

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

BASE CASE RESULTS

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	0.20	237
2007	267	0%	0.107	268
2010	521	0%	0.00002	295
2012	521	0%	0.00006	319
2004	215	0.4%	0.24	253
2007	267	0.4%	0.17	295
2010	521 ²	0.4%	0.0005	300
2012	521 ²	0.4%	0.0010	325

¹ The projected import capability is based on the Northern Umbrella Plan.

² Modeled as two equal capacity blocks.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

NO TRANSMISSION IMPROVEMENTS

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability ¹	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	0.20	237
2007	215	0%	0.51	268
2010	215	0%	1.03	295
2012	215	0%	1.84	319
2004	215	0.4%	0.24	253
2007	215	0.4%	0.60	295
2010	215	0.4%	1.17	300
2012	215	0.4%	2.10	325

¹ If the transmission improvements associated with Northern Umbrella Plan are not implemented, the import capability stays at approximately 215 MW. The equivalent forced outage rate on the import capability would also probably be in the higher 0.4% range.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

PRESQUE ISLE UNITS 1&2 On Cold Standby¹

Year	Import Capability-Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	0.40	260
2007	267	0%	0.28	292
2004	215	0.4%	0.48	285
2007	267	0.4%	0.32	337

¹ Presque Isle Units 1 & 2 are assumed to be available only when one of the other Presque Isle Units is on scheduled maintenance. It also assumed that it takes 1 day to bring Presque Isle 1 & 2 on-line from cold standby.

PRESQUE ISLE UNITS 1&2 RETIRED IN 2004

Year	Import Capability-Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	1.1	295
2007	267	0%	0.64	326
2010	521	0%	0.0002	353
2012	521	0%	0.0006	377
2004	215	0.4%	1.3	340
2007	267	0.4%	0.78	410
2010	521 ²	0.4%	0.003	362
2012	521 ²	0.4%	0.050	388

PRESQUE ISLE UNITS 1&2 RETIRED IN 2004 & UNITS 3&4 RETIRED IN 2012

Year	Import Capability-Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	1.1	295
2007	267	0%	0.64	326
2010	521	0%	0.0002	353
2012	521	0%	0.0257	482
2004	215	0.4%	1.3	340
2007	267	0.4%	0.78	410
2010	521 ²	0.4%	0.003	362
2012	521 ²	0.4%	0.075	508

PRESQUE ISLE UNITS 7, 8 & 9 COMMON MODE FAILURE

Year	Import Capability-Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	215	0%	0.30	261
2007	267	0%	0.19	292
2010	521 ²	0%	0.00021	322
2012	521 ²	0%	0.00050	344
2004	215	0.4%	0.33	274
2007	267	0.4%	0.23	314
2010	521 ²	0.4%	0.00097	326
2012	521 ²	0.4%	0.0017	349

¹ The projected import capability is based on the Northern Umbrella Plan analyses.

² Modeled as two equal capacity blocks.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

300 MW LOAD REDUCTION IN 2010 & 2012

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2010	521	0%	0.2688E -12	0
2012	521	0%	0.3113E -11	18
2010	521 ²	0.4%	0.399E -7	0
2012	521 ²	0.4%	0.9355E -7	19

150 MW LOAD REDUCTION IN 2010 & 2012

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2010	521	0%	0.7223E -8	145
2012	521	0%	0.3805E -7	169
2010	521 ²	0.4%	0.543E -5	148
2012	521 ²	0.4%	0.115E -4	172

¹ The projected import capability is based on the Northern Umbrella Plan analyses.

² Modeled as two equal capacity blocks.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

200 MW LOAD INCREASE IN 2010 & 2012

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2010	521 ²	0%	0.05	501
2012	521 ²	0%	0.12	527
2010	521 ²	0.4%	0.12	528
2012	521 ²	0.4%	0.21	558

¹ The projected import capability is based on the Northern Umbrella Plan analyses.

² Modeled as two equal capacity blocks.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

ALL HOURS LOLE SENSITIVITY

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Hrs/Year)	Minimum Import Capability Needed to Meet the 0.481 Hrs/Yr (MW)
2004	215	0%	1.60	251
2007	267	0%	0.829	282
2010	521	0%	0.708E -5	309
2012	521	0%	0.00026	331
2004	215	0.4%	2.17	296
2007	267	0.4%	1.58	*
2010	521 ²	0.4%	0.0045	318
2012	521 ²	0.4%	0.0083	341

¹ The projected import capability is based on the Northern Umbrella Plan.

² Modeled as two equal capacity blocks.

* Cannot meet the LOLE criterion with a single block regardless of size.

Upper Peninsula and Northeast Wisconsin LOLE Analysis Results

WESTERN UP LOLE SENSITIVITY

Year	Import Capability- Existing and Projected ¹ (MW)	Equivalent Forced Outage Rate on the Import Capability	LOLE (Days/Year)	Minimum Import Capability Needed to Meet the 0.1 Days/Yr (MW)
2004	190	0%	0.01	135
2007	266	0%	0.002	166
2004	190	0.4%	0.02	138
2007	266	0.4%	0.01	171

¹ The projected import capability is based on the Northern Umbrella Plan. Line T6913 is assumed open at Hiawatha.