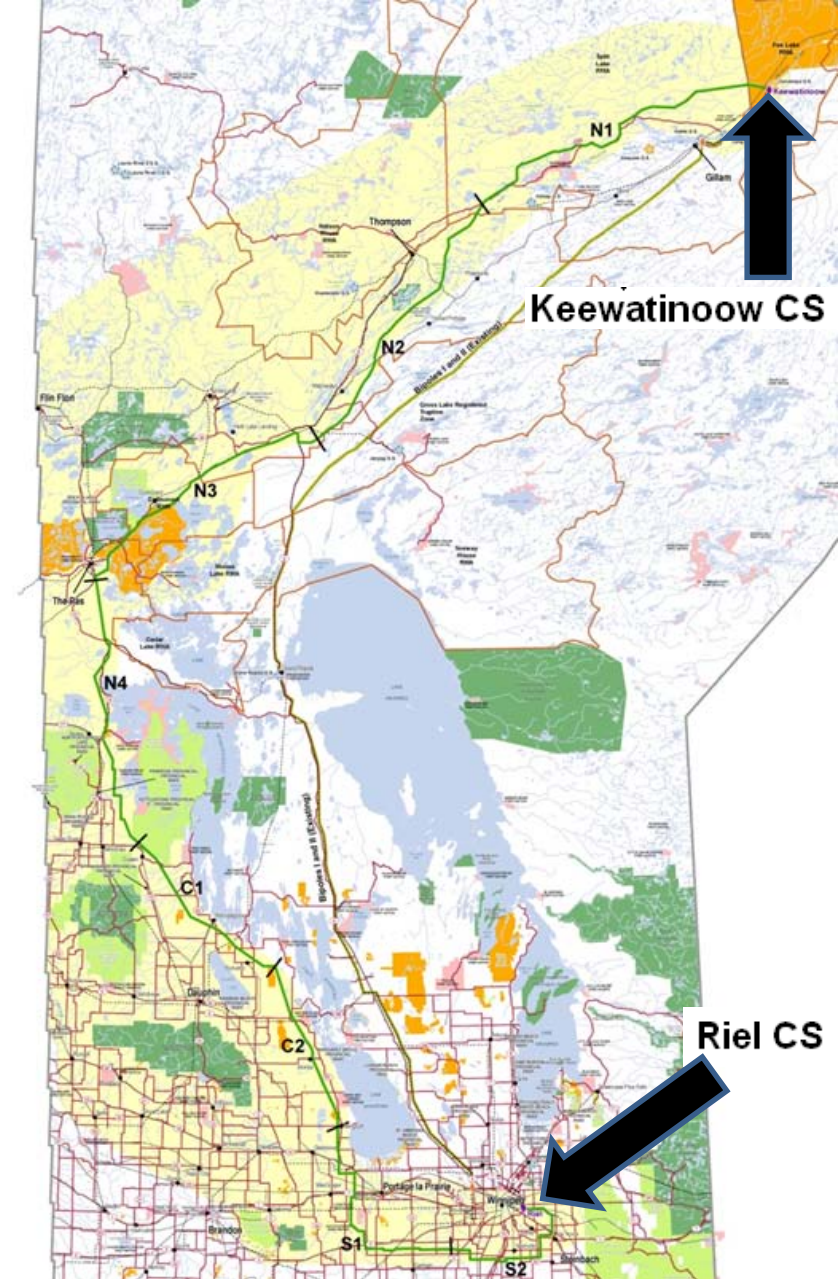


Environmental Assessment Process



Construction Planning

- Keewatinooow CS
- Transmission line
 - 8 construction segments
- Riel CS



Environmental Protection

Site Selection Process

- Used to avoid impacts wherever feasible through routing

Environmental Protection Program

- Provides a framework for the delivery, management and monitoring of environmental mitigation measures

Environmental Protection Plans

- Prescribes general protection measures
- Ensures compliance with regulatory requirements
- Identifies and prescribes mitigation for specific sensitive sites

Thank You