

**To Clean Environment Commission**

**Location Options for Bipole  
Converter Stations near Winnipeg**

**Part 1**

**Art Derry P.Eng.**

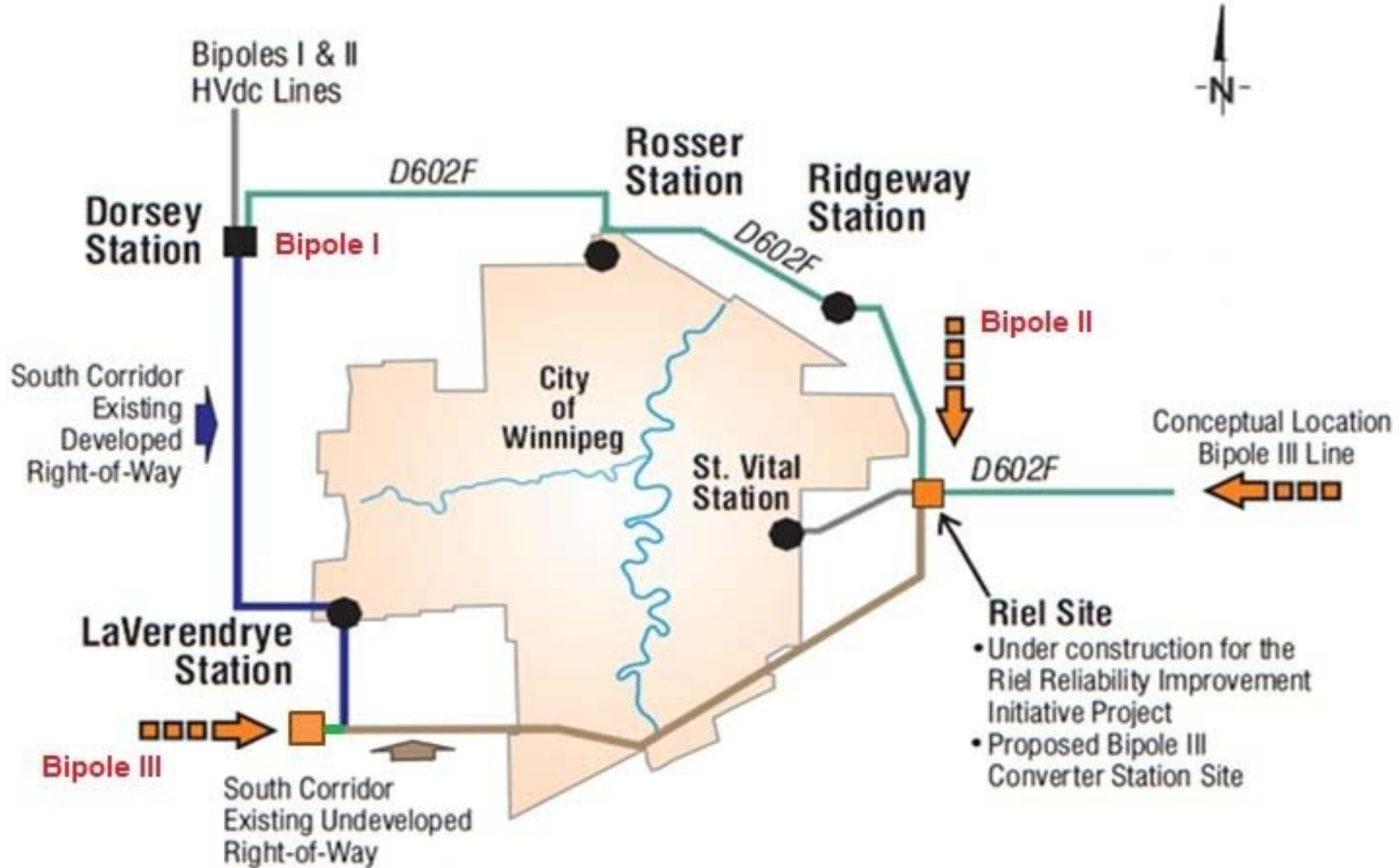
5<sup>th</sup> March, 2013

# Options

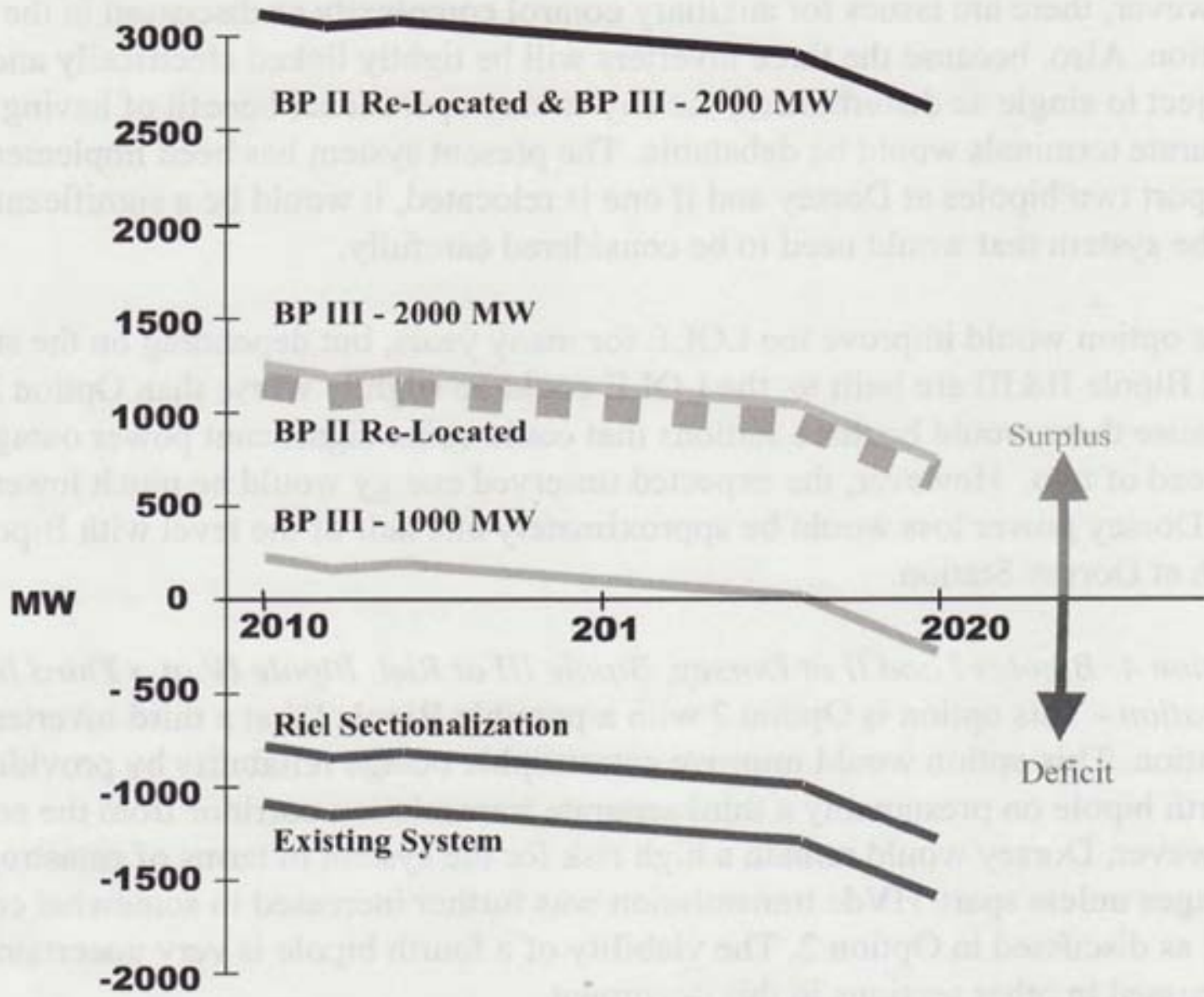
- a) Status quo
- b) Relocate Bipole II at Riel and build Bipole III at Dorsey (CEC enquiry)
- c) Locate the converter station for Bipole III at Riel (MH proposal)
- d) Relocate a new converter station for Bipole II at Riel (Recommended proposal)
- e) Build a converter station for Bipole III in the vicinity of LaVerendrye (Recommended proposal)



**Figure 1-1**



**Figure 1-2**



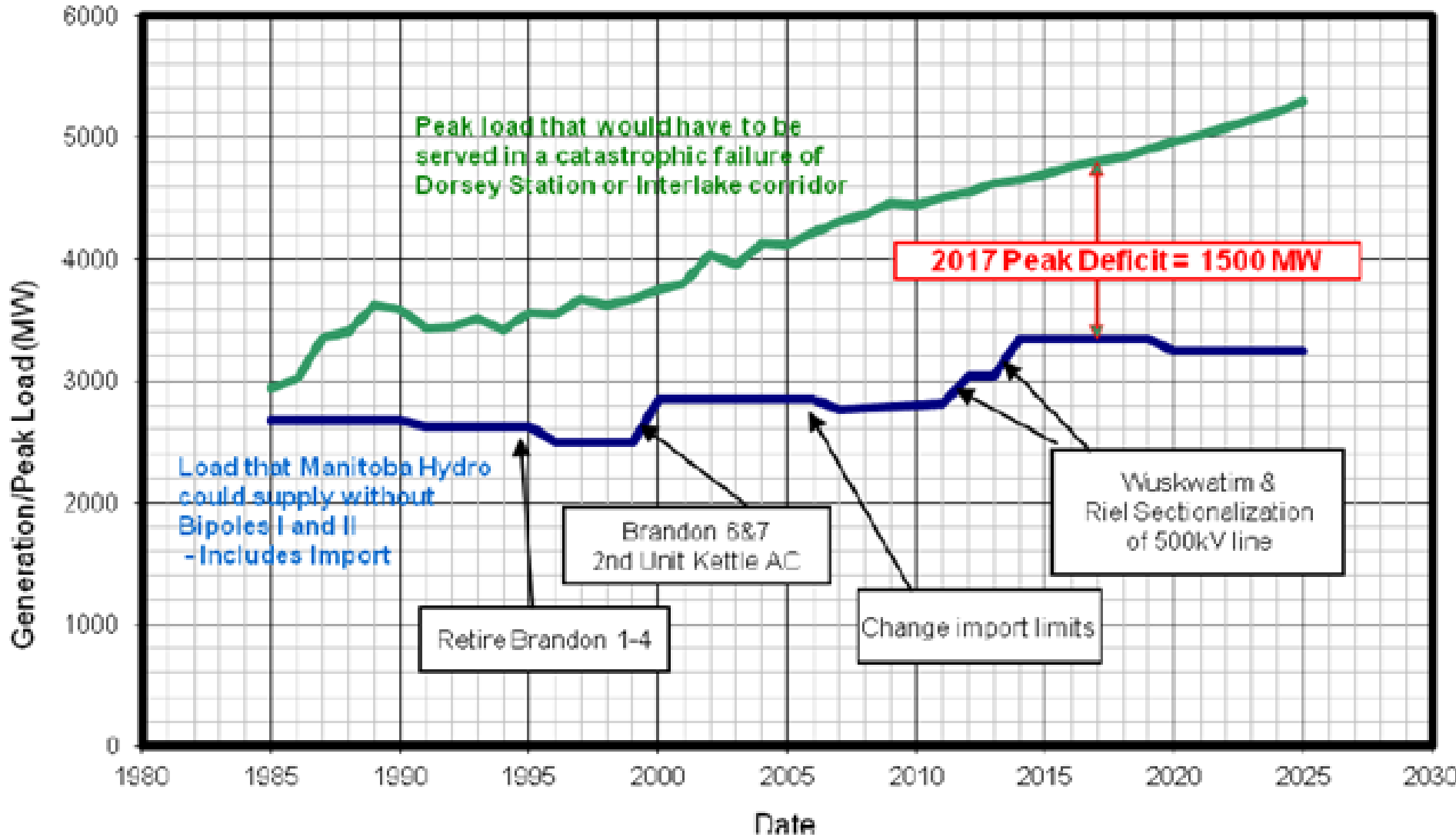
Assuming: Favourable water conditions, 900 MW import and Brandon Unit 5 in-service until 2019

**Figure 1-3**

# Options

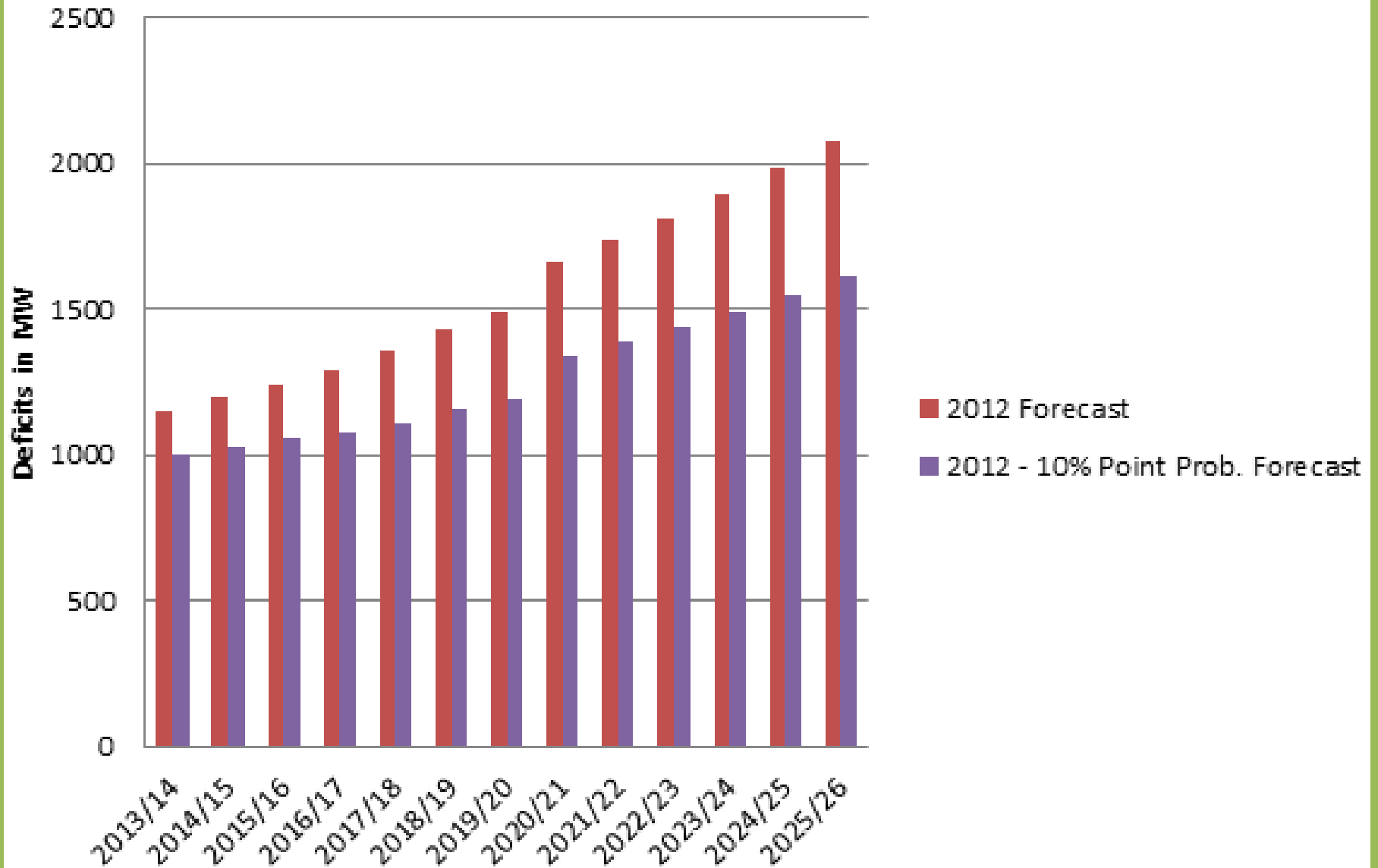
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# Manitoba Load Serving Capability



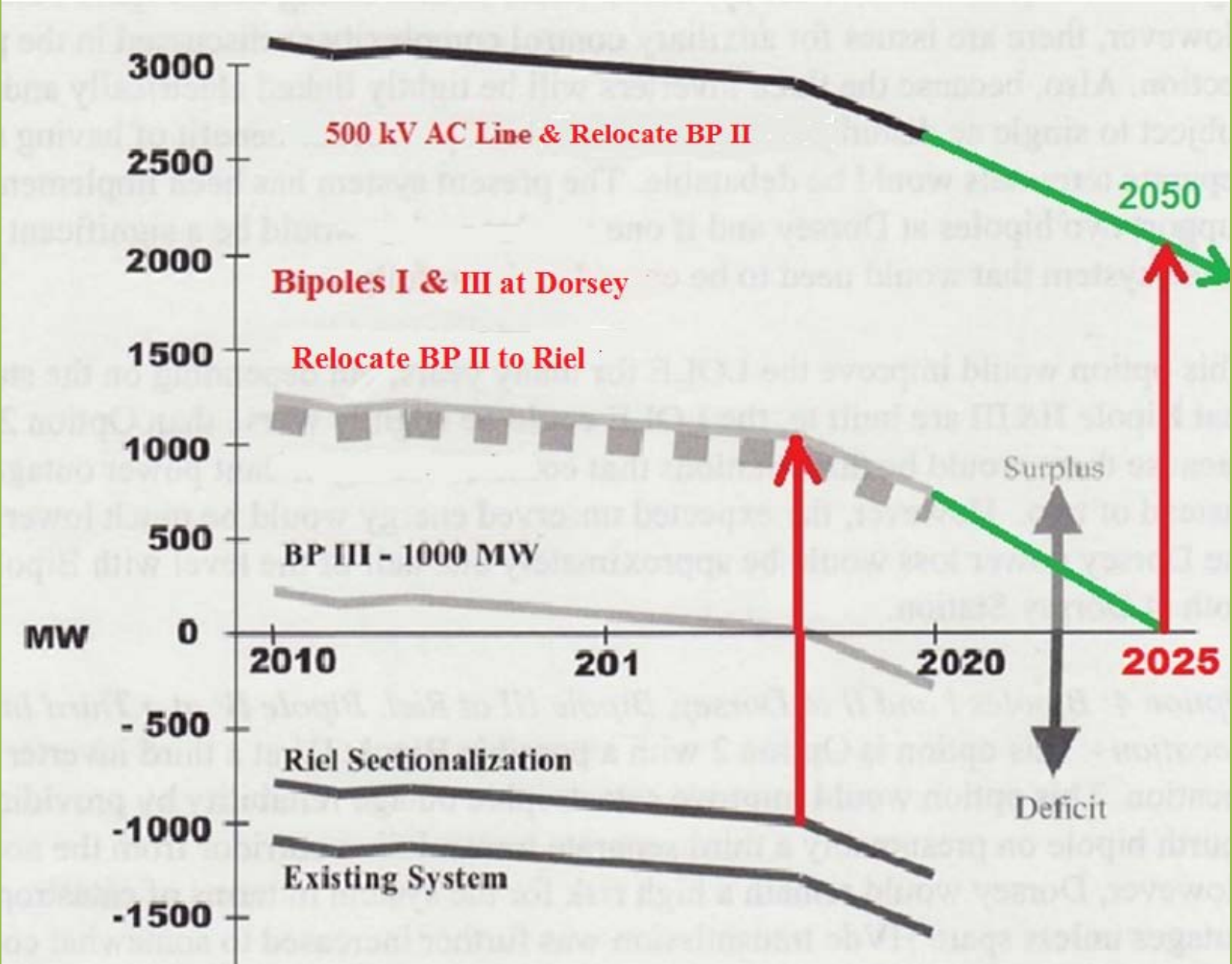
**Figure 1-4**

# Dorsey Outage (Peak Load) Deficits in MW

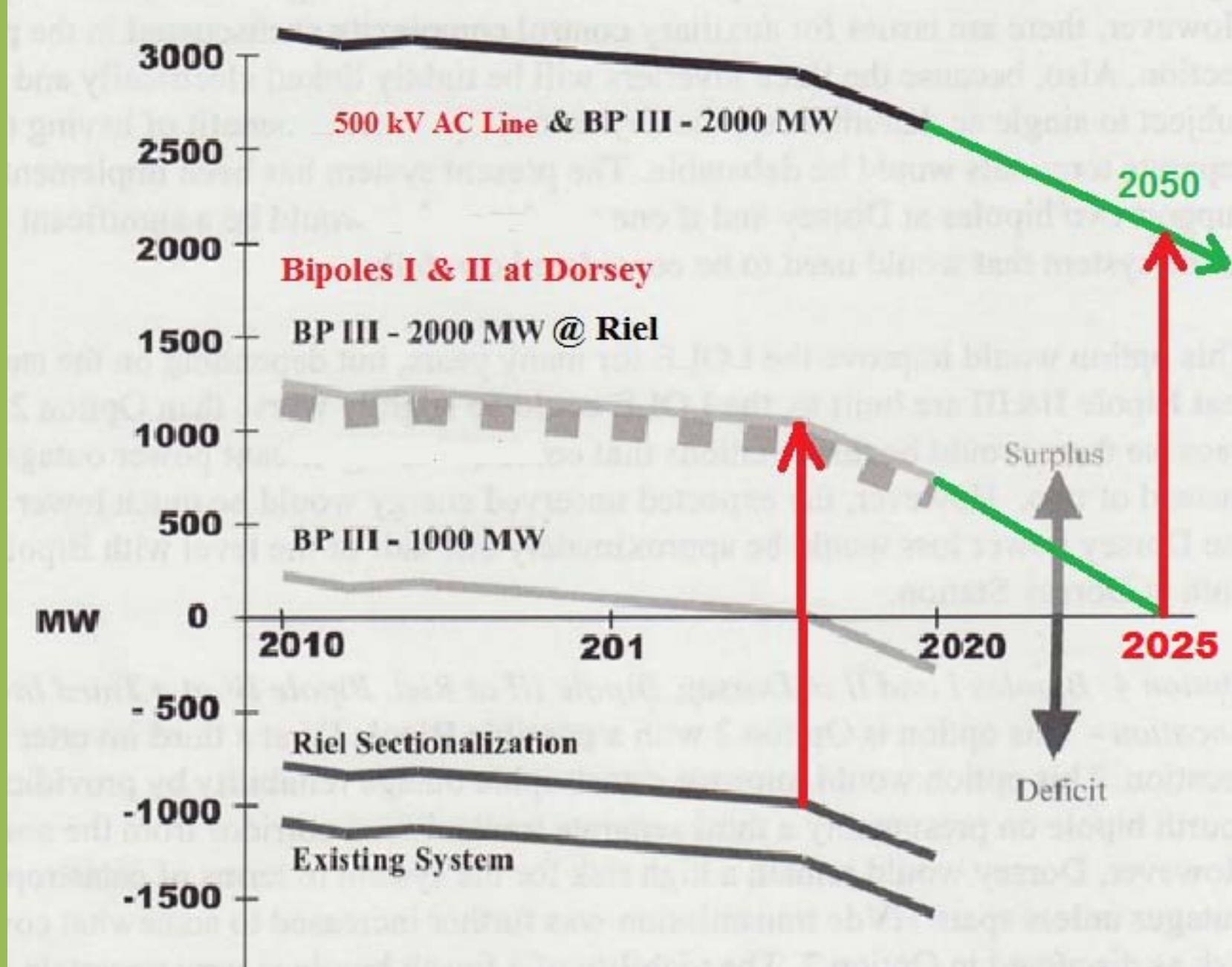


**Figure 1-5**

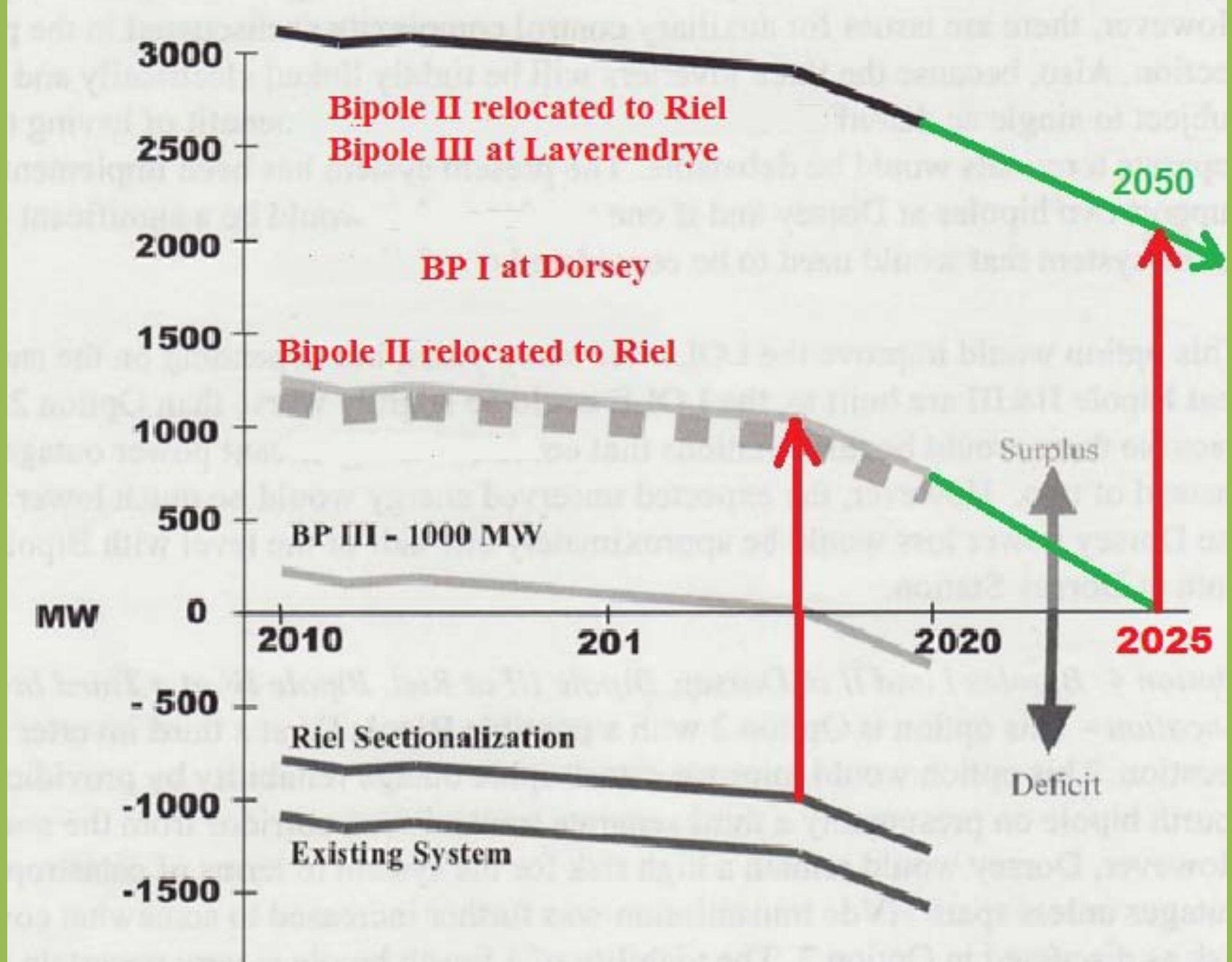




**Figure 1-3b**



**Figure 1-3c**



**Figure 1-3d&e**

# What the Analysis Means?

- A final route selection for Bipole III should *not be delayed*
- MH should reconsider the in-service date of 2017 for Bipole III
- The location of Bipole II should be at Riel for 2017
- Bipole II is 27% to 31% of the Bipole III in-service costs
- The location for Bipole III should be at La Verendrye by 2025
- All the above minimizes the effect on the southern Manitoba agricultural community
- Expenditures to the end of 2012 on Bipole III are \$194 m (6% of Bipole III)

Monthly Net Total Peak (per unit of the peak month January)

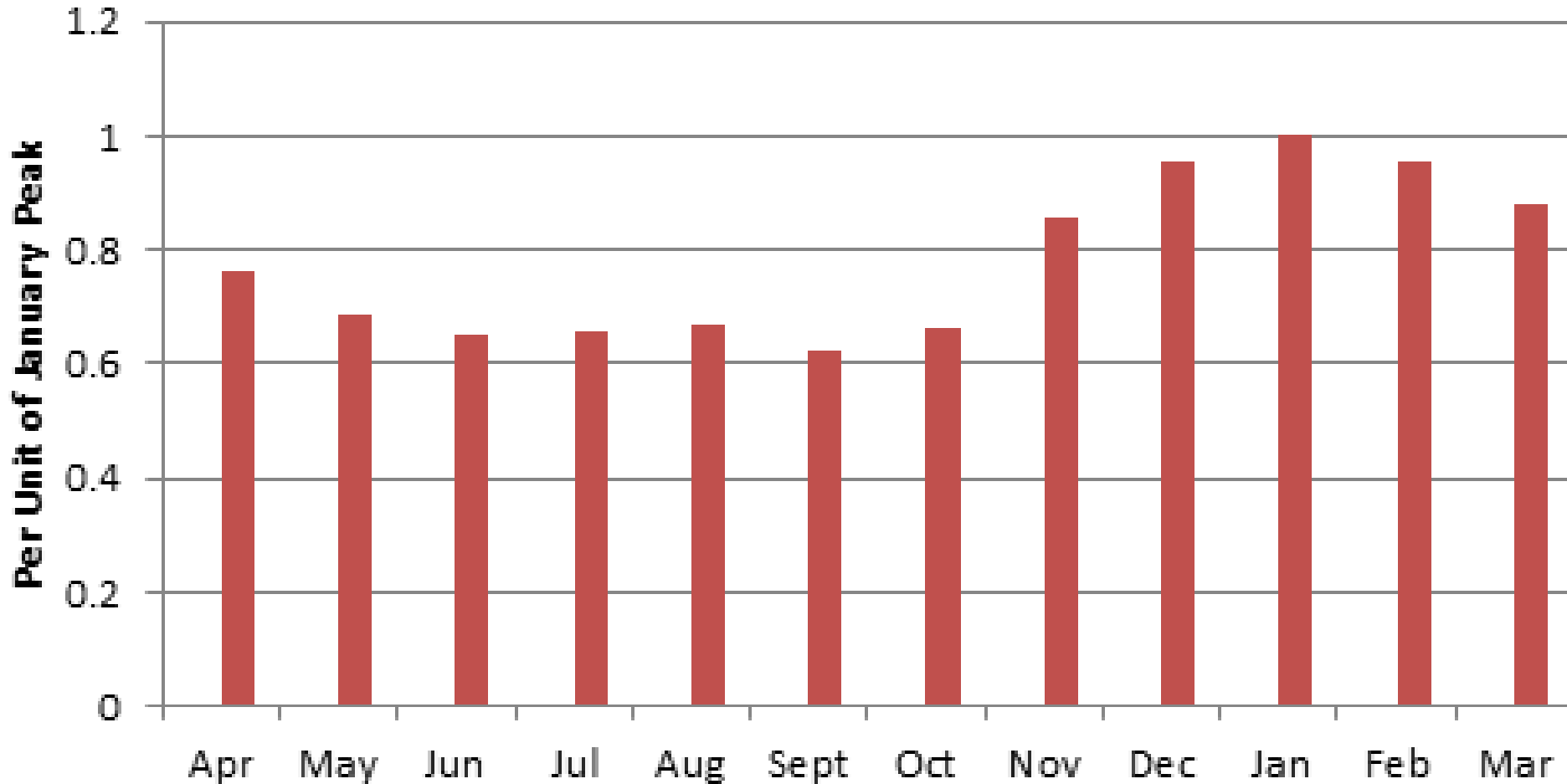
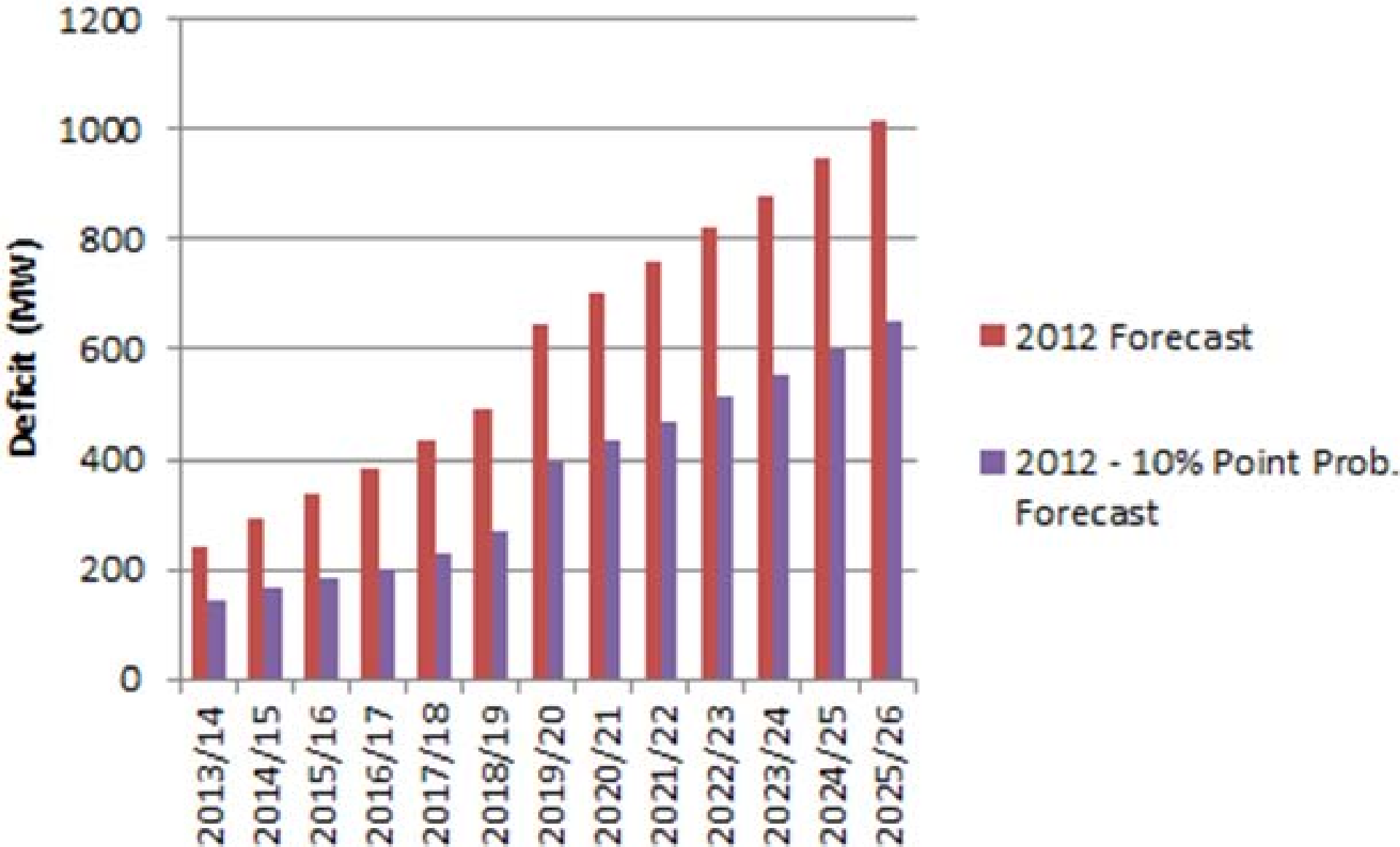
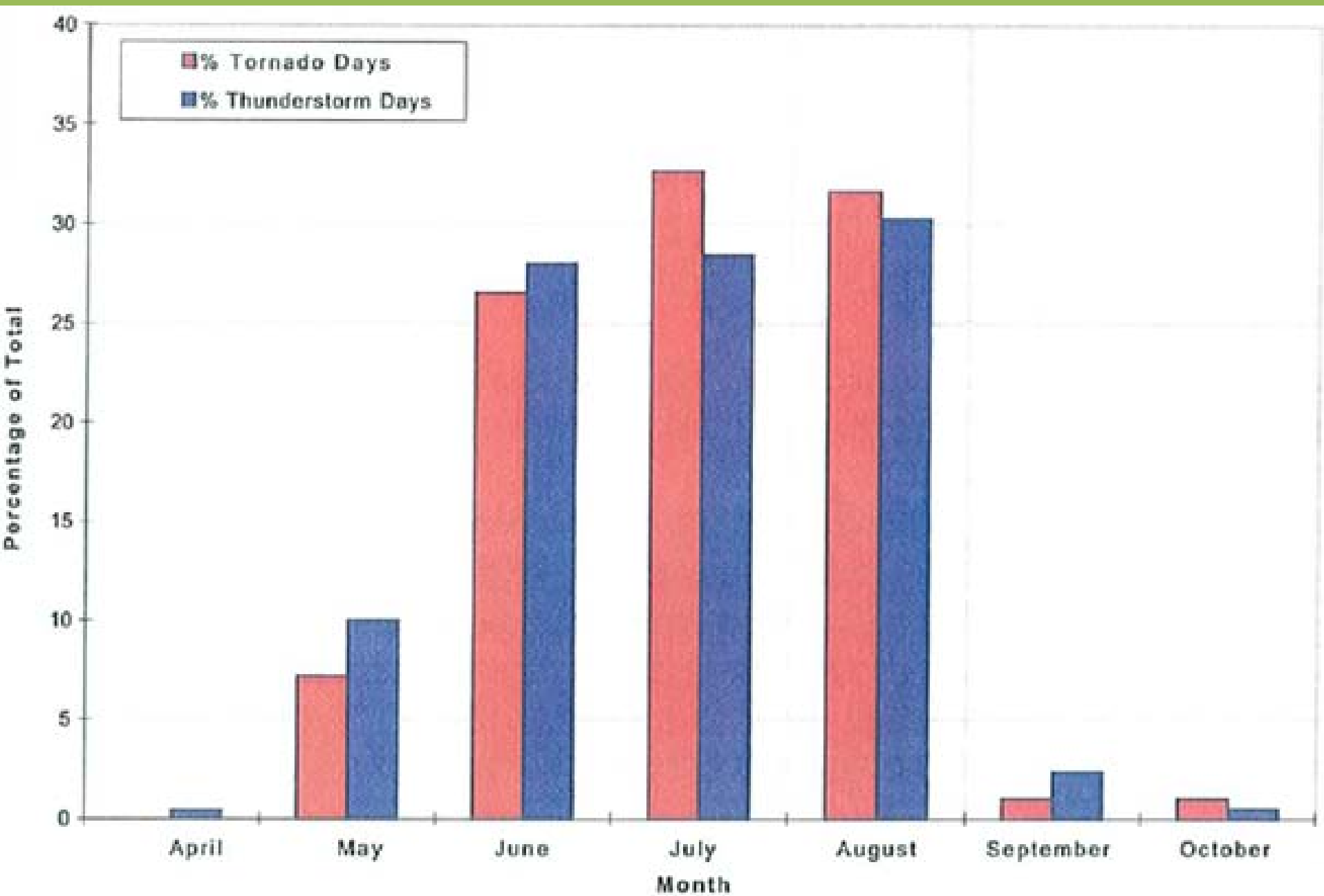


Figure 1-6

# Transmission Corridor (Shoulder Months) 80% of Peak Load

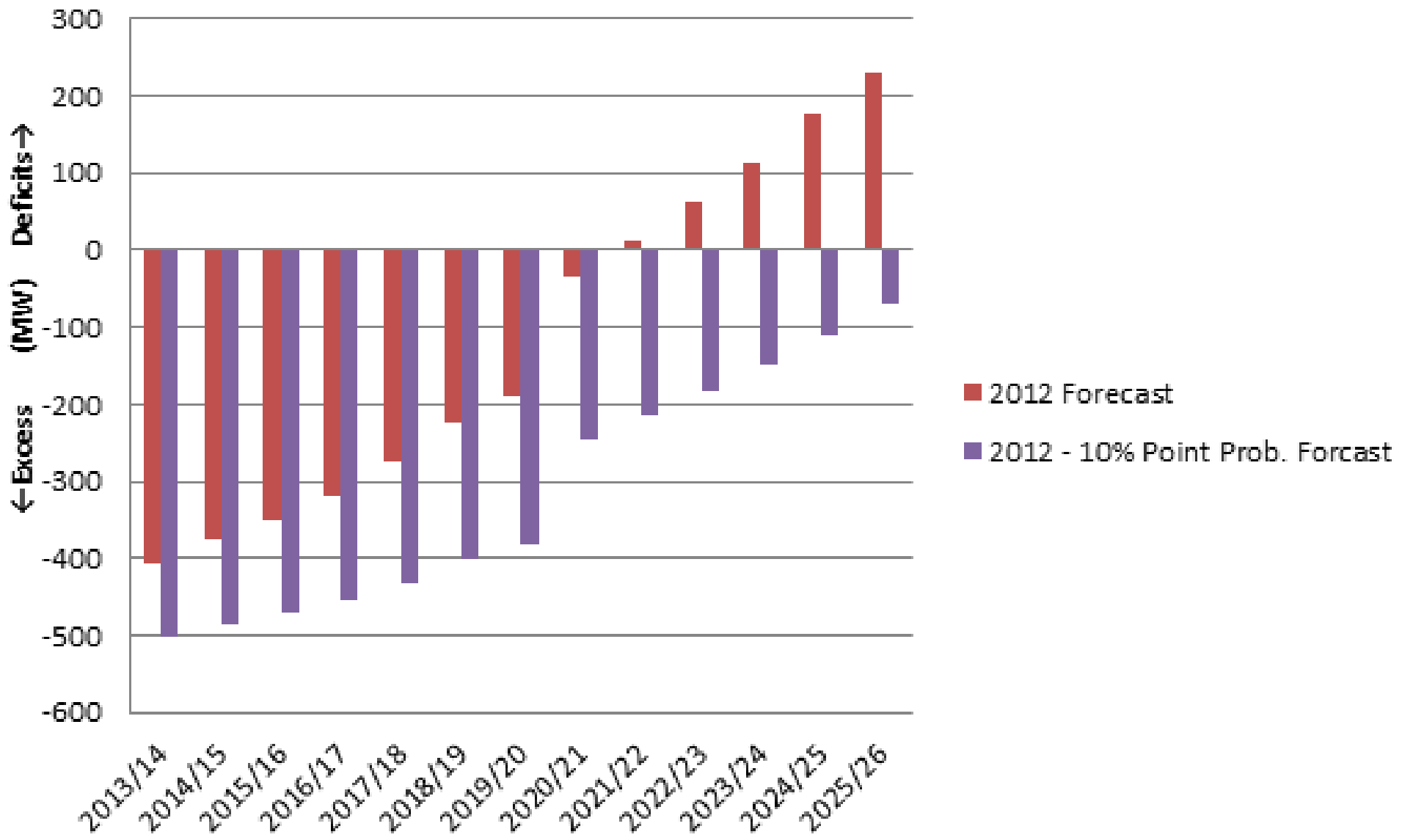


**Figure 1-7**



**Figure 1-8**

# Transmission Corridor (Summer Months) 65% of Peak Load



**Figure 1-9**



# Costs of Outages

- 1996 Wind Storm MH estimate \$11.1 million
- Dorsey winter 2011 MH estimate \$6.6 million
- Annual Carrying Charges for Bipole III are \$322 million

TABLE 1 Capital Cost Comparisons

All costs 2017 billions of dollars Bipole Locations	CEC ALT (B)	MH ALT (C)	Coalition (D) & (E)
Bipole II @ Riel	1.20		1.20
Bipole III @ Dorsey	3.14		
Bipole III @ Riel		3.28	
Refurbish Bipole II		<b>0.54</b>	
Bipole III @ near Laverendrye			<b>3.17</b>
North South 500 kV Line Compatibility	<b>4.18</b>	<b>4.18</b>	
Total	8.52	8.00	4.37

**Table 1**

## COMPARISON OF CAPITAL COSTS UNDERGROUND CABLE vs OVERHEAD LINES (All costs in millions of dollars)

a) BIPOLE III cable to Laverendrye (65 km)	\$292.5
BIPOLE III (O/H) to Riel (credit) (190 km)	-\$190.0
Difference Additional Cost	\$102.5 (3.1% of total BP III cost)
b) BIPOLE II Cable to Riel (50 km)	\$225.0
BIPOLE II (O/H) to Riel (credit) (170 km)	\$170.0
Difference Additional Cost	\$55.0 (4.6% of total BP II Cost)

# Annual Carrying Charges

## Millions of dollars/year

### **Bipole III at Riel plus refurbishment at Dorsey:**

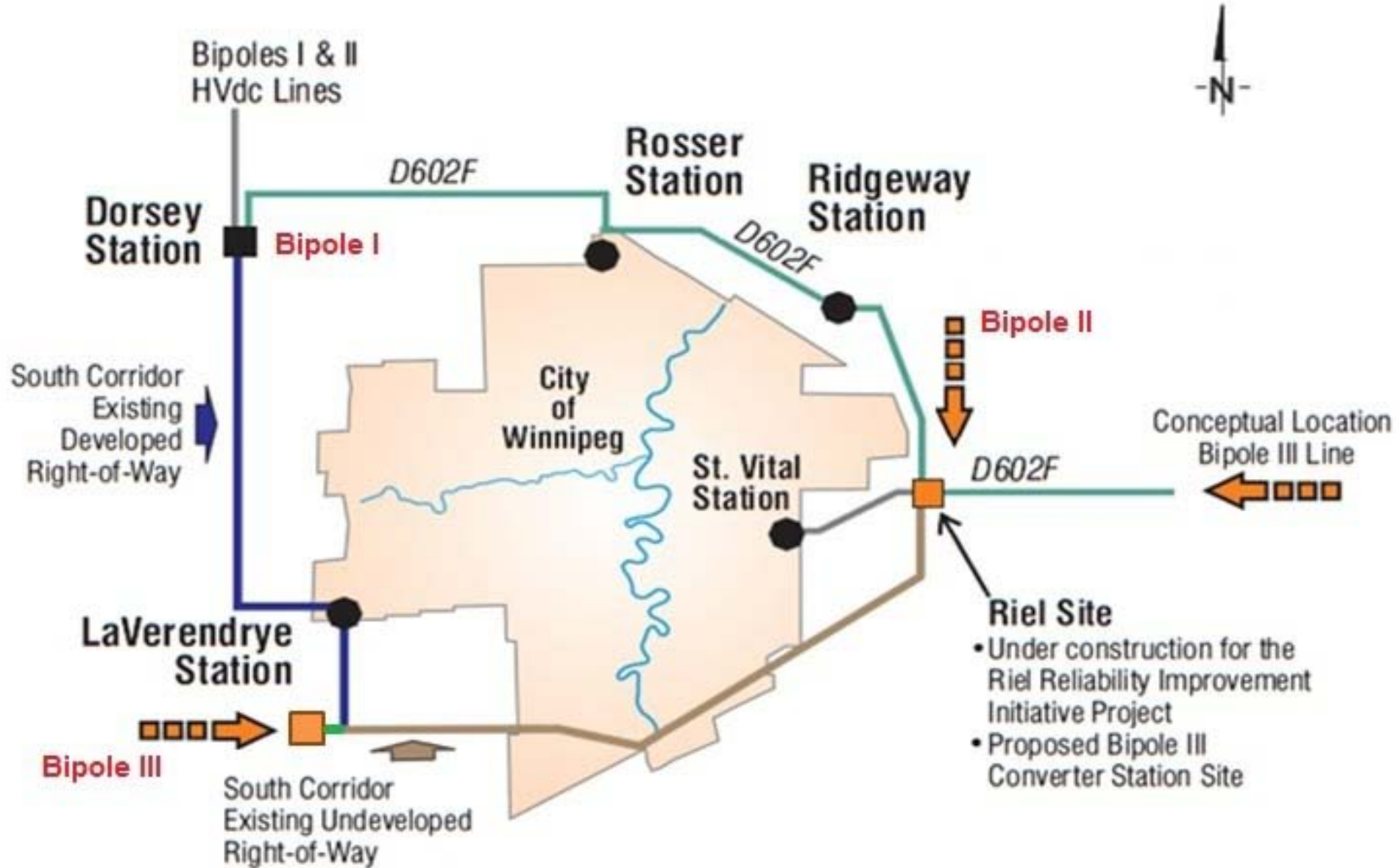
VSC alternative, annual carrying charges \$322

LCC alternative, annual carrying charges \$385

### **Bipole II at Riel:**

VSC alternative, annual carrying charges \$109

**Present Value difference (\$322 - \$109) over 8 years = \$1.3 b**



**Figure 1-2**

# Conclusions

- Relocate a new Bipole II at Riel for 2017
- Locate Bipole III at LaVerendrye by 2025



**Figure 1-1**