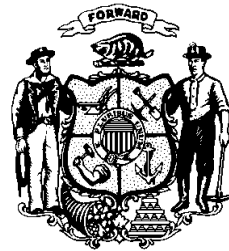


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Annotations in Magenta

**PUBLIC SERVICE COMMISSION OF WISCONSIN
WISCONSIN DEPARTMENT OF NATURAL RESOURCES**

Public Service Commission of Wisconsin
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Badger Coulee Transmission Line Volume 1

Final Environmental Impact Statement

PSC Docket 5-CE-142

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were evaluated, including: system failure at a coal generation campus; and a regulatory mandate across three nuclear units. A third risk level for generation is already embedded in the PROMOD software. This risk level includes removal of single units on the basis of their forced outage characteristics.

To determine the system failure insurance benefit of the proposed project, the applicants used standard insurance valuation methods to evaluate its identified transmission and generation outage scenarios. The applicants define the value of the system failure insurance benefit as:

- The energy and congestion cost impacts on the load served as evaluated when each of the major contingencies was run through the PROMOD model, plus
- The value of load not served.

Because the PROMOD model does not estimate the magnitude of unserved energy, the applicants did not calculate the additional cost per MWh value of load not served.

The applicants assumed the system failure insurance value for all of the high voltage system alternatives would be the same as that for Badger Coulee alternative. The applicants state that this is appropriate because each of the alternatives is anticipated to perform similarly in each of the evaluated insurance value scenarios. The low voltage alternative is not assumed to provide any insurance value because of the limited amount of new infrastructure added in this alternative that would be capable of providing system support during the various insurance value scenarios.

Based on its analysis, the applicants estimate the 40-Year present value system failure insurance value benefits of the proposed Badger Coulee project to be \$23.63 million.

The applicants did not calculate an updated system failure insurance benefit for the proposed Badger Coulee project, because this benefit represents a relatively minor portion of the applicants' estimated overall economic benefits from the proposed Badger Coulee project.¹²⁴

3.8. ALTERNATIVES TO THE PROPOSED PROJECT

3.8.1. Non-transmission options¹²⁵

The applicants considered several non-transmission alternatives to the proposed project. These alternatives were modelled at the electric distribution system level in the applicants' PROMOD analysis, both within ATC's transmission system and throughout MISO. The non-transmission alternatives considered include:

- Energy efficiency and load reduction¹²⁶ – Focus on Energy (Focus) and utility demand response programs have historically reduced energy usage and load. The applicants state that they considered reduced energy consumption and peak load above that achieved historically in the

¹²⁴ Response to Data Request Item 02.34, [PSC REF#: 212861](#).

¹²⁵ A detailed discussion of non-transmission alternatives savings is included in revised Application Appendix D, pp. 102-105, [PSC REF#: 204739](#).

¹²⁶ Focus is the existing statewide energy efficiency and renewable resource program for Wisconsin. For 2012, Focus reported a net demand reduction of 66.8 MW, and net energy savings of 461 gigawatt-hours. This represents approximately 0.5 percent of Wisconsin's total electric load. As such, Focus programs are decreasing electric growth rates in Wisconsin by approximately 0.5 percent compared to what would be expected in the absence such a program. This level of savings is embedded into the historic load data and growth trends used by ATC in its PROMOD modelling for the proposed Badger Coulee project. Program spending in 2012 was \$81.7 million.

futures it used to evaluate transmission system alternatives using PROMOD computer modelling. At the low end, the applicants assumed energy and load growth rates of 0.1 and 0.2 percent, respectively. This compares to mid-range energy and load growth rates of 1.0 and 1.4 percent, respectively. The applicants state that they used these levels in the Carbon Constrained future to reflect possible increased energy efficiency and demand-side management as a result of utility, customer, and policy conservation measures. Similarly, in the Green Economy future the applicants assumed load growth would be less than energy growth because of an increased focus on Smart Grid demand measures. The applicants also included interruptible loads and direct load control within the analyses. In the PROMOD modelling, the applicants reflected these reduced loads by selectively placing system resources at various substation locations and price points where the applicants state studies have shown customers are willing to consider load reductions.

- Generation – The applicants included additional generation resources in the futures used to evaluate transmission system alternatives in its PROMOD modelling, including natural gas, coal, and combustible and non-combustible renewable resources. Low, middle, and high levels of coal retirements were used within the ATC service area and for overall generation additions. For example, the applicants’ 2026 Carbon Constrained future adds substantial photovoltaic and biomass capacity in Wisconsin. The 2020 and 2026 Green Economy and Carbon Constrained futures include an estimate for distributed renewable generation within ATC, and in its PROMOD modelling the applicants placed this generation at appropriate substation locations within ATC. Similarly, the generation portfolios outside ATC include three different MISO generation expansion scenarios: a scenario consisting primarily of coal and gas units, a gas-only scenario, and a scenario that would comply with carbon constraints. The applicants also considered renewable generation alternatives in their analysis. Within the ATC service area low, middle, and high percentage of total energy from renewable resources were modelled based on current and potential future renewable energy use. A similar set of renewable generation alternatives was included for the MISO region. Multiple locations for renewable energy resources were evaluated, both within the region and within the states to which the renewable energy is allocated for RPS compliance purposes.
- Distributed resources – The applicants developed and applied a PROMOD modelling technique to consider distributed resources within the ATC system. This technique mimics demand response and distributed-generation technologies that may serve to offset load in the future. Distributed resources modeling used by the applicants included components to address both energy efficiency as well as behind-the-meter renewable generation that may exist across the scenarios analyzed. The applicants used price points to develop a dispatch curve for the distributed resources that would mimic energy efficiency programs and consumer response to electric market conditions. The resources were located across the ATC service area to model impacts with various types of load and system configurations. The resources were included in both the base models and project models and the impacts of the resources were subsequently accounted for within the project savings metrics.
- No build alternative – ATC used the no-build alternative as the base case for evaluating the quantitative and qualitative benefits of the proposed Badger Coulee project and the other transmission system alternatives. In these evaluations, the applicants analyzed the transmission system with and without each alternative, and if the analysis produces more favorable results with a particular alternative then the no-build option is economically inferior to that alternative. In addition to economic factors, reliability and transfer capability impacts were considered. Since the no-build option provides poorer reliability and electrical supply performance compared to any of the transmission system alternatives, it would have to be significantly economically superior to justify selecting the no build alternative. The applicants state that the no build alternative was not a

viable alternative to the proposed Badger Coulee project because no such economic advantage exists.

3.8.2. The applicants' evaluation of non-transmission system alternatives

The applicants chose the proposed Badger Coulee project over the energy efficiency and load reduction alternative for the following reasons:

- It is uncertain what level energy efficiency and load reduction is necessary to equal the quantitative and qualitative benefits of the proposed Badger Coulee project. For example, the applicants state that to eliminate the need for lower-voltage reliability projects, energy efficiency and load reduction would have to be targeted to each of the substations where NERC violations are expected to occur in the WWTRS.
- Energy efficiency and load reduction would not serve as an adequate substitute for the proposed Badger Coulee project because it would not provide energy cost savings for Wisconsin customers regardless of the level of additional load reduction achieved.
- Energy efficiency and load reduction would not provide the increased transfer capability from the west and into the ATC service area, and corresponding renewable investment benefit that results from the proposed Badger Coulee project.
- Since ATC does not offer energy efficiency or load management programs to retail electric customers, nor does it have the ability to curtail retail load except through actions of load serving entities under emergency conditions, energy efficiency and load reduction programs are outside of ATC's control.
- Energy efficiency and load reduction would have to function as reliable, continuous, firm resources. The applicants state that most energy efficiency and load reduction programs are voluntary and lack the firmness of a hard asset like the proposed Badger Coulee project.
- Energy efficiency and load reduction resources would have to be shown to be technically feasible and cost-effective. Based on a review of publicly available data, the applicants state that they are unable to conclude that any combination of energy efficiency and load reduction would be feasible and cost-effective and provide the same package of benefits as the proposed Badger Coulee project.

The applicants chose the proposed Badger Coulee project over the generation and distributed resources alternatives for the following reasons:

- Generation and distributed resources would not serve as an adequate substitute for the Badger Coulee project because it would not provide energy cost savings for Wisconsin customers.
- Generation and distributed resources would be outside of the applicants' control.

3.8.3. Transmission system alternatives¹²⁷

The applicants considered several transmission system alternatives, including:

¹²⁷ A detailed discussion of transmission system alternatives is included in revised Application Appendix D, pp. 18-28, [PSC REF#: 204739](#).