



# 10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

2008

September 2008 10-Year Assessment  
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## **Executive Summary**

American Transmission Co.'s 2008 10-Year Transmission System Assessment (Assessment) provides current results of planning activities and analyses of the company's transmission facilities. These activities and analyses identify needs for transmission system enhancement and potential projects responsive to those needs. This 2008 report is based on updated information provided by local distribution companies, the latest transmission service requirements, distribution and generation interconnection requests, recent analyses conducted by ATC, input from various stakeholders at ATC-sponsored meetings and other events.

Since 2001, we have engaged in open and collaborative efforts to share information and solicit input on our plans. We believe that in making our planning efforts transparent and available to the public, the proposals for needed facilities can be more readily understood and accepted by communities that stand to benefit from them. In recent years the federal government has taken additional steps to ensure that transmission-owning utilities have produced and shared planning information with the public and local stakeholders. The underlying principles of an open, transparent and collaborative planning approach are now required from all utilities that own and plan for new transmission lines. An overview of our planning process is available [here](#).

The updated information in this report provides further foundation for continued public discussions on the transmission planning process, identified transmission needs and limitations, possible resolutions to those needs and coordination with other public infrastructure planning processes.

The rest of this summary:

- provides links to the two planning initiatives ([Economic Planning](#) and [Policy & Regional Analyses](#)) continuing at ATC.
- summarizes the current project projections
- describes the status of ATC economic benefits analysis and
- summarizes the 10-year capital cost of the potential expansion plan.

In the years 2008 and beyond, ATC will be conducting additional public outreach, gathering input from our stakeholders early in the 10-Year Assessment process to include in our assumptions and models. This process is intended to provide even more openness and transparency and result in better planning.

## **Economic Analysis**

ATC operates its transmission system in the Midwest regional market, the purpose of which is to allow customers access to the least expensive available power, both within and



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outside of Wisconsin. However, transmission system constraints can block customers from access to low-cost generation.

Traditionally, ATC has developed transmission projects based on system reliability needs, but all transmission projects have both reliability and economic impacts. Many projects serve to increase customer access to low-cost generation, which can reduce the cost of serving load in the ATC footprint. In certain cases, expected economic benefits may be the primary driver of a project.

In ATC's economic analysis, a computer simulation model is used to predict energy costs savings derived from transmission projects. The economic analysis of projects may be used in the prioritization and staging of projects. To this end, an attempt is made to capture all relevant factors in determining the economic benefits of a project.

In order to provide a thorough analysis of large projects, ATC tests these projects against multiple plausible futures for Wisconsin's electric industry, such as robust or slow economic growth, additional environmental regulation, and fuel supply volatility. The futures are based upon key drivers such as load growth, generation retirement and expansion, fossil-fuel costs, use of renewable energy, and increased environmental regulation. After consultation with stakeholders, ATC specifies futures which are designed to broadly cover most if not all plausible futures. During the 40-year life of a project, it is expected that actual events will fall somewhere within the defined futures. The premise of this approach, known as Strategic Flexibility, is that if a project performs well in all or most of these futures, it is a robust project that will produce benefits for ratepayers. The specific futures to be analyzed in 2008 include: Robust Economy, High Power Plant Retirements, Increased Environmental Regulation, Slow Economic Growth, 20% Energy from Wind, and Fuel Supply Disruption/Project Delays.

More details about economic benefits can be found on our [Economic Planning](#) section.

## **Policy & Regional Analyses**

In addition to providing updated need and project information, the 2008 Assessment report presents information on ATC Planning involvement in regional transmission system studies. In addition to conducting transmission system planning studies internal to the ATC footprint, ATC is also involved in transmission planning studies to address regional needs that can impact the ATC system.

### *Midwest developments*

There have been a number of developments in the Upper Midwest that could affect us and/or our customers. Among the more relevant of these include potential changes in state regulations, renewable portfolio standards (RPS), exploratory transmission initiatives being investigated by MISO and generation developments.



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- ❑ *State regulations* – The Public Service Commission of Wisconsin (PSCW) compiles information on utility plans every other year in its Strategic Energy Assessment (SEA). As a result of the SEA, the Commission opened a docket to review Wisconsin’s generation reserve margin which would impact the amount of generation built in this state. The SEA evaluates the plans of utilities for the following seven years. In addition, the PSCW is considering methods for better integrating generation and transmission planning efforts. ATC also works closely with the Michigan Public Service Commission and the Minnesota Public Utilities Commission regarding transmission needs, opportunities and projects.
- ❑ *Midwest Governors Association (MGA) – Energy Security and Climate Stewardship Platform for the Midwest* – In November 2007, the MGA held a security and climate stewardship summit. At that summit, the MGA committed to a goal of maximizing energy resources and economic advantages and opportunities of Midwestern state while reducing emissions of atmospheric CO<sub>2</sub> and other greenhouse gases. In order to achieve that goal, the MGA developed objectives and strategies. A key strategy is to develop regional electric transmission and energy delivery capacity sufficient to accommodate the substantial increases needed in low- and zero-carbon energy production. ATC actively participates in committees and activities to support efforts to develop regional transmission to meet the objectives and strategies outlined by the MGA.
- ❑ *CapX2020 (Capacity Expansion - by the year 2020)* The CapX Utilities announced four projects for which they are seeking regulatory approval. We have been participating in this effort to determine what impact these plans would have on transmission development in and around Wisconsin. Please refer to the Policy & Regional analyses section for more information.
- ❑ *ATC Energy Collaborative-Michigan*  
ATC has completed or has under construction a series of significant upgrades across the Upper Peninsula (U.P.). The most notable projects completed as part of this effort are the Eastern U.P. Reliability and Operating Enhancement Phase 1 (EUROPE) projects completed in 2006 and the Northern Umbrella Projects (NUP) scheduled for completion in 2010. ATC recently completed three urgent projects in the Eastern U.P. in the winter of 2007-08 to hedge the risk of low water availability for hydroelectric generation. Even with these significant upgrades, operational challenges remain in this region due to the delicate balance among generation, load, market flows and transmission that currently exists.

To vet our planning assumptions for the intermediate (3-5 year) and long term (10-15 year) periods before future projects are proposed, we are engaging stakeholders in a



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collaborative process across the U.P. to examine the bounds of several plausible futures. From this process, ATC intends to develop a plan that will provide more operational flexibility and may impact the Lower Peninsula of Michigan or Canada as well as the U.P. and northern Wisconsin.

## ❑ T-T developments

ATC engages with its neighboring transmission owners on a regular basis to share planning expertise and to jointly plan the transmission system. The Arrowhead-Gardner Park 345-kV line, put into service in early 2008, is an example of a particular Transmission-Transmission line that was developed over many years by neighboring transmission owners. ATC is meeting with Xcel Energy, ITC, and Hydro One regarding a strategic transmission plan for the Upper Peninsula of Michigan and with Dairyland Power Cooperative regarding market flow and reliability issues in western Wisconsin.

## ❑ Wind Development

Wind on the water -- In June 2008, the Wisconsin Public Service Commission (PSCW) opened a docket (05-EI-45) to consider the potential of developing wind resources in Lake Michigan and Lake Superior. The investigation began based on a recommendation from the Governor's Task Force on Global Warming issued on February 19, 2008. The investigation will include an assessment of the economic and financial parameters for off-shore wind installations in Wisconsin, identify potential environmental impacts and identify what local, state or federal regulations may come into play. ATC is participating in the investigation efforts through the task forces that have been set up to conduct the assessments.

## ❑ Governor Doyle's Task Force - A Global Warming Task Force appointed by Governor Doyle is examining numerous policies that will reduce carbon emissions by changing electric generation sources and increasing energy efficiency. Such policies could affect the need for and location of future transmission lines, especially if more renewable energy is to be imported from other states. ATC has advised work groups about the need for careful, wide-area studies of transmission that will enable the state to increase its use of renewable resources. Another major focus of task force report, with possible implications for ATC, are recommendations concerning energy efficiency and conservation that may stabilize or reduce overall electric energy use in Wisconsin over the long term.

## ❑ JCSP/DOE 20% wind study

The Joint Coordinated System Plan (JCSP) is joint study between MISO and other regional entities including PJM, SPP, TVA, MAPP and NYISO. MISO is coordinating the study. The study is being performed in coordination with the DOE Eastern Wind Integration Transmission Study and it will identify transmission infrastructure under two scenarios:



1. Scenario 1: Reference Future - This scenario models the power system as it exists today with reference values and trends based on recent historical data while preserving existing standards for resource adequacy, existing renewable mandates and environmental legislation.
2. Scenario 2: 20% Wind Mandate Future - This future requires 20% of the energy consumption be provided from wind by the year 2024.

The JCSP study is expected to be completed at the end of 2009.

In April 2008, the Department of Energy (DOE) issued its 20% wind by 2030 study. The report examines the costs and challenges of generating 20% of the country's energy from wind by 2030. The modeling done for the report estimates that wind power installations with capacities of more than 300 GW will be needed for the 2030 20% scenario. The report describes the significant changes in transmission infrastructure that would be required to provide this level of wind energy under the assumption that 10% of the existing transmission grid capacity is available. The report contains a full section on transmission infrastructure and the integration of wind energy and includes conceptual information regarding the amount of transmission needed to optimize wind power in local area(s) where it is generated. In addition, conceptual details are provided regarding the location and/or type of transmission infrastructure needed to transfer power from high wind production areas to high demand centers.

#### ❑ MISO Regional Generation Outlet Study

MISO has initiated a study to evaluate transmission infrastructure needs for wind generation located in the western footprint of MISO. The study is focused on delivering wind to the nearby states in MISO's territory that have renewable portfolio standards (RPS) – Illinois, Iowa, Minnesota and Wisconsin. The study will look at potential generation sites and potential transmission infrastructure solutions. MISO will identify a variety of options for transferring the energy from wind generation, including delivering wind energy only to the RPS states and also to other locations within the MISO footprint.

The study process began in April, 2008 and is expected to be completed by April, 2009. MISO expects to have alternative transmission expansion solutions identified in the study and anticipates that transmission owners will consider the identified solutions to develop transmission projects that can be included in MTEP 09.

## Interconnections

### *Generation developments*

- ❑ Since ATC's inception, the trend in generation development in Wisconsin has moved away from just natural-gas fired generation, which dominated the development picture in the last 15 years, to include coal-fired and wind generation. Thus far, two 650-MW coal-fired units and another 550-MW unit have been approved. In addition, Alliant Energy has filed for a Certificate of Public Convenience and Necessity (CPCN) from the





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PSCW to construct a new base load coal unit at Nelson Dewey. The application is in process and a decision is expected by the end of 2008. We have identified the transmission expansion requirements and improvements to accommodate these units.

Currently, there are over 30 proposals to install more than 6,000 MW of wind turbines in Wisconsin in the MISO generation queue. For more on generation developments in Wisconsin and Michigan's Upper Peninsula, see [Generation Interconnections](#).

### *Distribution developments*

- ❑ Several previously unforecasted large customer interconnections have recently developed in ATC's service territory. Ethanol plants have been interconnected within the last two years. A large gas distributor is installing a pumping station for a pipeline extension to northeast Wisconsin. In addition, several economic development opportunities in Michigan's Upper Peninsula require new distribution interconnection facilities. Distribution interconnections are also being developed to support pollution control equipment that is being added at two coal fired power plants.

### **Current Projections**

Based on anticipated changes to the ATC 10-Year system expansion plan since the November 2007 10-Year Assessment, ATC now estimates that it will build 212 miles of new transmission lines on new rights-of-way and will make improvements to 605 miles of lines on existing rights-of-way over the next ten years (refer to [Table ES-1](#)). A graphical representation of the transmission system reinforcements included in this year's Assessment is shown in [Figure ES-1](#). Please refer to the tables in [Projects](#) for details on each of the particular projects reflected in this figure.

Details of the specific changes to ATC plans from those listed in the November 2007 report are provided in the [Summary of Changes](#) (Table PR-23) table. Several of the changes are due to proposed new generation projects meeting criteria for inclusion that will require the construction of new transmission facilities. Other changes are attributable to further analyses of project alternatives done by ATC. Still other changes are due to updated load forecast information provided by ATC customers.



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## Capital Cost of ATC Expansion Plan

Based on this 2008 Assessment, the total cost estimate for needed transmission system improvements is about \$2.7 billion over the next 10 years (through 2017). Included in this total cost is \$1.3 billion for projects specifically detailed in this Assessment. The remaining \$1.4 billion include costs for interconnecting other proposed generators, asset renewal projects, infrastructure replacements and relocations, unspecified network projects, and other smaller network reliability improvements. The total \$2.7 billion in projects can be broken down into the following categories.

Category	2007 Update 10-year capital estimate in billions	2008 10-year capital estimate in billions
10-Year Assessment projects	\$1.44	\$1.30
Asset Maintenance	\$0.44	\$0.46
Generator interconnections	\$0.23	\$0.29
Distribution interconnections	\$0.17	\$0.16
Asset Protection & control	\$0.13	\$0.08
Network	\$0.11	\$0.10
Unspecified network projects	\$0.22	\$0.23
Other *	\$0.10	\$0.09
Total expenditures	\$2.84	\$2.71

\* Other includes Administration & General, Asset Acquisition, Asset Contribution, and Infrastructure Relocation.

The total cost trends of the last five Assessments and Updates are as follows:

	March 2005	Sept 2005	March 2006	Nov 2006	Nov 2007	Sept 2008
Specified 10-Year Assessment Projects	\$2.1B	\$2.4B	\$2.1B	\$1.7B	\$1.4B	\$1.3B
Other Capital Expenditures	\$0.7B	\$1.0B	\$1.3B	\$1.4B	\$1.4B	\$1.4B
Total 10-Year Capital Cost	\$2.8B	\$3.4B	\$3.4B	\$3.1B	\$2.8B	\$2.7B



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In the 2008 Assessment, ATC continues to project a decreasing total cost estimate for all needed transmission system improvements over a rolling ten year period. Additionally the proportionate share of cost of projects specifically detailed in the Assessments continues to decrease relative to the total ten year capital cost. The issues that can influence the total 10-year cost up or down as each future Assessment is completed can include the following factors:

- Completion of prior projects that improve reliability and renew assets,
- Changing load forecast,
- Changes in generation and distribution interconnection projects,
- Improved resource planning to manage construction projects,
- Changes in mandatory reliability standards,
- Additional projects that are driven by economic benefits and
- Increasing equipment and labor costs.

Referring to the breakdown of the 2008 total cost, Unspecified Network Projects are defined as those projects which may shift into the 10-year timeframe because of factors listed earlier. This \$226 million represents anticipated costs from projects not defined in the Assessment but potentially driven by some combination of the following issues that we continue to analyze:

- Reliability impacts to our customers, both short- and long-term
- Economic impacts to our customers
- Multiple outage impact solutions.

Future Assessments will continue to define these unspecified costs as issues are further defined in the continuing planning process.

Table 2008 Financial outlines the costs of both the Assessment projects and ATC construction projects overall.



**Table ES-1**  
**Summary of American Transmission Co.'s**  
**2008 Transmission System Assessment**

	<b>2007 Assessment Update</b>	<b>2008 Assessment</b>
	(November 2007)	(September 2008)
<b><i>New Transmission Lines Requiring New Right-of-Way</i></b>		
345 kV	4 lines / 139 miles	2 lines / 82 miles
138 kV	12 lines / 73 miles	10 lines / 84 miles
115 kV	1 line / 14 miles	1 line / 7 miles
69 kV	6 lines / 32 miles	6 lines / 36 miles
<b><i>Transmission Lines to be Constructed, Rebuilt, Reconductored or Upgraded on Existing Right-of-Way</i></b>		
345 kV	2 lines / 82 miles	3 lines / 102 miles
161 kV	1 line / 20 miles	1 line / 20 miles
138 kV	22 lines / 433 miles	17 lines / 320 miles
69 kV	11 lines / 96 miles	11 lines / 107 miles
<b><i>New Transformers to be Installed</i></b>		
<b><i>(# of transformers / total increase in capacity)</i></b>	23 transformers / 4,459 MVA	23 transformers / 3,373 MVA
<b><i>New Capacitor Banks to be Installed</i></b>		
<b><i>(# of installations / capacity)</i></b>	38 installations / 1,307 MVAR	39 installations / 1,412 MVAR

ATC 2007 10-Year Assessment, September 2008  
Summary of Capital Expenditures (2008-2017)  
10-Year Assessment Project Detail

Funding Project Number	10-Year Assessment Project Description	Sum of Previous Expenditures as of 12/31/07	Sum of Total 2008-2017	Sum of Total (2001-2017)
F0033	Construct a 345-kV bus at Bain Substation	\$0	\$2,093,932	\$2,093,932
F0181	Construct a second Dunn Road-Egg Harbor 69-kV line	\$0	\$6,097,939	\$6,097,939
F0283	2009 Oak Creek/Elm Road generation-related projects	\$28,482,430	\$2,150	\$28,484,580
F0301	Gardner Park-Highway 22 345-kV line	\$71,565,984	\$55,063,103	\$126,629,087
F0339	Install a second 138/69-kV transformer at Hillman	\$0	\$2,531,712	\$2,531,712
F0365	Rebuild Blaney Park-Munising 69 kV to 138 kV	\$0	\$52,013,217	\$52,013,217
F0763	2010 Oak Creek/Elm Road generation-related projects	\$0	\$1,222	\$1,222
F0823	Construct Morgan-Werner West 345-kV line	\$51,239,297	\$91,340,059	\$142,579,355
F0924	Construct a Jefferson-Stony Brook 138-kV line	\$3,792,447	\$30,128,191	\$33,920,638
F1165	Zone 5 CTs (Various)	\$0	\$229,022	\$229,022
F1282	Construct ring bus at the Pine River 69-kV Substation and replace 1-5.4 MVAR capacitor bank with 2-4.08 MVAR banks	\$0	\$8,738,306	\$8,738,306
F1357	Rebuild Crivitz-High Falls 69-kV double circuit line	\$1,598,026	\$16,876,581	\$18,474,607
F1358	Construct 138-kV line from Canal to Dunn Road	\$0	\$15,505,284	\$15,505,284
F1361	Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	\$15,477	\$2,944,836	\$2,960,312
F1363	Cranberry-Conover-Iron River-Plains project	\$21,666,299	\$105,804,997	\$127,471,296
F1367	Construct Butler Ridge 138-kV Substation	\$0	\$3,555,796	\$3,555,796
F1403	Install 28.8 MVAR capacitor bank at Butternut 138 kV	\$0	\$596,084	\$596,084
F1407	Oak Ridge-Verona 138-kV line	\$2,580,498	\$17,430,775	\$20,011,273
F1435	Construct 345-kV line from Rockdale to West Middleton	\$0	\$221,000,000	\$221,000,000
F1605	Relocate Cedar substation (North Lake)	\$1,969,111	\$10,456,590	\$12,425,701
F1619	Bayport-Pioneer Phase I	\$0	\$20,439,553	\$20,439,553
F1621	Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the substation	\$0	\$5,016,328	\$5,016,328
F1626	Construct a new 138-kV line from North Madison to Huiskamp (was Waunakee)	\$4,430,343	\$14,615,688	\$19,046,032
F1637	Install a second 138/69-kV transformer at McCue Substation	\$0	\$4,123,412	\$4,123,412
F1638	Construct a Lake Delton-Birchwood 138-kV line	\$0	\$9,004,670	\$9,004,670
F1640	Construct a Horicon-East Beaver Dam 138-kV line	\$0	\$10,194,552	\$10,194,552
F1670	Y32 Colley Rd-Brick Church uprate	\$0	\$11,225,537	\$11,225,537
F1690	Convert Rock River to Bristol to Elkhorn 138-kV operation; rebuild Bristol with a new 138 kV bus	\$2,502,284	\$8,409,923	\$10,912,207
F1712	Kilbourn and Artesian capacitor banks	\$0	\$2,060,388	\$2,060,388
F1714	Replace the 1200 A breaker at Edgewater T22 345/138 kV	\$0	\$248,191	\$248,191
F1727	Construct Monroe County-Council Creek 161-kV line	\$0	\$27,248,056	\$27,248,056
F1729	Elm Road TSR Phase II circuit breakers	\$26,749	\$436,908	\$463,657

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Summary of Capital Expenditures (2008-2017)  
10-Year Assessment Project Detail

Funding Project Number	10-Year Assessment Project Description	Sum of Previous Expenditures as of 12/31/07	Sum of Total 2008-2017	Sum of Total (2001-2017)
F1819	Install 1-5.4 MVAR capacitor bank at L'Anse 69 kV	\$0	\$605,340	\$605,340
F1820	Install 1-5.4 MVAR capacitor bank at Munising 69 kV	\$0	\$1,545,437	\$1,545,437
F1844	Construct Brandon-Fairwater 69-kV line	\$0	\$2,817,916	\$2,817,916
F1847	Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	\$0	\$2,473,544	\$2,473,544
F1867	Replace 138/69-kV transformer at Metomen	\$0	\$2,970,145	\$2,970,145
F1868	Uprate projects West portfolio (Various)	\$0	-\$4,108	-\$4,108
F1869	Install transformer and bus at Bass Creek	\$0	\$6,061,866	\$6,061,866
F1923	Install 2-16.3 MVAR capacitor bank at Aviation	\$0	\$196,330	\$196,330
F1924	Install 2-16.3 MVAR capacitor bank at Mears Corners 138 kV	\$0	\$1,245,285	\$1,245,285
F1925	Install 2-16.3 MVAR capacitor bank at Rosiere 138 kV	\$0	\$1,334,875	\$1,334,875
F1981	Paddock-Rockdale 345-kV line	\$0	\$124,449,913	\$124,449,913
F2001	Stoughton SS CC Switch and relays	\$0	\$669,683	\$669,683
F2016	Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	\$0	\$767,321	\$767,321
F2035	Relocate Mishicot 138-kV Substation	\$0	\$3,134,065	\$3,134,065
F2053	West Portfolio Future T-D projects	\$0	\$30,000	\$30,000
F2079	Replace Glenview transformer	\$0	\$3,442,062	\$3,442,062
F2080	Sunset Point transformer replacements	\$0	\$5,371,145	\$5,371,145
F2081	Shoto-Custer 138-kV line	\$0	\$21,243,417	\$21,243,417
F2086	Pleasant Valley T-D (second transformer)	\$0	\$2,158,853	\$2,158,853
F2088	Nine Springs-Pflaum loop into Femrite Substation	\$0	\$5,368,656	\$5,368,656
F2092	Uprate Portage-Trienda 138-kV line	\$0	\$1,404,379	\$1,404,379
F2093	North Randolph 500 MVA transformer	\$0	\$9,718,088	\$9,718,088
F2095	Somers T-D Interconnection (rebuild Racine-Somers-Albers 138-kV line)	\$0	\$4,181,904	\$4,181,904
F2097	Brookdale T-D Interconnection	\$0	\$2,529,227	\$2,529,227
F2105	Construct Fairwater-Mackford Prairie 69-kV line	\$0	\$3,213,219	\$3,213,219
F2112	GIC 012 Elm Road Unit 1 Phase II	\$0	\$2,722,032	\$2,722,032
F2135	Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	\$0	\$108,590	\$108,590
F2140	Elm Road Phase II Upgrades	\$0	\$13,232,084	\$13,232,084
F2142	Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	\$0	\$273,140	\$273,140
F2153	Uprate Brick Church-Walworth 69-kV line to 115 MVA	\$0	\$706,204	\$706,204
F2154	Uprate Walworth- North Lake Geneva 69-kV to 69 MVA	\$0	\$426,536	\$426,536
F2155	Uprate North Lake Geneva-Lake Geneva 69-kV line to 115 MVA	\$0	\$453,976	\$453,976
F2173	Warrens DIC	\$0	\$6,524,108	\$6,524,108
F2220	Install 2-16.33 MVAR capacitor bank at Perkins 138-kV Substation	\$0	\$1,383,807	\$1,383,807
F2222	Install 1-16.33 MVAR capacitor bank at Hiawatha 138-kV Substation	\$0	\$598,564	\$598,564

ATC 2007 10-Year Assessment, September 2008  
Summary of Capital Expenditures (2008-2017)  
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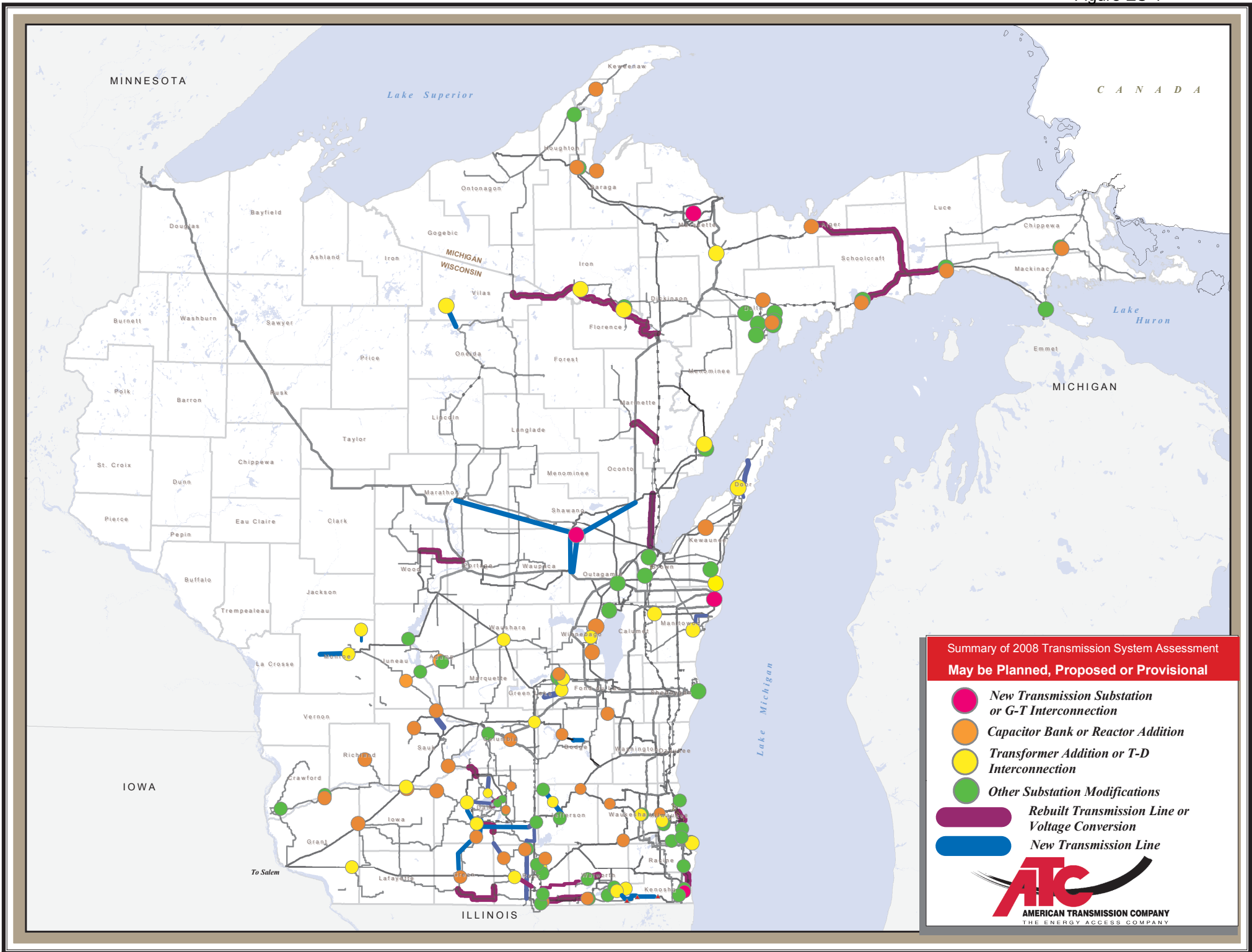
Funding Project Number	10-Year Assessment Project Description	Sum of Previous Expenditures as of 12/31/07	Sum of Total 2008-2017	Sum of Total (2001-2017)
F2223	Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	\$0	\$584,007	\$584,007
F2248	Sheepskin SS Relay Upgrades	\$0	\$2,256,302	\$2,256,302
F2252	Rebuild Arpin-Rocky Run 345-kV line	\$0	\$23,003,226	\$23,003,226
F2256	Summit capacitor banks	\$0	\$2,049,660	\$2,049,660
F2279	Mobile 69-kV capacitor bank	\$0	\$593,778	\$593,778
F2317	Royster SS Breaker Replacement	\$0	\$428,385	\$428,385
F2318	Brewer/Richland area upgrades	\$0	\$730,010	\$730,010
F2324	Lamar DIC	\$0	\$3,917,218	\$3,917,218
F2327	Spring Green capacitor banks	\$0	\$4,962,259	\$4,962,259
F2332	Union Townline Distribution capacitor bank	\$0	\$155,000	\$155,000
F2371	Kewaunee SS-Repl OCB-TAT	\$0	\$2,687,744	\$2,687,744
F2404	Brick Church capacitor banks	\$0	\$1,709,794	\$1,709,794
F2405	Uprate Y-79 McCue-Milton Lawns 69-kV line	\$0	\$823,530	\$823,530
F2434	Tayco - Melissa OPGW Line 138124	\$0	\$230,224	\$230,224
F2435	Bluemound Equip Replacement 2010	\$0	\$8,207,091	\$8,207,091
F2437	Kewaunee SS-Bus Reconfiguration	\$0	\$17,509,123	\$17,509,123
F2445	Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	\$0	\$1,380,000	\$1,380,000
F2449	Dickinson Distribution capacitor bank	\$0	\$195,000	\$195,000
F2461	Upgrade Bain-Albers 138-kV Line	\$0	\$2,685,284	\$2,685,284
F2462	Bain-Kenosha Substation Upgrades	\$0	\$655,730	\$655,730
F2466	West Middleton-Blount 138-kV line	\$0	\$64,610,250	\$64,610,250
F2468	Osceola Substation-Install capacitor bank	\$0	\$824,207	\$824,207
F2469	Rebuild the Verona to Oregon 69-kV line Y119	\$159,858	\$5,933,972	\$6,093,830
F2471	6986 Royster-Sycamore uprate	\$0	\$790,584	\$790,584
F2472	North Monroe 69-kV capacitor banks	\$0	\$1,329,404	\$1,329,404
F2473	Oak Creek-Pennsylvania 138-kV Line KK837 Upgrade	\$0	\$2,060,081	\$2,060,081
F2474	Dam Heights 69-kV capacitor banks	\$0	\$2,816,028	\$2,816,028
F2475	Sun Prairie 69-kV capacitor banks.	\$0	\$2,566,334	\$2,566,334
F2477	Ripon Substation capacitor banks	\$0	\$801,448	\$801,448
F2480	Wautoma Substation second transformer	\$0	\$4,029,502	\$4,029,502
F2485	M38 Substation-capacitor bank-Bus Expansion	\$0	\$3,294,956	\$3,294,956
F2487	Shorewood-Cornell underground 138-kV Line	\$0	\$7,329,347	\$7,329,347
F2489	Concord capacitor bank installation	\$0	\$3,357,082	\$3,357,082
F2490	North Bluff SS-Install capacitor bank	\$0	\$1,452,898	\$1,452,898
F2491	Uprate Castle Rock-Mckenna 69-kV line	\$0	\$581,500	\$581,500
F2492	Atlantic 69-kV line uprate	\$0	\$3,118,520	\$3,118,520
F2493	Mukwonago Capacitor bank	\$0	\$1,850,815	\$1,850,815
F2495	Construct 115-kV line from new Arnett Road Substation to the Clear Lake Substation	\$0	\$12,200,000	\$12,200,000

ATC 2007 10-Year Assessment, September 2008  
 Summary of Capital Expenditures (2008-2017)  
 10-Year Assessment Project Detail

Funding Project Number	10-Year Assessment Project Description	Sum of Previous Expenditures as of 12/31/07	Sum of Total 2008-2017	Sum of Total (2001-2017)
F2502	Shorewood RTU and DIC	\$0	\$831,886	\$831,886
F2515	Eden 69-kV capacitor banks	\$0	\$1,325,153	\$1,325,153
F2516	Femrite capacitor banks	\$0	\$2,404,642	\$2,404,642
F2517	Mazomanie 69-kV capacitor banks	\$0	\$1,302,312	\$1,302,312
F2518	Boscobel SS 69-kV capacitor banks	\$0	\$1,093,610	\$1,093,610
F2519	McKenna 69-kV capacitor bank	\$0	\$326,860	\$326,860
F2520	Verona capacitor bank	\$0	\$1,572,509	\$1,572,509
F2522	North Bluff 69-kV line uprate	\$0	\$162,243	\$162,243
F2526	Y33 Brodhead-South Monroe rebuild	\$0	\$10,840,911	\$10,840,911
F2531	Mead 69-kV line uprate	\$0	\$492,686	\$492,686
F2532	Lakehead 69-kV line uprate	\$0	\$495,140	\$495,140
F2533	Gladstone 69-kV line uprate	\$0	\$343,020	\$343,020
F2534	Delta 1 69-kV line uprate	\$0	\$717,909	\$717,909
F2535	Delta 2 69-kV line uprate	\$0	\$518,818	\$518,818
F2539	Arcadian transformer replacements	\$0	\$7,276,385	\$7,276,385
F2558	Construct 69-kV double-circuit line between McCue and Lamar substations	\$0	\$8,522,646	\$8,522,646
F2560	Convert Necedah distribution substation from 69 kV to 138 kV	\$0	\$128,310	\$128,310
F2570	Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	\$0	\$61,936,663	\$61,936,663
F2587	Construct new 138-kV line from South Lake Geneva to North Lake Geneva	\$0	\$14,716,353	\$14,716,353
<b>2008 TYA Totals Reported</b>				
		<b>\$190M</b>	<b>\$1.298B</b>	<b>\$1.488B</b>
<b>Plus Projects Completed Prior to 2008 TYA</b>				
		<b>\$1.585B</b>		
<b>Plus Projects Not in TYA (other capital expenditures)</b>				
			<b>\$1.412B</b>	
<b>Total ATC Capital Expenditures</b>				
		<b>\$1.775B</b>	<b>\$2.71B</b>	<b>\$4.485B</b>



Figure ES-1



**Table PR-23****Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>PROJECTS CANCELED</b>	<b>Former In-Service Date</b>	<b>Planning Zone</b>	<b>Reason for Removal</b>
Install two 69-kV breakers at Beardsley Street Substation	2010	4	Updated study results
Reconductor Pulliam-Danz 69-kV line	2015	4	Updated study results
Reconductor Danz-Henry Street 69-kV line	2015	4	Updated study results
Reconductor Pulliam-Van Buren 69-kV line	2015	4	Updated study results
Construct a Northside-City Limits 138-kV line	2016	4	Updated study results
Install second 345/138-kV transformer at Plains Substation	2009	2	Updated model information
Install 1-5.4 MVAR capacitor bank at MTU or Henry Street 69-kV Substation	TBD	2	Updated study results
Upgrade the existing 2-8.16 MVAR to 2-16.33 MVAR capacitor banks at South Lake Geneva Substation	2010	3	Updated load/model information
Loop the Deforest to Token Creek 69-kV line into the Yahara River Substation and install a 138/69-kV transformer at Yahara River	2014	3	Updated load/model information
Uprate Yahara River-Token Creek 69-kV line	2014	3	Updated load/model information
Uprate Gardner Park-Black Brook 115-kV line - scope TBD	2012	1	Equipment replaced during construction of another project
Rebuild/convert Holmes-Chandler 69 kV to 138-kV operation	2013	2 & 4	Updated load/model information
Replace the existing 138/69-kV transformer at South Sheboygan Falls Substation with 100 MVA transformer	2018	4	Updated load/model information
Rebuild Hiawatha-Pine River 69-kV line ESE_6908	TBD	2	Upper Peninsula collaborative currently underway to identify best area solution.
Construct new Mackinac 138/69-kV Substation	TBD	2	Upper Peninsula collaborative currently underway to identify best area solution.
Replace the 400 amp metering CT at North Mullet River 69-kV Substation	2011	4	Updated model information

**Table PR-23****Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>PROJECTS DEFERRED</b>	<b>New date</b>	<b>Planning Zone</b>	<b>Reason for Deferral</b>
Construct ring bus at the Pine River 69-kV Substation and replace 1-5.4 MVAR capacitor bank with 2-4.08 MVAR banks	2009	2	was 2008; revised resource scheduling
Relocate Mishicot 138-kV Substation	2009	4	was 2007; deferred due to the delay of G384.
Replace 138/69-kV transformer at Metomen Substation	2013	1	was 2010; deferred because of updated load forecasts.
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	2013	2	was 2009; review of physical condition required (may require a rebuild)
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2014	1	was 2013; customer deferred distribution project by one year.
Rebuild Blaney Park-Munising 69 kV to 138 kV	2014	2	was 2013; continuation of review of performance, condition and need
Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	2014	5	was 2011; need for area voltage support decreased as a result of capacitors added at Bluemound and Summit.
Construct a Lake Delton-Birchwood 138-kV line	2015	3	was 2013; load forecast change in the Reedsburg loop area
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2015	3	was 2013; load forecast change in the Hillman area
Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	2015	3	was 2013; load forecast change in Sauk and Columbia counties and reactive reinforcement projects developed in the area
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2015	3	was 2011; load forecast change in the Lake Geneva area
Install 2-16.3 MVAR capacitor bank at Mears Corners 138-kV Substation	2015	4	was 2011; deferred due to updated load model
Install 2-16.3 MVAR capacitor bank at Rosiere 138-kV Substation	2015	4	was 2011; deferred due to updated load model.
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2016	1	was 2011; deferred because of updated load forecasts.

**Table PR-23****Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>PROJECTS DEFERRED (continued)</b>	<b>New date</b>	<b>Planning Zone</b>	<b>Reason for Deferral</b>
Install a second 138/69-kV transformer at McCue Substation	2016	3	was 2014; deferred due to load forecast change in the McCue area and other new project developments in this area
Install 138/69-kV transformer at Custer Substation	2016	4	was 2014; deferred due to updated generation dispatch information
Construct Shoto to Custer 138-kV line	2016	4	was 2014; deferred due to updated generation dispatch information
Uprate the Melissa-Tayco to 229 MVA (300F)	2016	4	was 2014; deferred due to updated load model
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2016	4	was 2015; deferred due to updated load model
Install a second 138/69-kV transformer at Wautoma Substation	2017	1	was 2015; deferred because of updated load forecasts.
Construct Fairwater-Mackford Prairie 69-kV line	2018	1	was 2014; deferred because of updated load forecasts.
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2018	1	was 2014; deferred because of updated load forecasts.
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond du Lac 345-kV line into the substation	2018	3	was 2014; deferred due to load forecast changes in Sauk and Columbia counties and reactive reinforcement projects developed in the area
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2018	4	was 2015; deferred due to updated load model
Install 2-16.3 MVAR capacitor bank at Aviation Substation	2018	4	was 2015; deferred due to updated load model
Replace the 1200 A breaker at Edgewater T22 345/138-kV transformer	2018	4	was 2014; deferred due to updated load model
Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	2023	1	was 2016; deferred because of updated load model
Construct Evansville-Brooklyn 69-kV line	TBD	3	was 2016; no firm planning need driver identified in this Assessment

**Table PR-23**

**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

OTHER PROJECT CHANGES AND POSSIBLE CHANGES	Date	Planning Zone	Nature of Change or Update
Install 1-8.16 MVAR capacitor banks at the M38 138-kV Substation	2009	2	was TBD in-service date 2-8.16 banks; on the 69 kV due to updated load forecast in western U.P.
Install 1-4.08 MVAR capacitor banks at Osceola 69 kV	2009	2	was TBD in-service date 2-5.4 MVAR banks; due to updated load forecast in western U.P.
Install a 138/69-kV transformer at Bass Creek Substation	2013	3	Status was changed from provisional to proposed
Rebuild/reconductor X-12 Town Line Road-Bass Creek 138-kV line	2013	3	Status was changed from provisional to proposed
Construct new 138-kV line from North Lake Geneva to South Lake Geneva	2014	3	was 2016; date accelerated due to updated study results
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2014	3	was 2016; date accelerated due to updated study results
Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	2014	3	capacitor banks were previously at Montrose, moved to Verona due to updated study results
Construct West Middleton-Blount 138-kV line	2017	3	In-service date was previously to be determined, 2017 in-service date due to updated study results
NEW PROJECTS	In-Service Date	Planning Zone	Reason for Project
Install a total of 6.3 MVAR distribution capacitor banks at Dickinson Substation	2008	3	reliability
Uprate the Delta-North Bluff 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2	reliability
Uprate the North Bluff-Gladstone 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2	reliability



**Table PR-23****Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>NEW PROJECTS (continued)</b>	In-Service Date	Planning Zone	Reason for Project
Uprate the Masonville-Gladstone 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2	reliability
Uprate the Chandler-Masonville 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2	reliability
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 Mvar 69 kV capacitor banks at Lamar Substation	2009	3	reliability
Rebuild Stoughton Substation bus	2009	3	reliability
Install 5.7 MVAR distribution capacitor bank at Union Townline 69-kV Substation	2009	3	reliability
Install a second 138-kV reserve auxiliary transformer (RAT) at Kewaunee and remove tertiary auxiliary transformer (TAT)	2009	4	reliability
Construct 138-kV bus section at Shorewood	2009	5	T-D interconnection
Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	2010	1	T-D interconnection
Rebuild Arpin-Rocky Run 345-kV line	2010	1	maintenance
Install 1-4.08 MVAR capacitor bank at North Bluff 69-kV Substation	2010	2	reliability
Uprate the Chandler-Delta #1 69-kV line summer emergency rating from 120 deg F to 167 deg F	2010	2	reliability
Uprate the Chandler-Delta #2 69-kV line summer emergency rating to from 120 deg F 167 deg F	2010	2	reliability
Uprate the Royster Substation terminals	2010	3	reliability
Upgrade Sheepskin capacitor bank from 10.8 MVAR to 16.2 MVAR	2010	3	reliability
Upgrade Bain-Albers 138-kV line	2010	5	reliability
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2011	3	reliability, economics
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2011	5	reliability

**Table PR-23****Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>NEW PROJECTS (continued)</b>	<b>In-Service Date</b>	<b>Planning Zone</b>	<b>Reason for Project</b>
Install 2-24.5 Mvar 138-kV capacitor banks and 1-18 Mvar 69-kV capacitor bank at Brick Church Substation	2011	3	reliability
Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	2011	4	reliability, condition
Construct 115-kV line from new Arnett Road Substation to the Clear Lake Substation	2012	1	T-D interconnection
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2012	3	reliability, condition
Construct second Shorewood-Humboldt 138-kV underground cable	2012	5	reliability
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2013	3	reliability
Upgrade Bain-Kenosha 138-kV line	2013	5	reliability
Uprate X-23 Colley Road-Marine 138-kV line terminals	2014	3	reliability
Upgrade Oak Creek-Pennsylvania 138-kV line	2014	5	reliability
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line	2015	3	reliability
Install 2-16.33 Mvar 69-kV capacitor banks at Sun Prairie	2016	3	reliability
Uprate the summer emergency rating of the Forsyth 138/69-kV transformer to 57 MVA	2017	2	reliability
Construct double-circuit line between McCue and Lamar substations	2017	3	reliability
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating	2017	3	reliability
Install 2-16.33 Mvar 69-kV capacitor banks at Dam Heights	2017	3	reliability
Convert Necedah distribution substation from 69 kV to 138 kV	2018	1	reliability
Uprate Castle Rock-Mckenna 69-kV line	2018	1	reliability

**Table PR-23**

**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2008 10-Year Assessment**

<b>NEW PROJECTS (continued)</b>	<b>In-Service Date</b>	<b>Planning Zone</b>	<b>Reason for Project</b>
Install 2-16.33 Mvar 69-kV cap banks at North Monroe	2018	3	reliability
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	3 & 5	T-D interconnection, reliability
Install 2-16.33 Mvar 69-kV cap banks at Rio	2019	3	reliability
Construct Verona-North Monroe 138-kV line	TBD	3	reliability
Uprate 138-kV line from Kewaunee to East Krok	TBD	4	reliability
Reconductor Ramsey-Harbor 138-kV line	TBD	5	reliability