Consumers Energy Electric Generation Alternatives Analysis For Proposed Permit to Install (PTI) No. 341-07 For an Advanced Supercritical Pulverized Coal Boiler at the Karn-Weadock Generating Station, Essexville, Michigan

Docket Number: U-15996

*Staff Report to Michigan Department of Environmental Quality**

September 8, 2009

*Prepared by Staff from the Generation and Certificate of Need Section, Electric Reliability Division of the Michigan Public Service Commission

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Executive Summary

On April 1, 2009, the Commission entered into a Memorandum of Understanding (MOU) with the DEQ that clarified each participant's role and responsibility regarding a review process to evaluate electric generation alternatives and provide technical assistance to the DEQ. The Commission Order in Docket Number U-15958 was issued to clarify the roles and responsibilities of the Commission Staff (Staff) pursuant to the MOU between the Commission and the DEQ related to filings of electricity generating alternatives analyses.

Consumers Energy submitted an Electric Generation Alternatives Analysis (EGAA) to the DEQ and Commission on June 5, 2009. As detailed in their EGAA, Consumers Energy is proposing to install a new baseload, 930 megawatt (MW) gross electric output, coal-fired Advanced Supercritical Pulverized Coal (ASCPC) boiler at the existing Karn-Weadock Generating Station in Hampton Charter Township in Bay County.

Consumers Energy's EGAA filing does not constitute an Integrated Resource Plan (IRP) as required by 2008 PA 286 for the request of a Certificate of Necessity (CON). Scenario analyses, using various sensitivities, including a reasonable range of values for the key input assumptions such as capital costs, fuel prices, CO_2 costs, load and energy requirements were not conducted as part of this analysis.

In accordance with the MOU, Staff reviewed Consumers Energy's EGAA for the proposed coal-fired electricity generating plant to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs. Staff provides the following findings:

- Consumers Energy's long-term capacity need is unjustified without the explicit retirement of existing coal capacity in its baseload generation fleet. Given Consumers Energy's load growth assumption of approximately 0.3% per year, coupled with anticipated effects of energy efficiency and demand reduction initiatives, the long-term projected capacity need before the assumed expiration of the Palisades Purchase Power Agreement (PPA) in 2022 is based primarily on assumed retirement of approximately 950 MW of existing coal capacity.
- Staff notes that the proposed ASCPC plant is one alternative out of a range of alternatives that may be used to fill the projected capacity need. Other alternatives that may fill all or portions of the projected capacity need include; energy efficiency and load management; renewable resources; or a combination of a number of alternatives that could include lesser amounts of purchased power.

Introduction and Background

DEQ – Commission Memorandum of Understanding (MOU)

On April 1, 2009, the Michigan Public Service Commission (Commission) entered into a Memorandum of Understanding (MOU) with the DEQ that clarified each participant's role and responsibility regarding a review process to evaluate electric generation alternatives and provide technical assistance to the DEQ.

The Commission has two tasks, pursuant to the MOU:

a. Providing technical assistance to the DEQ on all matters related to the need for electric generation in the state, as it relates to the analysis that looks at alternatives to coal-fired generation.

b. Reviewing the alternatives analysis to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs.

The MOU between the DEQ and Commission is entered into for the sole purpose of clarifying each agency's role and responsibility regarding the alternatives analysis review and technical assistance for the proposed coal-fired electricity generating plant applications currently pending before the DEQ. The DEQ - Commission MOU is contained in Appendix A of this Staff Report.

Commission Order in Docket Number U-15958

The Commission Order in Docket Number U-15958 was issued to establish procedures for the Staff to conduct an alternatives analysis review and to provide other technical assistance to the DEQ pursuant to a MOU between the Commission and the DEQ related to proposed coal-fired electricity generating plants.

The MOU constitutes a clarification of each participant's role and responsibility in satisfying the requirements regarding an alternatives analysis review and the provision of other technical assistance to the DEQ by the Commission related to the DEQ's task of issuing permits in response to applications filed under Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 PA 451, MCL 324.101 et seq., R 336.2817(2), and Section 165(a)(2) of the federal Clean Air Act, 42 USC 7475(a)(2) for authority to construct a new coal-fired electricity generating plant. For the Commission Order in Docket Number U-15958, see Appendix B.

Summary of Proposed Project

Consumers Energy filed an Electric Generation Alternatives Analysis (EGAA) in the Commission's Docket Number U-15996 on June 5, 2009.[1] Consumers Energy is proposing to install a new baseload coal-fired Advanced Super Critical Pulverized Coal (ASCPC) boiler with

[1] http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf

a heat input rating of 8,190 million British thermal units per hour (MMBtu/hr) and two mechanical draft cooling towers. The project will include a steam turbine generator capable of producing 930 megawatt (MW) gross electrical output; a 220 MMBtu/hr natural gas-fired auxiliary boiler for startup assistance and general heating; and diesel fuel-fired equipment including an emergency generator, a fire pump, a fire booster pump, and a wet flue gas desulfurization (FGD) quench pump. The ASCPC boiler is designed to burn western Powder River Basin (PRB) coals but will maintain the capability to use a mix of eastern bituminous coals in the boiler. Consumers Energy has determined that maintaining an ability to blend up to 50% bituminous coal with the sub-bituminous PRB coal provides the most long term stability in fuel pricing and supply for this baseload unit. The location is at the existing Karn-Weadock Generating Station in Hampton Township. The site is approximately 2400 acres located near the mouth of the Saginaw River, near Essexville, Michigan.[2]

Disclaimer regarding Certificate of Necessity (CON) – 2008 PA 286

On October 6, 2008, Governor Jennifer M. Granholm signed into law 2008 Public Act (PA) 286, an amendment to 1939 PA 3. Section 6s of PA 286, MCL 460.6s, provides the option for a utility that seeks to add capacity to its system by construction, renovation, or long-term power purchase to seek one or more certificates of necessity (CON) from the Commission. If a utility seeks a CON under this section, it must file an application with the Commission, along with an Integrated Resource Plan (IRP).

Section 6s(10) provides that within 90 days of the effective date of the amendatory act, the Commission "shall adopt standard application filing forms and instructions for use in all requests for a certificate of necessity under this section." Section 6s(11) provides that the Commission "shall establish standards for an integrated resource plan that shall be filed by an electric utility requesting a certificate of necessity under this section."

The issuance and subsequent findings contained in this Staff Report on Consumers Energy's filing of their EGAA (Docket No. U-15996) does not constitute approval or issuance of a CON by the Commission. Any utility required and/or seeking to obtain a CON must do so in accordance with the rules and procedures set forth under Section 6s(10) of 2008 PA 286.

Furthermore, the findings contained in this Staff Report are limited to the scope of work described in the MOU between the DEQ and Commission and subsequent Commission Order in Docket Number U-15958 and will have no bearing on any future CON proceeding that may or may not take place for this or a similar proposed project.

[2] http://www.deq.state.mi.us/aps/downloads/permits/PubNotice/341-07/341-07%20Fact%20Sheet.pdf

Technical Meetings

In order to facilitate a thorough review in a relatively short amount of time, Staff scheduled weekly meetings with staff members of Consumers Energy to discuss questions that arose from the material supplied in the filing. Questions that Staff posed to the utility were submitted to them in advance (via email or phone calls) in order to properly prepare for productive and efficient meetings. Weekly meetings were set into motion immediately after the EGAA filing and through the 30-day public comment period of the docket. Additional meetings were scheduled on an as needed basis through the remaining sixty days of the ninety day docket period.

In addition, Consumers Energy also agreed to participate in a technical forum, hosted by the Commission, to provide various environmental groups an opportunity to ask questions about the filed EGAA. Participants included members from the Sierra Club, National Resource Defense Council, Consumers Energy Staff, Commission Staff and DEQ Staff. Attendees were advised to submit questions in advance to Staff to allow representatives from the utility the ability to prepare background information, and to ensure appropriate staff from their companies were in attendance and able to respond adequately. Consumers Energy EGAA Technical Forum took place on Wednesday June 24, 2009 from 2:00 p.m.- 4:00 p.m. at the Commission's offices in Lansing, Michigan.[3]

Consideration of Public Comments

As part of the Staff analysis of the EGAA filing, public comments were evaluated and considered in terms of their relevance and merit to the proposed project and within the scope of work covered by the MOU and subsequent Commission Order in Docket Number U-15958. All comments submitted within the public comment period were evaluated by Staff and are contained in Docket Number U-15996.[4] The public comment period for this filing was 30 days. Comments received after the 30 day comment period were not required to be considered by Staff in the assessment and creation of this report. Please note the DEQ had a separate public comment period which is factored into their review process for purposes of this air permit application.[5]

Interested citizens, corporations, environmental groups, and other interested parties filed public comments regarding Consumers Energy's proposed coal plant. Specific groups filing public comments included the Sierra Club, National Resource Defense Council (NRDC), Environmental Law and Policy Center (ELPC), Great Lakes Environmental Law Center, Association of Businesses Advocating Tariff Equity (ABATE), City of Bay City, New Covert Generating Company, LLC, American Coalition for Clean Coal Electricity (ACCCE), Birch, Becker & Moorman, LLP, Bluewater Wind, LLC, Michigan Environmental Council (MEC),

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[3] To review the questions and answers covered during this technical forum, refer to http://efile.mpsc.state.mi.us/efile/docs/15996/0109.pdf

[4] For a list of all public comments posted to the PSC e-docket, refer to http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=15996

[5] For a list of all public comments posted on the DEQ web site for Permit to Install applicants, refer to http://www.deq.state.mi.us/aps/downloads/permits/cfpp/cfpp.htm

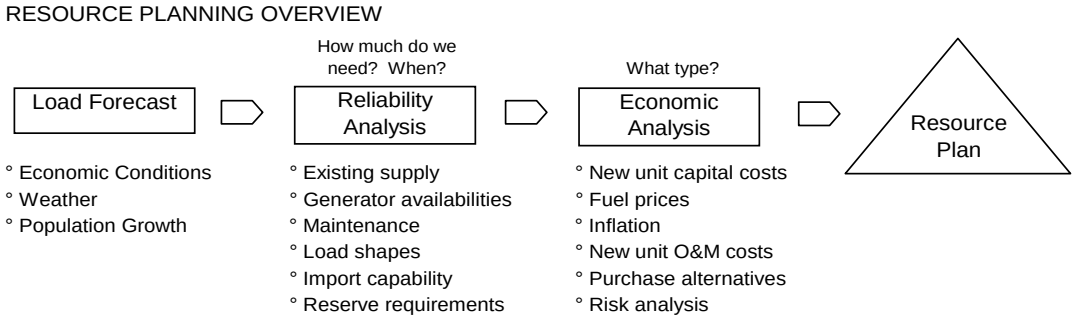
Attorney General of Michigan, ITC Holdings Corporation, Michigan Manufacturers Association, International Union of Operating Engineers – Local 324, EcoCenter, Co-op Conversations.

A range of public comments were received, including supporting and opposing comments, as well as points of clarification. Major issues cited include, but are not limited to: proposed ASCPC represents a highly advanced, cost effective, reliable operation; reduction/replacement of coal would increase energy costs substantially; retiring/replacing older, less efficient plants with ASCPC significantly reduces system-wide emissions; proposed plant will be basis for Michigan's economic recovery; a need for new electric generation to meet net customer demand still exists in spite of implementation of aggressive energy efficiency, demand management and renewable resource programs; insignificant public comment period; Michigan's energy need claim unsubstantiated; promote renewable energy, green jobs and long-term economic health; no explicit guarantee of retirement of aging units; EGAA relies on outdated energy demand forecasts; 0.5% annual peak load reduction after 2015 unsupported via study; carbon capturing/sequestration costs and viability provided without sufficient confidence; energy efficiency delivered at one-third to one-half of cost per kWh compared to electricity from coal; procedures could be seen as means to avoid statutory requirements; and several potential misconceptions associated with value of offshore wind energy generation in Great Lakes.

Regional Resource Adequacy

Planning for Reliability

For many decades, electric utilities have been planning to meet the forecasted needs of their customers. The figure below outlines the elements of a typical utility resource plan.



For several decades utility resource planning has been directed towards answering the following traditional questions:

- Build versus buy?
- What is the best mix of baseload, intermediate, and peaking resources?
- What is the cost to my customers, and what is the rate of return for my shareholders?

In recent years, utility planning has become more complex and must address some new challenges and risks[6]:

- Am I operating in a regulated or deregulated market?
- Given the recent volatility in gas/oil prices, what type of resource should be considered (i.e., gas, coal, nuclear, renewable, or fixed price)?
- Does the resource satisfy installed capacity requirements?
- Is there regional coordination of planning to consider?
- Am I affected by Renewable Portfolio Standard (RPS) mandates?
- How will the new Clean Air Interstate Rule (CAIR), Clean Air Mercury Rule (CAMR), and carbon regulations affect my power supply decision?
- Where does demand-side management economically fit in to the portfolio?

Staff expects that utility plans filed today will address a full spectrum of risks as outlined above. While individual utilities must assess the reliability of their own supply to meet their projected loads and individual requirements, similar assessments may be completed at the state level and at the regional level that provide insight into the resource adequacy and future resource plans of the broader region in which the utility operates.

Regional Grid Operation

The Midwest Independent Transmission System Operator (ISO) is the independent system operator that was established in 1998 and approved by Federal Energy Regulatory Commission (FERC) to be the nation's first regional transmission organization in 2001. The Midwest ISO is the reliability coordinator in our region and it manages the real-time power flow throughout the region twenty four hours per day, seven days per week. In addition to reliability coordination, the Midwest ISO also operates a day-ahead market, a real-time energy market, an ancillary services market, and a financial transmission rights market. The energy markets are operated using a security constrained economic dispatch. The Energy Policy Act of 2005 (EPAct 2005) defines economic dispatch to mean "the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities"[7] [EPAct 2005, Sec. 1234 (b)].

EPAct 2005 also directed that an "Electric Reliability Organization" (ERO) be formed to develop and enforce mandatory electric reliability standards for the bulk power system in the United States. In 2006, the North American Electric Reliability Council (NERC) was approved to be the ERO for the U.S. EPAct 2005 directs the ERO to "conduct periodic assessments of the reliability and adequacy of the bulk-power system in North America" [EPAct 2005, Sec. 215 (g)]. NERC designates some regional responsibilities to Regional Entities such as Reliability*First* Corporation (RFC) and the Midwest Reliability Organization (MRO), including

[6] Ventyx, Resource Evaluation, Planning, and Reliability Services, http://www1.ventyx.com/advisory/irp-rfp.asp.
[7] Economic Dispatch of Electric Generation Capacity, U.S. DOE, http://www.oe.energy.gov/DocumentsandMedia/final_ED_03_01_07_rev2.pdf, p. 2.

the development of regional long-term resource assessments. The electric reliability standards enforced by NERC and the Regional Entities are mandatory. Non-compliance with the standards may result in significant financial penalties.

RFC's regional reliability Standard BAL-502-RFC-02,[8] Planning Resource Adequacy Analysis, Assessment and Documentation directs the methods and frequency for conducting assessments of resource adequacy in the RFC territory. MRO has a similar standard for resource adequacy assessments. The Midwest ISO serves as the planning coordinator in our region and conducts resource adequacy assessments to meet the regional reliability standards set forth by RFC and MRO. In addition to adequacy assessments, FERC approved changes to the Midwest ISO transmission and energy markets tariff in 2009 to include reserve margin requirements that are specified as "an individual LSE reserve level of 12.69%"[9] for the summer of 2009.

Adequacy in the Midwest ISO East Sub-Region

The Midwest ISO Independent Market Monitor (IMM), Dr. David Patton of Potomac Economics, annually delivers a State of the Market Report (SOM) which includes details that provide insight with regard to the resource adequacy of our region. The IMM's recently released 2008 SOM, states that "Although the system's resources are adequate for the summer of 2009, new resources will be needed over the long-run to meet the needs of the system." [10] More specifically, the IMM indicates that the Midwest ISO East Region has the tightest reserve margins in all of Midwest ISO for all cases analyzed.[11]

The Midwest ISO East region includes the majority of Lower Michigan and a small part of northern Indiana and northern Ohio. The SOM reports reserve margins for the Midwest ISO

[8] Standard BAL-502-RFC-02, 12/4/08, http://www.rfirst.org/Documents/Standards/Approved/BAL-502-RFC-02.pdf.
[9] Midwest Independent System Operator 2009 – 2010 LOLE Study Preliminary Report, http://www.midwestmarket.org/publish/Document/1d44c3_11e1d03fcc5_-7df00a48324a/Midwest%20ISO%202009-2010%20LOLE%20Executive%20Report.pdf?action=download&_property=Attachment.
[10] 2008 Midwest ISO IMM's State of the Market Report, http://www.midwestmarket.org/publish/Document/6ef35b_121e89707ed_-7dcf0a48324a/2008%20Midwest%20ISO%20State%20of%20the%20Market.pdf?action=download&_property=Attachment, 6/26/09, p. 55.
[11] 2008 Midwest ISO IMM's State of the Market Report, p. 56.

East Region from a high of 22.5% of nameplate capacity for 2009, down to 3.5% of high-temperature capacity excluding interruptible load and behind the meter generation. It should also be noted that 11.4% reserve margin for high temperature capacity that includes existing interruptible load and behind the meter generation, is below the current Midwest ISO Module E tariff requirement of 12.69% planning reserve margin that is required for Midwest ISO load-serving entities for 2009, and the 12.69% requirement is likely met through imports from neighboring regions.

Adequacy in the Reliability*First* Region

Reliability First Corporation (RFC) is a Regional Entity enforcing NERC reliability standards. While a portion of Michigan's Upper Peninsula is within the MRO footprint, the RFC footprint includes a majority of Michigan[12]:

Long Term Assessments of electric demand and supply are required by NERC standards. The RFC's October 2008 Long Term Resource Assessment projects an increase of 24,500 MW in net internal demand for the entire region from 2008 - 2017, and an increase in net summer capacity of 16,100 MW for the same ten year time period.[13] Although RFC is projecting that demand growth will continue to outpace supply growth over the next ten years, RFC does project that reserve margin requirements will continue to be met throughout the study period.

RFC reports that "maintaining the overall reliability of the ReliabilityFirst Region could be challenged by such factors as:

- Potential environmental regulations & emission control systems
- Aging Generating Units"[14]

[12] RFC Region Map, http://www.rfirst.org/MiscForms/AboutUs/Territory.aspx).
[13] 2008 RFC Long Term Resource Assessment, October, 2008, http://www.rfirst.org/Documents/Reliability/Reports/2008%20RFC%20Long%20Term%20Resource%20Assessment.pdf, p. 2.
[14] 2008 RFC Long Term Resource Assessment, October, 2008, http://www.rfirst.org/Documents/Reliability/Reports/2008%20RFC%20Long%20Term%20Resource%20Assessment.pdf, p. 2.

Planned Generation in the Midwest ISO Region

As new generation is proposed, interconnection studies are performed to determine the scope of transmission upgrades that may be necessary in order to accommodate the proposed generation. Generation planners submit interconnection requests to the regional transmission operators, such as the Midwest ISO and they are placed in an interconnection queue. Current[15] active interconnection requests in the Midwest ISO queue[16] include:

Proposed Generation Type	Total Midwest ISO (Nameplate MW)	Total Michigan (Nameplate MW)
Coal	2693	600[17]
Nuclear	3405	1563
Gas / Diesel / Co-gen	1655	0
Wind[18]	45671	1549
Other Renewables	485	101

In Michigan, there are currently three baseload generators in the Midwest ISO interconnection queue. They include Wolverine's Rogers City coal-fired circulating fluidized bed (CFB) proposal, Consumers Energy's Karn-Weadock ASCPC plant proposal, and Detroit Edison's Fermi 3 nuclear plant proposal. This EGAA specifically focuses on Consumers Energy's ASCPC Karn-Weadock coal plant proposal.

Planning in Michigan

Michigan has recently developed long-term resource adequacy plans for the state. The Michigan Public Service Commission commenced the Capacity Needs Forum[19] in October 2004 to assess the adequacy of resources to meet the long-term electric needs in Michigan. Shortly following, Governor Granholm issued E.D. No. 2006-2 which called for the development of a comprehensive plan for meeting the state's electric power needs. The 21st Century Energy Plan[20] (21st CEP) was issued in response to the executive directive on January 31, 2007. Since the release of the 21st CEP, Michigan has enacted 2008 PA 295 and 286. 2008 PA 295 outlines requirements for renewable energy and energy optimization within the State of Michigan. Another key change since the 21st CEP has been the continued downturn in the Michigan economy which has generally lowered utility forecasts in Michigan. Electric plans from Michigan companies developed since the enactment of 2008 PA 295 should reflect the

[15] Current active interconnection requests as of 7/27/09, including projects that are not in "parked" status.
[16] Midwest ISO Interconnection Queue, http://www.midwestmarket.org/page/Generator+Interconnection.
[17] The 600 MW listed is for Wolverine's Rogers City proposal. Consumers Energy also has a Karn-Weadock proposal for 875 MW of coal in Michigan in the Midwest ISO queue, however, it is currently in "parked" status for up to one year. The "parked" status is a temporary holding pattern and projects in the parked position may still proceed forward through the interconnection queue process at a later date.
[18] New Wind resources in the Midwest ISO are credited with 20% of nameplate capacity for installed reserve requirements, whereas coal, nuclear, and gas-fired units are typically credited with 100% of nameplate capacity on-peak for installed reserve requirements.
[19] MPSC Capacity Needs Forum, http://www.dleg.state.mi.us/mpsc/electric/capacity/cnf/index.htm.
[20] 21st CEP, http://www.dleg.state.mi.us/mpsc/electric/capacity/energyplan/index.htm.

requirements outlined in the Act, and should also include updated forecasts, costs, and assumptions as compared to previous plans.

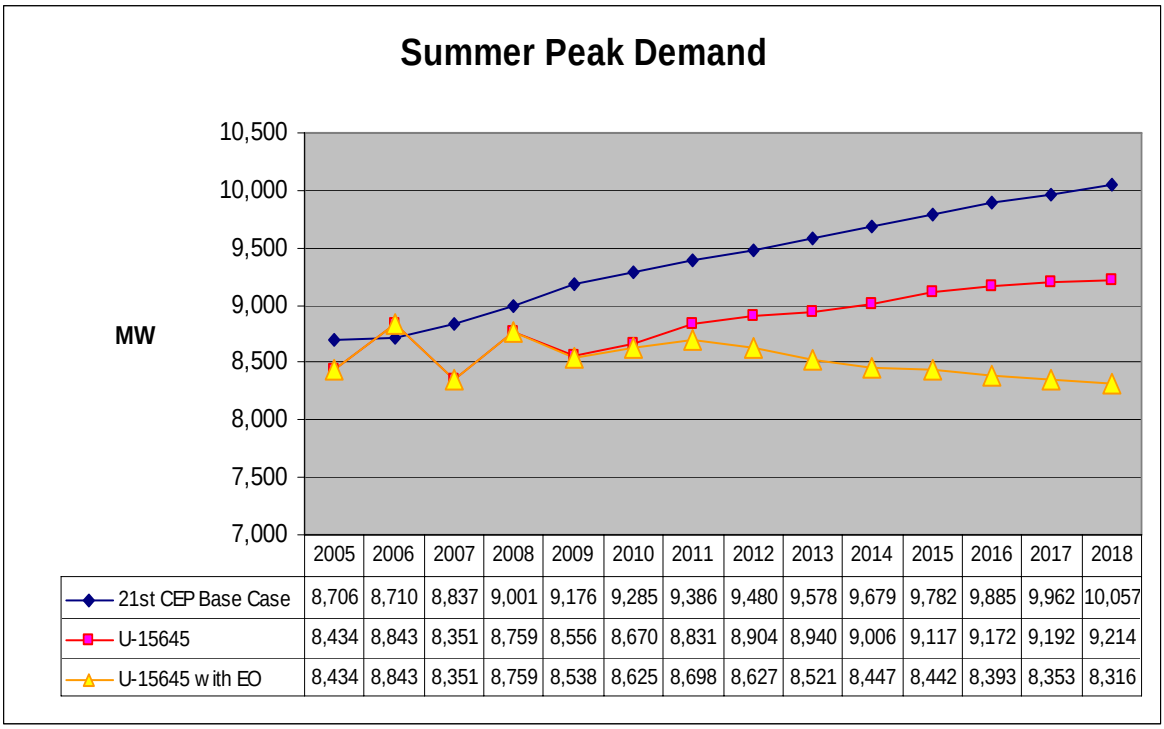
Consumers Energy - Load Forecast Evaluation

Consumers Energy projects an overall average peak load growth of 0.33% per year through 2030 compared to a historical average of roughly 2% per year.[21] As a result of Michigan's declining economy, the company's forecast is about one-third of the 1% per year average load growth projected in May 2007. This recent forecast is largely driven by expected decline in Michigan's manufacturing activity, population and a weak housing market.[22]

Historical Comparison

Figure 1 depicts Consumers Energy's revision of its peak demand forecast since the 21st CEP.[23]

Figure 1



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
21st CEP Base Case	8,706	8,710	8,837	9,001	9,176	9,285	9,386	9,480	9,578	9,679	9,782	9,885	9,962	10,057
U-15645	8,434	8,843	8,351	8,759	8,556	8,670	8,831	8,904	8,940	9,006	9,117	9,172	9,192	9,214
U-15645 with EO	8,434	8,843	8,351	8,759	8,538	8,625	8,698	8,627	8,521	8,447	8,442	8,393	8,353	8,316

Staff has represented this forecast with and without the expected effects of Consumers Energy's energy efficiency, load control and demand response programs. Aside from assumed reductions in demand from their energy optimization programs, Consumers Energy's revised forecast clearly reduces its peak demand in response to the state's recessionary condition. For 2005 to

[21] This growth excludes retail open access sales.
[22] This summary is based on that provided by Consumers Energy in its EGAA, pg. 6-7. Consumer's forecast used in the EGAA is based on the testimony and exhibits presented by Lincoln Warriner in Case U-15645.
[23] The following link identifies the CNF Update web page:
http://www.dleg.state.mi.us/mpsc/electric/capacity/energyplan/cnfupdate/cnfupdate.htm

2018, Consumers Energy's previous planning efforts projected 1.12% average annual compound growth. This has since been reduced to 0.68% over the same period.[24]

Consumers Energy's EGAA net peak demand includes the effects of various optimization programs mandated by 2008 PA 295.[25] By 2018, Consumers Energy has included a 378 MW capacity value for its efficiency program, and a combined 520 MW peak reduction capacity for its advanced metering infrastructure (AMI) program.[26] Consumers Energy's AMI program includes both demand response and air conditioning (A/C) load control. The combined net reduction in peak demand is depicted in Figure 1. It is important to note that this graph and the associated data do not factor in Midwest ISO reserve requirements.[27] Consequently, Consumers Energy's interruptible demand reductions have not been depicted. Total energy optimization effects reduce Consumers Energy's forecasted annual average growth to -0.1% from 2005 to 2018. Consumers Energy's EGAA assumes these programs will continue throughout the planning period with increasing credited peak capacity. By 2025, Consumers Energy projects total demand-side reductions, excluding interruptibles, to encompass 1,335 MW of peak demand. By 2030, Consumers Energy projects that this will reduce net annual peak demand growth to -0.49%.[28]

Internal Assessment of the Forecasting Models

Consumers Energy's forecasts are direct outputs of a combination of separate regression models for each customer class.[29] Various demographic, economic and weather variables were themselves forecasted and used as inputs into the models.[30] Consumers Energy's residential and commercial models assume negative statewide population growth through 2017 followed by modest growth of roughly 0.1% through 2030.[31] They also assume long-term downward growth in housing starts. Aside from any energy optimization effects, Consumers Energy's "use-per-customer" does reflect sustained growth in baseline energy consumption.[32] The industrial models assume negative growth in transportation and manufacturing employment but also include a fixed 0.39% growth rate of manufacturing productivity. While Consumers Energy's

[24] In order to make U-15645 data comparable to the CNF Update Workgroup estimates, Staff used "total delivery" figures presented in Exhibit A-79 (LDW-4) for the years 2005-2007 and "total delivery" figures presented in Exhibit A-86 (LDW-11) for the years 2008-2018. Staff adjusted U-15645 data for an assumed fixed quantity of wholesales. The peak demand figures exclude reserve requirements.
[25] A complete description of Consumers Energy's energy optimization program is provided in Case U-15805.
[26] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 11
[27] The Midwest ISO requires utilities to carry reserve, or excess, capacity to help preserve the grid's reliability. Consumers Energy's EGAA assumes an additional 250 MW of fixed capacity for their Peak Load Management, or Interruptible Load, program. This quantity is not depicted by Figure 1 because it is counted towards Consumers Energy's reserve requirements.
[28] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, pg.11
[29] Some of Consumers Energy's large industrial customers are counted individually and then added to the industrial class total demand.
[30] The economic and demographic data inputs used by Consumers Energy were provided by Global Insight's Michigan Fall 2008 Long Term report.
[31] This data, along with other economic and demographic indicators were taken from Consumers Energy's work-papers associated with Lincoln Warriner's testimony on Case Number U-15645. These papers are not available on the MPSC's E-docket system, but are available for public review upon request.
[32] "Baseline" refers to energy consumption not influenced by weather.

models predict a sharp downturn in electricity consumption from the automotive sector, they also expect robust gains from other manufacturing customers including large producers of semiconductor and solar energy components.[33]

An important component of Consumers Energy's peak demand forecasting model is electricity usage associated with air conditioning (A/C). This estimated usage is generally a function of expected peak temperature[34] and A/C saturation levels. Consumers Energy's forecast assumes a fixed peak-day temperature throughout the planning period and modest growth in central A/C saturation levels from 54% in 2008 to 55.98% in 2030.[35] The peak demand forecast also factors in a long-term trend of increasing A/C appliance efficiency. Collectively, Consumers Energy's expected 22-year growth in peak demand related to weather and A/C saturation levels is less than 100 MW, a relatively insignificant amount.

Key Observations

While Consumers Energy's forecast provides supportable estimates, the reliability of the forecast could be called into question. Figure 2 attempts to visually depict the underlying technical reason behind Staff's assertion. This figure and the accompanying table examine a sample of Consumers Energy's historical and predicted growth rates net of the effects of weather[36] so that changes in peak energy demand can be justifiably attributed to economic and demographic metrics used in the forecast models. Consistent with Michigan's current recessionary condition, Consumers Energy's projected annual compound growth rate is lower than the average from the previous twenty years.

Figure 2 indirectly depicts an often unavoidable flaw common in real-world applications of regression analysis for purposes of forecasting. Traditional methods of determining the probability that actual peak demand will fall within some specific interval around the forecast relies on the assumption that the parameters (i.e., population, employment, housing starts) are themselves known values. However, real world applications usually require that these parameters be estimated out into the future. The result is that the parameters themselves contain degrees of uncertainty. The direct consequence of this is that the probability, or measure of reliability as defined by traditionally-calculated confidence intervals,[37] cannot be accurately applied.[38] Methods attempting to provide more accurate portrayals of confidence intervals have been developed and incorporated into computing models but continue to lack any definitive theoretical support; they remain estimates.[39] Furthermore, Staff also observed that independent

[33] Direct Testimony of Lincoln Warriner, Case Number U-15645, pg. 20
[34] "Peak temperature" refers to either the max or average temperature on the day of greatest energy demand.
[35] Data on Consumers Energy's peak demand model was submitted to staff for purposes of this review.
[36] In order to mitigate the effect of weather on this historical comparison, Consumers Energy submitted weather adjusted peak-load data for the years 1979 to 2008. This data represents total service territory sales without any assumed energy optimization.
[37] See Exhibits A-86 (LDW-11) and A-87 (LDW-12) supporting Lincoln Warriner's direct testimony in Case Number U-15805
[38] Veall, Michael R. *Bootstrapping the Probability Distribution of Peak Electricity Demand*, International Economic Review, vol. 28, no. 1, February 1987, pp. 203-212
[39] MetrixND supporting documentation, "Appendix B: Statistics Available in MetrixND" pp. 208-209. This documentation includes reference to the following scholarly paper:

variables used in Consumers Energy's residential and commercial models were themselves outputs of separately calculated regressions. While this methodology may prove useful for purposes of building a forecast model, traditional interpretation of that forecast's reliability cannot be accurately made.

Ultimately, Staff believes that use of multiple demand-side forecast scenarios should have been employed to alleviate the risks associated with application of Consumers Energy's forecast for resource planning purposes. All forecasts are "best guesses" and carry with them degrees of risk stemming from inherent variability of the data as well as from the models themselves. The uncertainty surrounding the magnitude, timing and nature of Michigan's economic recovery adds additional risk which any one forecast cannot completely capture. High and low economic growth scenarios that consider multiple values for economic and demographic indicators are often employed by utilities to assess how changes in possible demand affect optimal resource choices.

M. Feldstein *The Error of Forecast in Econometric Models When the Forecast Period Exogenous Variables are Stochastic*, Econometrica, vol. 39, pp. 55-60, January, 1971

Figure 2

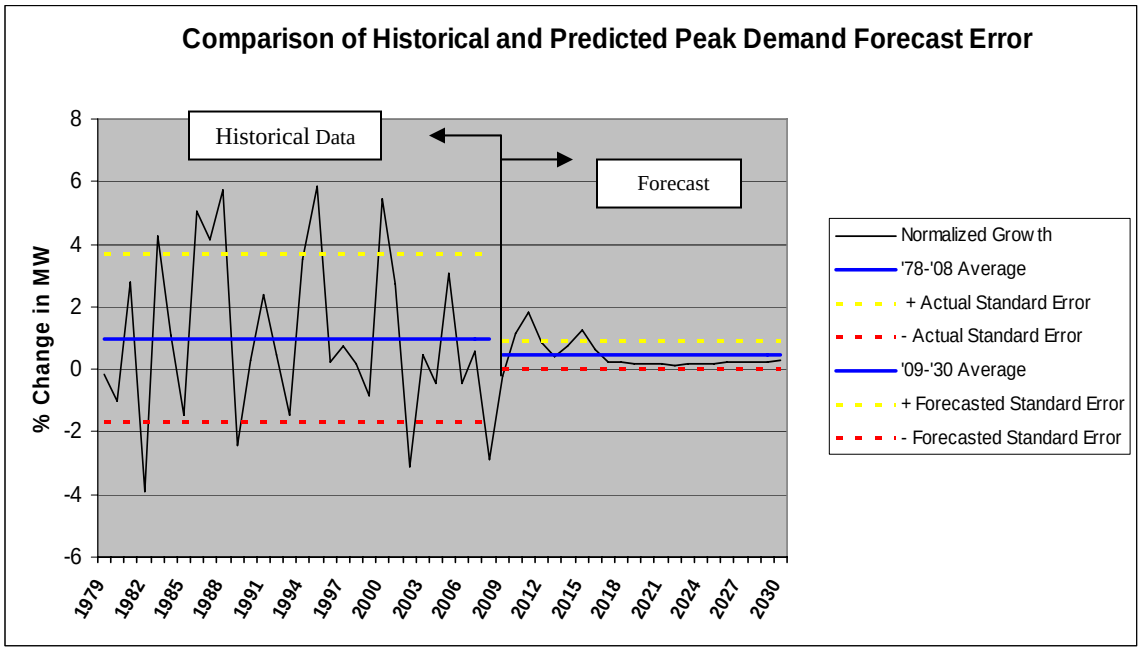


Table 1[40]

	Summer Peak Demand (MW)	
1979	6,367	**Annual Compound Growth is 0.94%**
1982	6,226	
1985	6,466	
1988	7,482	
1991	7,496	
1994	7,682	
1997	8,211	
2000	8,598	
2003	8,601	
2005	8,826	
2008	8,582	
2009	8,561	**Annual Compound Growth is 0.46%**
2011	8,817	
2014	8,993	
2017	9,179	
2020	9,234	
2023	9,279	
2026	9,335	
2030	9,428	

In **Table 1**, 1978-2008 summer peak demand represents historical data that has been "weather-normalized" by Consumers Energy so that a meaningful comparison can be made between this data set and the 2009-2030 forecasted summer peak demand. In order to weather normalize this 1978-2008 historical data, Consumers Energy adjusted the actual peak demands for a constant peak day temperature of 81° C, a constant 2008 level of A/C saturation and a constant 2008 level of A/C unit efficiency.

The horizontal blue lines represent annual compound growth rates (average % change) for the historic 1978-2008 data and projected 2009-2030 data. Each average growth rate, 0.94% for 1978-2008 and 0.46% for 2009-2030 has a standard error associated with it. These errors are represented for both data sets by the distance from the dashed lines to the average growth rate.

The standard error is one measure of the expected amount of error in a data set. **Figure 2** shows that the expected error in the weather-normalized 1978-2008 data is significantly greater than the expected error predicted by Consumers Energy's forecasting models which have also been weather-normalized in the same manner as the historic data set. This inconsistency in modeled error can be partially hedged by use of multiple demand-side scenarios.

[40] Table 1 does not present full data set used in Figure 2

Consumers Energy - Resource Needs Evaluation

Consumers Energy illustrated its peak load and capacity requirements in its EGAA filing[41] and subsequently provided the supporting data table quantifying the various existing and projected supply resources, demand response/load management, energy efficiency and total capacity requirements for the years 2008-2030.[42] In developing the peak load and capacity requirements, Consumers Energy assumes the retirement of approximately 950 MW of existing coal capacity by 2018.[43] Consumers Energy maintains that its fleet is the oldest in the United States (U.S.), averaging nearly 50 years of age. As such, Consumers Energy's EGAA assumes retirement of the company's oldest units, with an average age of over 53 years, in the 2015 to 2018 timeframe.

Beyond 2018, a significant decline in existing and long term purchases results in 2022 with the assumption of the termination of the Palisades Power Purchase Agreement (PPA). With this assumption, Consumers Energy projects a capacity shortfall of about 855 MW even with 519 MW ownership share of the proposed ASCPC plant.[44]

Given the historically low total load growth assumption of 0.3% per year, nearly all of the near-term projected capacity need before the assumed expiration of the Palisades PPA in 2022 is based primarily on the retirement of existing coal capacity.

Consumers Energy - Resource Planning Methodology

Consumers Energy presents a Balanced Energy Initiative (BEI) as its long-term (20-year) energy resource plan designed to meet the company's projected demand. The BEI purportedly represents an effective risk management strategy by providing a balanced approach, without dominant reliance on any one capacity source, fuel or technological solution. Over the course of the planning period, Consumers Energy's BEI analysis concludes that in addition to new renewable energy sources, as well as peak load reductions from new energy efficiency and demand management programs and despite historically low future electric load growth projections, there is a need for new baseload electric generation to meet future customer demand in a prudent, reliable and cost effective manner, and to eventually replace aging generating plants.[45]

Consumers Energy evaluated the following alternatives: advanced supercritical pulverized coal (PC), subcritical PC, supercritical circulating fluidized bed (CFB) boiler, integrated gasification combined cycle (IGCC), ultra supercritical PC, natural gas combined-cycle, natural gas combustion turbine, onshore wind, offshore wind, small wind, small biomass, solar photovoltaic (PV), hydroelectric, nuclear, geothermal, landfill gas, anaerobic digester, combined heat and power, distributed generation, marine power, air conditioning load management, peak load

[41] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, Figure 2, p. 7
[42] Consumers Energy EGAA Supporting Data, http://efile.mpsc.state.mi.us/efile/docs/15996/0050.pdf
[43] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 19
[44] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 15
[45] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 3

management (PLM) and interruptible, and energy efficiency. Consumers Energy has exited the nuclear ownership and operation business and did not consider nuclear power. Furthermore, an estimated in-service date of 2025 for a new nuclear unit is beyond the Company's capacity needs timeframe requirement.[46]

Consumers Energy's BEI modeling also considered the potential role of transmission expansion in helping to meet future demand and potentially reduce generation requirements. Consumers Energy reported that a May 2008 Midwest ISO study to evaluate a proposed AEP-ITC 765 kV project for increasing transmission into Michigan resulted in a failure to meet the economic test to justify the $2.4 billion investment under the benefit/cost test criteria. Consumers Energy acknowledges that increased transmission capability should continued to be studied as part of a balanced and well diversified portfolio and that economic transmission investments could reduce risk to customers and enhance overall system reliability.[47]

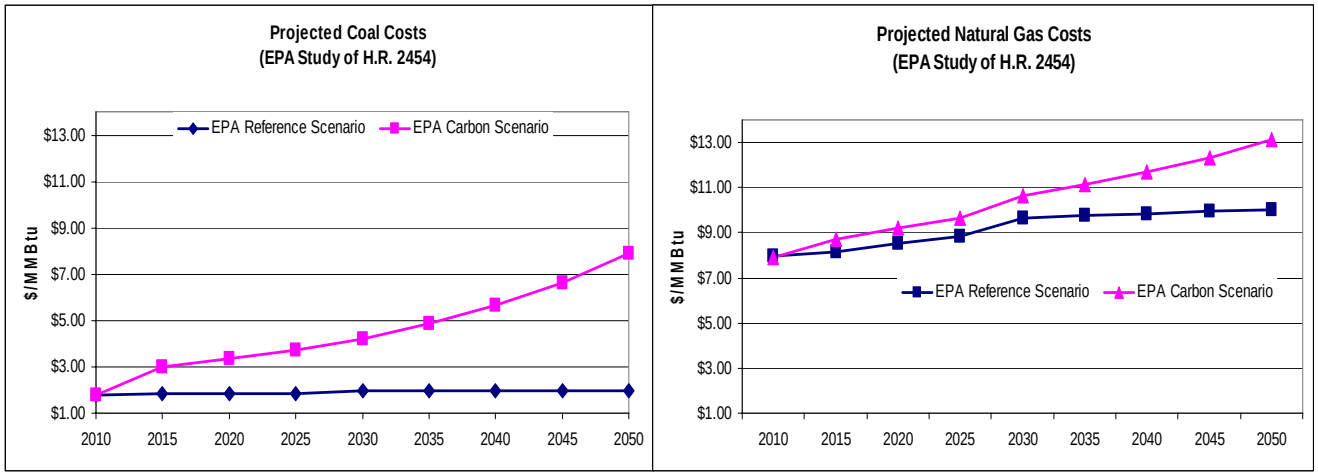
For each alternative, an estimate of the levelized cost of energy production or "busbar" cost was calculated. Generally speaking, busbar cost can be defined as the cost per kilowatt hour of producing electricity; it includes the cost of capital, debt service, operation and maintenance, and fuel. The power plant *bus*, or *busbar*, is that point beyond the generator but prior to the voltage transformation point in the switchyard. Busbar analysis provides a long-term economic comparison of capital, fuel, operation and maintenance, emission, interconnection and transmission system upgrade costs over the typical life expectancy of a future unit at varying capacity levels. Where applicable, a busbar cost excluding carbon dioxide (CO_2) cost assumes a CO_2 tax or cap and trade program has not been implemented. A busbar cost including CO_2 cost assumes a CO_2 tax cost of $22 per ton beginning in 2012 and rising to $53 per ton by 2025.[48]

Carbon Risk

The American Clean Energy and Security Act of 2009, H.R. 2454, that would regulate CO_2 emissions was recently passed by the U.S. House of Representatives and includes a carbon cap and trade program. Although that proposed legislation is still under consideration, the U.S. Environmental Protection Agency (EPA) recently conducted a study of the potential impacts of the proposed legislation.[49] While the EPA considered several scenarios, the graphs in Figure 3 depict one scenario[50] modeled by the EPA showing a potential rise in fuel prices from the proposed carbon cap and trade legislation versus a reference case which assumes no carbon legislation through the analysis period.

[46] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 37
[47] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 39
[48] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 27
[49] EPA Analysis of the American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 6/23/09, http://www.epa.gov/climatechange/economics/pdfs/HR2454_Analysis.pdf.
[50] EPA's Scenario 2, or draft Scenario in the ADAGE model results, EPA's H.R. 2454 analysis, data annex, ADAGE model results, http://www.epa.gov/climatechange/economics/economicanalyses.html#hr2452.

Figure 3[51]



The area between the two curves in each graph in Figure 3 shows the potential financial risk in future coal and natural gas prices due to proposed H.R. 2454 CO_2 legislation as predicted by the EPA. In addition to increases in fossil fuel prices, carbon legislation may also lead to higher electricity prices from sources that burn fossil fuels and emit CO_2. Additional investments in carbon capture and sequestration may be evaluated to comply with such future regulation. A study released by Energy Policy Group and Christensen Associates Energy Consulting earlier this year attempted to analyze the electricity price impacts of alternative carbon emission cap and trade programs in the Midwest. While electricity prices are predicted to rise due to the proposed carbon legislation, the study states that "…there are considerable uncertainties inherent in these estimates. First and foremost, we do not know with any certainty the carbon emission reductions that will be required by either regional programs in the Midwest or by federal legislation."[52]

While there is a great deal of uncertainty around the future of CO_2 legislation in the U.S., Staff contends that the potential risks associated with the future regulation of CO_2 emissions should be evaluated and considered. As previously indicated, Consumers Energy assumed a CO_2 tax of $22 per ton beginning in 2012 and rising to $53 per ton by 2025 in the development of their busbar cost analysis for coal and natural gas-fired technologies.

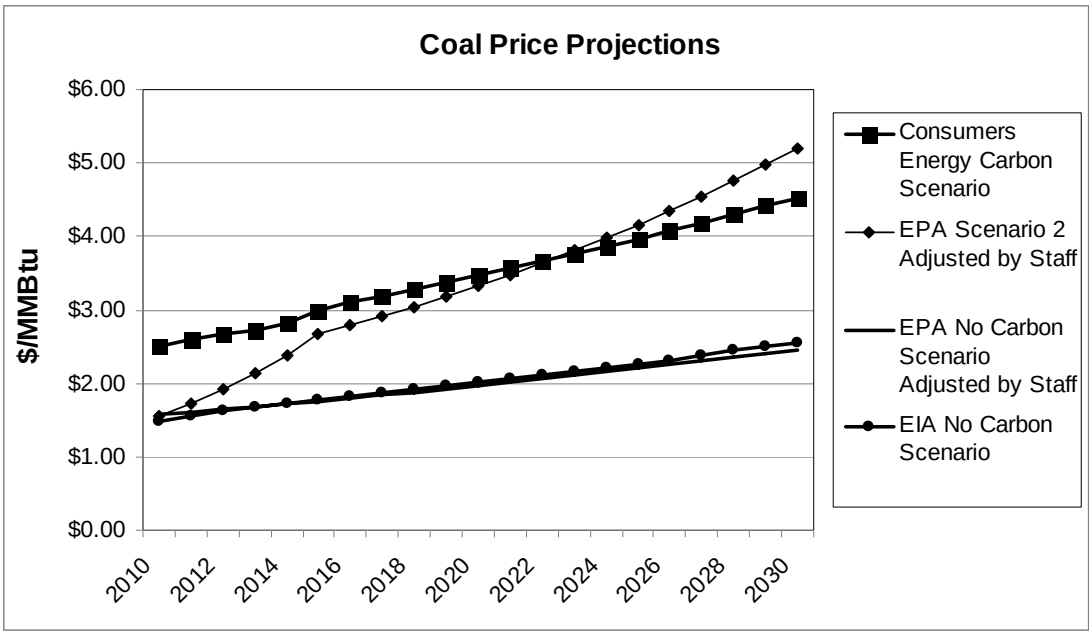
Fuel Price Assumptions

The predicted coal costs used in Consumers Energy's levelized cost calculations for various coal technologies[53] are based on analysis and modeling provided to Consumers Energy by Energy

[51] EPA's H.R. 2454 analysis, data annex, ADAGE model results, http://www.epa.gov/climatechange/economics/economicanalyses.html#hr2452.
[52] Energy Policy Group LLC and Christensen Associates Energy Consulting LLC, "Analysis of the Electricity Price Impacts of Alternative Carbon Emission Cap and Trade Programs in the Midwest", http://www.euci.com/energize/8-14-09_cap-trade.pdf, p. 38.
[53] These breakdowns, along with additional supporting information, were submitted to the MPSC E-Docket system Case Number U-15596. They can be found within filing #50.

Ventures Analysis, Inc. (EVA) for the purposes of Commission Case Number U-15805.[54] This coal price forecast represents the price of Southern Powder River Basin (PRB) delivered to a generic plant in Michigan.[55] It incorporates both the cost of mining and transportation by rail. Consumers Energy developed internal projections of nominal carbon costs starting at $22.30 in 2012 and increasing to roughly $280.00 by 2048. EVA's fuel forecast model used these carbon prices projected by Consumers Energy as inputs. As such, the resulting coal prices reflect a carbon tax scenario developed by Consumers Energy. Figure 4, denominated in nominal dollars, compares Consumers Energy's projected coal prices to delivered PRB cost estimated by Staff using EPA's "Scenario 2"[56] price projections under a carbon cap and trade regulatory structure outlined in H.R. 2454. EPA's "Scenario 2" assumes carbon prices, denominated in real 2000 dollars, starting at $12.40 in 2015 and increase to $70.40 by 2050. Figure 4 also depicts both the EPA and Energy Information Administration (EIA) projections of coal prices absent any future carbon regulations.

Figure 4



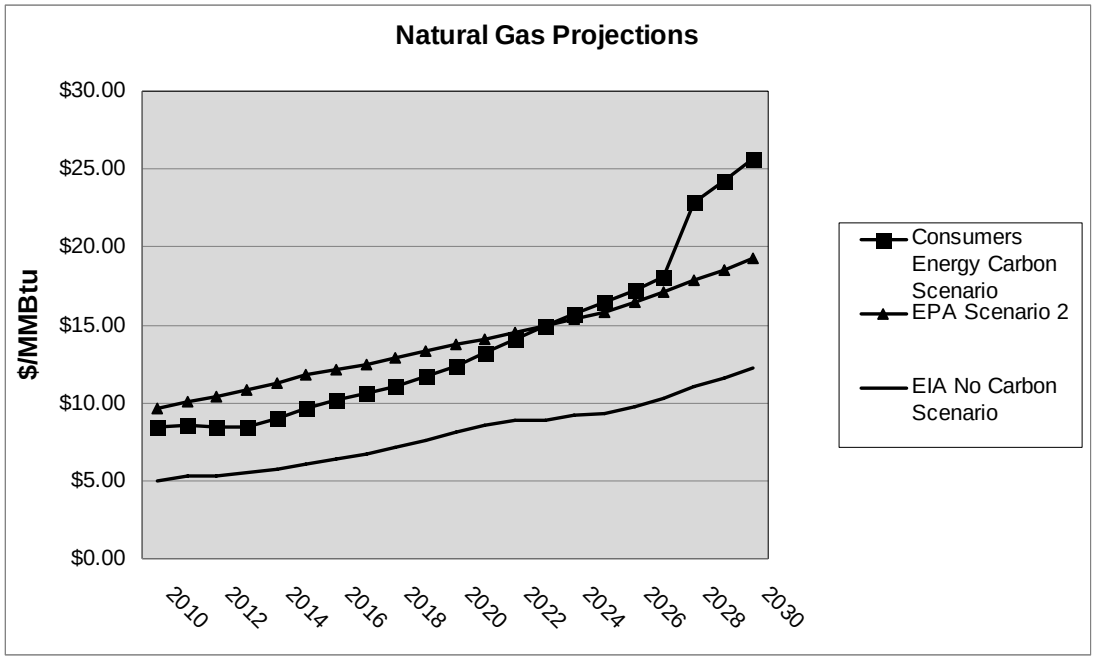
The common trend is that real PRB coal prices are projected to increase with or without federal regulations on carbon. While all price forecasts for commodities contain varying degrees of uncertainty and associated risk, fundamental cost drivers for PRB production support an expectation of long-run increases in the real price of PRB coal.[57]

[54] A complete description of this fuel forecast can be found in the exhibit A-14 (DFR-7) of Dave Ronk's Direct Testimony.
[55] Case Number U-15805 Exhibit A-14 (DFR-7)
[56] EPA's coal price forecasts were based on national average coal prices in the ADAGE data annex to the *EPA Analysis of the American Clean Energy and Security Act of 2009.* This annex can be downloaded at http://www.epa.gov/climatechange/economics/economicanalyses.html. To make a more corresponding comparison between coal prices, Staff adjusted EPA's national average coal prices to an estimated equivalent PRB price using EPA commodity figures in the EPA IPM regional coal price projections and the 21st CEP transportation costs.
[57] EIA, *Annual Energy Outlook 2009*, pp. 83-84

For purposes of resource planning, consideration of multiple coal price projections under varying scenarios is necessary to determine how higher than expected prices for fuel affect marginal baseload electricity costs, dispatch order and expected capacity factors. All of these variables affect this resource's levelized cost relative to other options. While Consumers Energy's projection of coal prices appears relatively conservative[58] through 2030, significant risk exists regarding how relative fuel prices will play out in the face of increasingly stringent environmental regulations throughout the life of the proposed plant.

Consumers Energy's natural gas forecast is based on modeled Henry Hub prices provided by EVA. Like their coal price projections, their model incorporated supply and demand effects associated with Consumers Energy's projected carbon costs. Figure 5[59] depicts Consumers Energy's delivered natural gas projected prices as well as the previously discussed EPA "Scenario 2" assumed carbon prices and EIA's projection absent any future carbon regulations. While EPA's prices represent a national average, EIA provides prices of natural gas delivered specifically to the northeast central states and for the purpose of electric generation. Figure 5 depicts another example of the potential rise in natural gas prices from the proposed carbon cap and trade legislation. As shown on Figure 5, Consumers Energy's projected natural gas prices including their carbon price scenario are more similar to the EPA scenario projecting natural gas prices with carbon legislation than the EIA prices projected with no carbon legislation.

Figure 5



As part of its response to Consumers Energy's EGAA, Synapse Energy Economics, Inc. referenced a recent report submitted by Entergy Louisiana which comments on an estimated 35%

[58] In this case, conservative refers to relatively high price levels.
[59] All prices represent delivered prices. EIA projections were taken from the supplemental tables of the 2009 Annual Energy Outlook. They represent projected prices of natural gas delivered to northeast central states for purpose of electric generation.

increase in domestic natural gas reserves in 2008 largely resulting from newly profitable access to unconventional gas sources. The report in turn describes how recent natural gas outlooks have revised price projections downward based on this new state of domestic supply.[60] The *2009 Annual Energy Outlook* (AEO) projects that domestic unconventional gas production is expected to increase by ten percent by 2030.[61] However, this report describes how access to these unconventional sources is largely a function of domestic market prices due to their relatively high cost of production. The 2009 AEO projects natural gas prices under multiple scenarios. All of them, including a scenario involving construction of a new Alaskan pipeline in service by 2022, result in long-run increases in natural gas prices driven by increasing cost of production and demand.

While recent declines in domestic natural gas prices are generally attributed to the downturn in the U.S. economy, long-term projections remain highly speculative in the face of changing supply conditions, technological advancements, carbon regulation and possible pipeline development.

Key Observations

As noted in public comments, the levelized cost analyses in the EGAA assume that all of the alternatives considered were in service in 2009. Furthermore, scenario analysis including a reasonable range of values for the key input assumptions such as capital costs, fuel prices, CO_2 costs, load and energy requirements was not conducted. Consumers Energy will be required to file an IRP including many of these elements as well as updated costs as required by MCL 460.6s(11) for the request of a CON. On December 23, 2008, the Commission issued an Order in Case Number U-15896 detailing the filing requirements and instructions for the application of a CON.

Based on key assumptions of an approximate 0.3% per year average peak load growth rate and the retirement of approximately 950 MW of existing coal capacity, Consumers Energy projects a need for baseload capacity and has proposed to construct a new 930 MW (gross electrical output) baseload ASCPC plant at the Karn/Weadock site to begin operation in 2017. Approximately 519 MW of the total capacity is dedicated to the Company's use and ownership of approximately 311 MW of the total capacity is assumed to be allocated to municipal entities or other interested parties. Assuming retirements and the added 519 MW of capacity from the proposed ASCPC facility, Consumers Energy continues to project annual capacity shortfalls ranging from about 100 to 200 MW in the 2018-2021 timeframe. With the assumption of the termination of the Palisades PPA in 2022, Consumers Energy projects a capacity shortfall of about 855 MW even with 519 MW ownership share of the proposed ASCPC plant.

Consumers Energy's EGAA submittal does not constitute an IRP as required by 2008 PA 286 for the request of a CON. The EGAA compiled by Consumers Energy was submitted solely for the purposes of satisfying the Commission Order in Case Number U-15958 and lacks many of the

[60] In Case U-15996, the Natural Resources Defense Council (NRDC) filed document #139 which is Synapse Energy Economics, Inc. response to Consumers Energy's EGAA. A review of natural gas forecasts and cited references can be found on pgs 31-36.
[61] http://www.eia.doe.gov/oiaf/aeo/gas.html

key elements of a complete IRP. Staff notes that given the uncertainty of the future price of carbon and fuel, the planning methodology would have benefitted from analyzing sensitivities with assumed low and high future prices of carbon and fuel, instead of a single fixed future price for each.

The ultimate purpose of forecasting fuel prices is to project electricity production and consumption costs for various technologies in both the short and long run. While Consumers Energy's forecast of carbon, coal and natural gas represent supportable projections, their EGAA presents an optimal resource choice based on only one possible commodity cost scenario. Given the future uncertainty regarding environmental regulation and future commodity prices, Staff contends that use of single price projections to determine life-cycle costs of various resource technologies does not represent sufficient analysis for purposes of long-term investment.

In evaluating fuel cost risk, as well as other resource cost risks, Consumers Energy's EGAA does not present an adequate analysis of the costs and benefits of reliance on short-term power supply options to mitigate long-term planning risk. For purpose of this report, Staff does not contend that short-term purchases are an optimal choice in the face of regulatory risk and uncertain economic conditions. However, the risks associated with a long-term central station investment, based on unusually speculative cost levels and future carbon regulation, appear significant enough to warrant a thorough review of short-term resource options and how they might add value to ratepayers by postponing long-term resource investment decisions until greater certainty is known about such investments.

Consumers Energy - Alternatives Analysis

Proposed Generation

Consumers Energy is proposing to construct a new 930 MW (gross electric output), baseload ASCPC facility at the company's Karn/Weadock Generating Complex near Essexville, Michigan. In choosing this technology, Consumers Energy reportedly conducted an extensive analysis of various coal-fired technologies, including circulating fluidized bed boiler technology, subcritical boiler technology, Integrated Gasification Combined Cycle (IGCC), and advanced and ultra supercritical boiler technologies. Each technology was evaluated in terms of cost, reliability, availability, efficiency, technical feasibility, emissions and risks as discussed in this Staff report.

In addition to the various coal-fired technologies, other non-coal commercial technologies including natural gas combined cycle, simple cycle combustion turbine, solar energy, hydroelectric dams and pumped storage, combined heat and power, distributed generation, geothermal energy systems, and biogas energy were evaluated. A discussion of the renewable energy and energy efficiency alternatives can be found in the respective sections of this Staff report.

The ASCPC boiler is designed to burn 100% PRB sub-bituminous ("western") coal and a blend of up to 50% eastern bituminous ("eastern") coal. The western coal was chosen as the primary fuel for economical reasons as well as for its relatively lower amounts of sulfur and mercury.

However, Consumers Energy maintains fuel flexibility to mitigate price fluctuations and maintain supply and transportation reliability.[62]

Consumers Energy reports that the supercritical boiler technology has been used by the power industry for large scale power production for many years and believes that the advanced supercritical technology is at the top end of known and proven technology. Consumers Energy indicates that the advanced supercritical technology provides the best long-term value for customers while avoiding the technology risk of the emerging and largely unproven technology associated with higher steam pressures and temperatures of ultra supercritical designs.[63]

As previously discussed, Consumers Energy developed an estimate of the levelized cost of energy production or "busbar" cost analysis. The busbar costs include all plant fixed costs (including all costs associated with the capital investment), fuel, operation and maintenance, emissions, interconnection and transmission system upgrade costs. A busbar cost excluding CO_2 cost assumes a CO_2 tax or cap-and-trade program has not been implemented. A busbar cost including CO_2 cost assumes a CO_2 tax cost of $22 per ton beginning in 2012 and rising to $53 per ton by 2025.[64] The cost calculations are reportedly consistent with the methodology used in the company's Renewable Energy Plan filed with the Commission in February 2009.[65]

Table 2 below represents the busbar cost summary developed by Consumers Energy for the proposed 830 MW ASCPC facility and a smaller 500 MW ASCPC facility.

Table 2: Consumers Energy ASCPC Technology Cost Summary[66]

Coal Technology	40-year Busbar Cost Excluding CO_2 Cost (2008 Dollars)	40-year Busbar Cost Including CO_2 Cost (2008 Dollars)
ASCPC (830 MW)	$97/MWh	$133/MWh
ASCPC (500 MW)	$104/MWh	$140/MWh
Sequestration on ASCPC	$135/MWh	$139/MWh

Consumers Energy is evaluating pre- and post-combustion carbon capture and sequestration (CCS) technologies for potential use at the proposed ASCPC facility. The plant will reportedly be carbon capture ready and designed to accommodate the installation of CCS equipment as it becomes technically and economically feasible. To this end, Consumers Energy has determined that the geology on and offsite is likely to be favorable for long-term carbon sequestration and is working with Western Michigan University to characterize the specific site geology.[67]

Public comments expressed concern that federal regulation of CO_2 and other greenhouse gases is inevitable and will require the State of Michigan to reduce its current heavy dependence on coal-fired power plants. Given the substantial CO_2 emissions from both existing coal-fired generating

[62] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 20
[63] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 26
[64] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 27
[65] http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=15805
[66] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 28
[67] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, pp. 30-31

units and the proposed ASCPC plant, rate payers will face significant financial risk associated with handling CO_2 emissions. Furthermore, the estimated cost of the proposed ASCPC plant has increased by thirty-two percent (32%) since Consumers Energy originally filed its BEI in 2007 and the plant's cost may increase further before its scheduled completion date. Finally, public comments contend that the busbar analysis in the EGAA was biased in favor of coal due to various assumptions such as the use of unreasonably high natural gas prices, high coal plant capacity factors, low natural gas plant capacity factors, high wind energy costs, and the unrealistic assumption that all of the alternatives considered were assumed to be in service as of the beginning of 2009.

Alternative Coal Technologies

Consumers Energy reports to have conducted an extensive analysis of various coal-fired technologies, including CFB boiler technology, subcritical boiler technology, IGCC, and advanced and ultra supercritical boiler technologies to reach its advanced supercritical boiler technology choice. Each technology was evaluated in terms of cost, reliability, availability, efficiency, technical feasibility, emissions and risk. Table 3 represents the coal technology busbar cost summary developed by Consumers Energy.

Table 3: Consumers Energy Alternative Coal Technology Cost Summary[68]

Coal Technology	40-year Busbar Cost Excluding CO_2 Cost (2008 Dollars)	40-year Busbar Cost Including CO_2 Cost (2008 Dollars)
ASCPC	*$97/MWh*	*$133/MWh*
Subcritical PC	$101/MWh	$136/MWh
Subcritical CFB	$108/MWh	$145/MWh
Supercritical CFB	$108/MWh	$144/MWh
IGCC	$128/MWh	$162/MWh
Ultra SCPC	$98/MWh	$133/MWh

Consumers Energy specifies that the subcritical pulverized coal (PC) technology has been extensively used in the power industry for well over a half-century. The availability is reported to typically range from 84% to 89%, lower than the advanced supercritical plants. Furthermore, subcritical plant efficiencies are expected to be lower than supercritical plants. Subcritical boiler technology will consume more fuel per unit of energy produced, have greater CO_2 emissions per unit of energy generated, and will have somewhat higher busbar costs as compared to supercritical boiler technology (see Table 3).[69]

CFB boiler technology is reported by Consumers Energy to be a well known and proven technology, capable of combusting a wide range of fuels. CFB boiler technology can be designed and used in either subcritical or supercritical steam cycles. Consumers Energy identified significant technology risks inherent in the supercritical CFB technology as the only one existing supercritical CFB boiler (460 MW CFB plant in Poland) is in the final stages of

[68] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 28
[69] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 24

commissioning and early operation at this time. As shown in Table 3, Consumers Energy calculated a higher CFB busbar cost than the ASCPC plant.[70]

Consumers Energy determined that IGCC technology is still an emerging technology that needs further research, development, and demonstration before the power industry will utilize this technology. Only a handful of IGCC electric generating plants are reported to have been built worldwide specifically for power production, including two demonstration plants in the United States: the Polk plant in Florida and the Wabash plant in Indiana. Although the availabilities of IGCC plants have increased from around 45% to 50% when they were first introduced to around 80% to 85% today, they are still not as high as large supercritical boiler demonstrated availabilities in excess of 90%. Consumers Energy concluded that IGCC technology, at this time, presents a reliability, cost and technology risk to customers without significant benefits; such as, improved plant operations or emissions performance, that would justify the risk associated with this technology choice.[71]

Supercritical boiler technology is reported by Consumers Energy to have been used by the power industry for large scale power production for many years. Efficiency improvements made with increased thermodynamic cycle steam pressures and temperatures (main steam pressure and temperature of 3,800 pounds per square inch (psig) at 1,100° F) results in less fuel used per unit of energy generated and corresponding CO_2 emission reductions. Consumers Energy reports the availability of advanced supercritical boiler technology to be in the range of 86% to 92%, typically higher than subcritical, CFB, or IGCC designs. Ultra supercritical boiler technologies (main steam pressures and temperatures to 4,200 psig or higher at 1,130°F) are currently being studied by the Electric Power Research Institute (EPRI), the National Electric Technology Laboratory (NETL), and others. Consumers Energy reports an improvement in plant efficiency would result from this technology, however the boiler materials needed to achieve these steam pressures and temperatures are still under development and not ready for wide-scale commercialization.[72]

Energy Efficiency and Load Management

Energy Efficiency

Consumers Energy's EGAA includes meeting the energy efficiency targets as prescribed in 2008 PA 295 up to 2015. These targets consist of energy reductions of 0.3% of retail sales in 2009, 0.5% and 0.75% incremental of retail sales in 2010 and 2011, respectively, and 1.0% incremental of retail sales in 2012-2015. For the years 2016 and beyond, an energy reduction of 0.5% incremental of retail sales is assumed. Consumers Energy translated this to a cumulative 7.6% of retail peak load reductions by 2030[73] and found this reduction to be consistent with the realistic

[70] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 25
[71] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 25-26
[72] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, pp. 26-27
[73] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 8

achievable potential summer peak demand reduction reported in a January 2009 Electric Power Research Institute (EPRI) report.[74]

At the request of Staff, Consumers Energy did model a more aggressive Energy Optimization (EO) high case of 1% incremental of retail sales assumption. At this high case of 1% incremental of retail sales, Consumers Energy indicates that there is a slight capacity surplus until the Palisades Power Purchase Agreement expires.[75]

Public comments contend that Consumers Energy has not provided a study of the potential for energy efficiency in its service territory, or the state as a whole, to support its claim that it can achieve only 0.5% annual peak load reductions after 2015. The EGAA did not take into account other studies that showed savings at greater levels than those identified in the cited EPRI report. In addition, the levelized cost analyses in the EGAA did not adequately consider portfolios of alternatives to the proposed ASCPC plant that included additional cost-effective energy efficiency, among other options.

In the past, Staff viewed energy efficiency potential study results for the State of Wisconsin as providing a reasonable proxy for the state of Michigan. With little recent experience or data to draw from, and no Michigan-based energy efficiency potential study results, the states' Midwest proximity as well as their similar climate and electric use characteristics lend support for this logic. In fact, a 2005 Energy Center of Wisconsin (ECW) energy efficiency study of Wisconsin was used by Staff in the preparation of the 21st CEP, as a first step to modeling the energy efficiency potential in Michigan. With this in mind, Staff reviewed an April 2009 draft of an energy efficiency potential study prepared by the ECW for the Wisconsin Public Service Commission[76] for an indication of the energy efficiency potential Michigan might experience.[77]

There are distinctions between Wisconsin and Michigan in terms of their recent experience with Energy Efficiency programming. Energy efficiency programs in Wisconsin began with a pilot in 2000, followed by the official start-up of state-wide programs in 2001. The recent 2009 Wisconsin energy potential study was undertaken to determine what savings could be achieved with an aggressive program, beyond a business-as-usual approach. Examples given for aggressive programming included capturing neglected opportunities through large scale retrofits, deployment of advanced rate designs to reduce peak electric demand and expanding behavior-based approaches to motivating energy efficiency savings. According to the report, the Base Case scenario focused on the economic benefits from saving energy and the environmental benefits of avoided carbon emissions while the assumptions under the aggressive scenario focused additionally on higher avoided costs, a less-restrictive cost-effectiveness screen and a

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[74] Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010-2030), Electric Power Research Institute (EPRI), January 2009

[75] http://efile.mpsc.state.mi.us/efile/docs/15996/0152.pdf

[76] Energy Center of Wisconsin's, *Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for the Years 2012 and 2018*, April 6, 2009 Public Comment Draft. Can be found on the Wisconsin Public Service Commission document search at http://psc.wi.gov/apps/erf_search/default.aspx, and entering document #112571 in the lower left corner.

[77] For the 21st CEP EE potential study, the Wisconsin model was updated with a limited number of macro-scale modifications in order to account for differences in the scale of Michigan markets and variation in weather patterns. No such updates were made to compare the 2008 Wisconsin potential study.

lower discount rate. The energy and peak demand savings estimates for the Base Case and Aggressive Case scenario are shown in the table below and ranged from a 1.6% annual savings potential for the Base Case, to 1.9% annual savings for the Aggressive Case.

Table 4: 2009 Wisconsin Energy Efficiency Potential Study Results

BASE CASE	Energy Savings (GWh)	Peak Demand Savings (MW)
Annually by 2012	1,200 GWh or 1.6% of sales	250 MW or 1.6% of peak demand
Cumulative by 2018	11,000 GWh or 13% of sales	2300 MW or 13% of peak demand

AGGRESSIVE CASE	Energy Savings (GWh)	Peak Demand Savings (MW)
Annually by 2012	1,400 GWh or 1.9% of sales	300 MW or 1.6% of peak demand
Cumulative by 2018	13,000 GWh or 16% of sales	2700 MW or 16% of peak demand

Despite the infancy of energy efficiency programming efforts in Michigan, it is reasonable to consider Wisconsin's Base Case energy efficiency potential study results as a Michigan proxy in this case, due to the considerable opportunities in capturing 'low hanging fruit' within easy reach. Other nation-wide potential studies also support higher electric energy efficiency potential savings numbers. A recent American Council for an Energy Efficient Economy (ACEEE) review of 20 state, regional and national electricity efficiency potential studies identified average achievable electricity saving potential of 1.5%, with Illinois and Ohio each averaging 2.0%.[78]

In concert with these study results, and with the Midwest Governors Association's goal to meet 2% reduction in annual retail sales of electricity through energy efficiency improvements by 2015,[79] Staff estimated a 2% energy efficiency potential scenario for the period beyond 2015, using data submitted by Consumers Energy.[80] The comparison of these energy efficiency potential scenarios (ranging from 0.5% potential scenario in the Consumers Energy's EGAA filing, to 2% potential scenario estimated by Staff) and the associated annual MW reductions are presented in Table 5.

[78] Eldridge, M, R. N. Elliot, and Max Neubauer. 2008. *State-Level Energy Efficiency Analysis: Goals, Methods, and Lessons Learned.* American Council for an Energy-Efficient Economy.
[79] *Energy Security and Climate Stewardship Platform for the Midwest, 2007*, Midwestern Energy Securtiy & Climate Stewardship Summit
[80] http://efile.mpsc.state.mi.us/efile/docs/15996/0152.pdf

Table 5: Comparison of Energy Efficiency Potential Cases

	2% incremental growth after 2015			1% incremental growth after 2015			0.5% incremental growth after 2015	
	savings targets	Reduction MW		savings targets	Reduction MW		savings targets	Reduction MW
2009	0.3	18		0.3	18		0.3	18
2010	0.5	27		0.5	27		0.5	27
2011	0.75	42		0.75	42		0.75	42
2012	1	57		1	57		1	57
2013	1	58		1	58		1	58
2014	1	57		1	57		1	57
2015	1	37		1	37		1	37
2016	2	109		1	54		0.5	27
2017	2	109		1	54		0.5	27
2018	2	108		1	54		0.5	27
2019	2	107		1	53		0.5	27
2020	2	107		1	53		0.5	27
2021	2	106		1	52		0.5	27
2022	2	105		1	52		0.5	27
2023	2	104		1	52		0.5	27
2024	2	104		1	51		0.5	27
2025	2	103		1	51		0.5	27
2026	2	102		1	51		0.5	27
2027	2	101		1	50		0.5	27
2028	2	101		1	50		0.5	27
2029	2	100		1	50		0.5	27
2030	2	100		1	50		0.5	27

Load Management

Consumers Energy assumes implementation of a comprehensive Advanced Metering Infrastructure (AMI) program that includes central air conditioning load management and demand response programs for residential and small commercial customers that will reduce peak demand as well as ongoing energy requirements.[81] Consumers Energy also has the ability to further reduce the peak load capacity through the Company's interruptible tariff (Rate GI) and the Peak Load Management (PLM). Consumers Energy also has the ability to shift demand from customers in the event of excessive unanticipated demand, transmission curtailments, external power supply shortages, or generator forced outages that threaten system integrity. Consumers

[81] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 8

Energy assumes a contribution of 250 MW of peak capacity reduction from the combination of interruptible and PLM reductions in all future years.[82]

Consumers Energy reports that their load management, demand response and interruptible load programs represent 9.3% of retail peak load reductions by 2030, consistent with the realistic achievable potential summer peak demand reduction reported in the January 2009 EPRI report.[83]

Consumers Energy cites lack of Michigan experience with customer response to the demand-side programs (energy efficiency, load management and demand response) as the basis for currently not being able to fully assess whether the assumed levels of demand management are achievable or if there is any potential to cost effectively achieve reductions in peak load above the proposed levels.[84]

The current Consumers Energy electric rate case in Case Number U-15645 requests approval of an AMI pilot, in addition to approvals for a demand response pilot and load control pilot. The company intends to fully deploy AMI technology throughout its service territory in the future. The significant investment of a full-scale deployment of AMI technology depends upon the added customer benefits and savings from demand response and load control programs in order to justify the costs. Staff testimony in that case recommended support of the capital investments in those AMI pilot programs, including demand response and load control pilots because of the potential for added benefits including peak and capacity reductions. While Consumers Energy's EGAA filing cites a lack of Michigan experience with customer response to the demand-side programs as rationale for their stagnant annual peak capacity reduction forecast of 250 MWs, Staff believes significant opportunities exist for additional peak and capacity reduction beyond the conservative estimate provided by Consumers Energy in this filing.

In addition, there are other non-AMI related opportunities for increasing peak load reduction via voluntary programs. Since 2005, the Commission has authorized two utilities to offer a program which compensates customers for voluntary reductions of their load.[85] This online electric power exchange program was first developed and offered to WPSC' Wisconsin customers in response to price spikes experienced in the late 1990's. In 2001, the program had thirty-three customers, representing 185 MW of load. Commission-sanctioned load reduction programs such as these require no additional infrastructure investment and allow peak reduction with little capital investment and could be considered an additional option for reducing peak load given the right pricing signals.

[82] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 10
[83] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 8
[84] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 8
[85] See Wisconsin Public Service Corporation order in Case Number U-14443 issued February 24, 2005 and UPPCO order in Case Number U-14866, issued April 21, 2006.

Renewable Energy

To satisfy the requirements of 2008 PA 295, Consumers Energy must increase the amount of renewable energy it supplies to customers to 10 percent by 2015. Currently, about five percent of Consumers Energy's power supply comes from renewable sources including hydroelectric, landfill gas, biomass and wind.[86]

Each renewable technology was evaluated by Consumers Energy in terms of cost, reliability, availability, efficiency, technical feasibility, emissions and risks as discussed in this report. Table 6 represents the renewable energy busbar cost summary developed by Consumers Energy.

Table 6: Consumers Energy Renewable Energy Cost Summary[87]

Renewable Technology	40-year Busbar Cost (2008 Dollars)
Onshore Wind	$198/MWh, Excluding CT Back-up Capacity $261/MWh, Including CT Back-up Capacity
Offshore Wind	$212-$385/MWh, Excluding CT Back-up Capacity $262-$429/MWh, Including CT Back-up Capacity
Small Wind	$648/MWh
Small Biomass – Wood	$151/MWh
Solar PV	$635/MWh
Hydroelectric	Not Feasible
Geothermal	$565/MWh
Landfill Gas	$124/MWh
Anaerobic Digester	$179/MWh
Distributed Generation	$1,519/MWh
Marine Power	$1,077/MWh, Excluding Back-up Capacity

Wind

Consumers Energy has not incorporated additional onshore wind capacity above its proposed renewable energy plan of 900 MW[88] due to the high cost of this capacity, its intermittent and unpredictable nature, and the potential need for back-up capacity. Consumers Energy asserts that this is consistent with the BEI's balanced approach to new resource additions designed to mitigate installation, fuel and operational risks, and to maintain reliability.[89]

Regarding offshore wind, Consumers Energy contends that building in the Great Lakes will present new technological and political challenges beyond those encountered when developing onshore wind farms, including: (1) environmental factors (e.g., icing, offshore construction and operation), (2) public objections, (3) higher costs, (4) lack of major transmission infrastructure along much of the Great Lakes coastline, and (5) technological risks.[90]

[86] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 9
[87] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, pp. 36-37
[88] MPSC Case Numbers U-15805/U-15889
[89] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 9
[90] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 35

Public comments indicate that high levelized costs for onshore and offshore wind without CT backup, used by Consumers Energy in their EGAA, bias the levelized cost analysis in favor of coal. For example, Wolverine Power Cooperative presents a levelized cost of $88/MWh for wind. Also, in the *Levelized Cost of Energy Analyses – Version 3.0*, Lazard, June 2009, at page 2, national estimates for a levelized cost of wind energy range from $57/MWh to $113/MWh. Public comments point to a number of assumptions Consumers Energy made, which in effect, bias their analysis against wind. Furthermore, public comments state that offshore wind is commercially viable and technologically proven with multiple European countries relying on offshore wind energy for part of their electric generation for over seventeen (17) years. The cost of offshore wind energy is reported to be competitive with conventional fuel sources with current projects on the east coast priced substantially below the cost figures provided by Consumers Energy.

Staff disagrees with the assertions made by Consumers Energy in its justification to not include additional onshore and offshore wind capacity beyond what they proposed in their renewable energy plan of 2009. In particular, Consumers Energy lists the high cost of onshore wind as a prohibitive factor in not incorporating additional capacity; instead, Staff finds wind to be a low cost resource and that, while significant, the initial capital costs of turbines has been decreasing.[91] Based on this trend, Staff surmises these costs will continue to decrease.

Additionally, Consumers Energy listed need for back-up capacity as a justification for not including additional onshore wind. Staff maintains that the best generation systems will use a variety of resources[92] and also that wind contributes measureable benefits to baseload.

Lastly, for onshore wind, Consumers Energy lists the intermittent and unpredictable nature of wind as a generation resource. Again, Staff, although agreeing in part, maintains that there are mitigating factors which will reduce the impacts of the discontinuous nature of wind. These factors include geographic diversity of wind generation and the improving predictability (forecasting) of wind that is available to be incorporated into the operating practices of generators.[93]

Consumers Energy fails to include offshore wind capacity in its portfolio, citing the high cost and risky nature of installing wind generation in the Great Lakes. Staff asserts that as additional information is gathered regarding offshore wind development (i.e., collection of data) advancements in research and technologies will likely enable such development in the Great Lakes.

In addition, policy decisions will be necessary in order to effectively promote offshore wind development in the Great Lakes. At this time, the Michigan Great Lakes Wind Council[94] created by Executive Order No. 2009-1, is actively examining these issues. The Council serves as an

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[91] Alfred Cavallo, "Controllable and affordable utility-scale electricity from intermittent wind resources and compressed air energy storage (CAES)," Energy 32 (2007): p. 124-125

[92] Michigan Public Service Commission, Michigan's 21st Century Electric Energy Plan (Lansing, 2007), p. 25

[93] U.S. Department of Energy, 2008 Wind Technologies Market Report (Lawrence Berkeley National Laboratory, 2009), pp. 48-49

[94] Michigan Great Lakes Wind Council web site; http://www.michiganglowcouncil.org/index.html

advisory body within the Michigan Department of Energy, Labor & Economic Growth to examine issues and make recommendations related to offshore wind development in Michigan. The Council consists of key state agency representatives and stakeholders appointed by Governor Jennifer M. Granholm.

The Council is charged with the following tasks: identify criteria that can be used to review applications for offshore wind development, and identify criteria for identifying and mapping areas that should be categorically excluded from offshore wind development, as well as those areas that are most favorable to such development, and provide these criteria in a report to the governor by September 1, 2009.

Solar

Solar electric power can be categorized into two major classifications: solar photovoltaic (PV) and concentrating solar power (CSP). Consumers Energy indicates that while some of these technologies are commercially available, geography limits the economic application of these technologies. Michigan is reported to be an uneconomic and infeasible location for large-scale solar PV systems due to relatively high installation costs combined with a poor solar profile in Michigan. In addition, CSP plants are reported to only be viable in locations that receive very high levels of solar radiation such as the southwest United States and southern Spain.[95]

Consumers Energy also reports that while they have an experimental advanced renewable program to encourage small scale PV technology, these installations are heavily subsidized at rates several orders of magnitude higher than the market value of the energy the systems are expected to produce. The program is capped at 2 MW. This capacity was not included in Consumers Energy's BEI as the resource will reportedly have little effect on the company's overall need for firm capacity and energy.[96]

Both Consumers Energy and Detroit Edison have Commission-approved solar PV pilot programs with differing program designs. The effectiveness of these programs will be evaluated on an on-going basis. Early indications show a high level of customer interest. These pilot programs could not replace a baseload plant; however, since solar PV is likely to be generated when additional power is needed; it is an essential and logical addition to a diverse supply portfolio.

Consumers Energy discusses both solar PV and concentrating solar power in its EGAA report and explains that solar power is not practical on a large scale in Michigan due to cost and Michigan's solar resource. Research and development to lower the cost of solar PV is ongoing and has the potential to significantly impact solar PV costs. The U.S. Department of Energy Solar Energy Technologies Program PV subprogram's goal is for PV technology to achieve grid parity by 2015. Achieving this goal will lead to rapid and significant growth of solar electricity in the United States.[97]

[95] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 32
[96] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 32
[97] http://www1.eere.energy.gov/solar/photovoltaics_program.html

Staff recommends that Consumers Energy monitor Detroit Edison's solar PV pilot program and continue to assess how more solar energy could be added to its supply portfolio as advancements in solar technology become commercially available. Additionally, Staff recommends that solar energy demand side management technologies (solar hot water, solar daylighting, solar space conditioning techniques) be considered as options for Energy Optimization planning.

Finally, Staff recommends that Consumers Energy monitor the ongoing investigation titled "Investigation to Assess Wisconsin's Potential for the Development of Utility Investments in Solar Energy Resources to Cost-Effectively Contribute to Wisconsin's Electric Supply" at the Wisconsin Public Service Commission in docket 5-EI-147.[98]

Biogas Energy

Consumers Energy uses biogas energy as a generic term for electricity produced by capturing the energy from the mixture of carbon dioxide and methane that is produced as part of an anaerobic digestion process, such as from landfills, farm waste, wastewater and sewage treatment facilities. Consumers Energy reports to currently purchase electricity from several landfill gas-to-energy (LFG) generators. Future supply of LFG installations is expected to be limited as the EPA had identified only seven undeveloped candidate LFG sites in the state of Michigan as of December 2008 and incremental capacity at existing sites is limited.[99]

Consumers Energy reports developed anaerobic digester gas-to-energy facilities in Michigan to be heavily reliant on grant funding and small in size (less than 1 MW). Wastewater and sewage treatment facilities are reported to be small in size as well with relatively few acceptable sites.[100]

Consumers Energy indicates that the company will continue to purchase economic energy from new small biogas facilities, but these facilities will not displace the need for new baseload generation.[101]

Biogas energy production, in its many forms, is efficient enough to be used as baseload generation. It is also a relatively low cost option compared to other alternative energy sources. The potential for biogas energy to serve baseload energy needs deserves more thorough analysis by Consumers Energy.

Based on the Michigan Climate Action Council Final Report; the 2025 LFG potential for Michigan is 20.6 MW, in addition to current LFG generation.[102] This is a conservative estimate that does not take into account advances in generation technologies or learning curve price reductions. A 2008 Department of Environmental Quality landfill map identifies 69 type II and type III landfills in Michigan's Lower Peninsula.[103] Consumers Energy currently receives

[98] A draft report is expected to be released in September 2009 and a final report is expected in December 2009.
[99] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 34
[100] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 34
[101] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 34
[102] Michigan Climate Action Council Report, http://www.miclimatechange.us/ewebeditpro/items/O46F21226.pdf, p. J-116
[103] MDEQ Landfill Map, http://www.michigan.gov/documents/deq/deq-whmd-swp-Landfill-map_247566_7.pdf

approximately 17 MW of capacity from only six of these landfills so the potential for expanding this resource is significant.[104]

Michigan's large agricultural base can provide opportunities for manure based anaerobic bio-digestion from livestock waste (i.e., wastes from hogs, cattle, turkeys, chickens, etc.). An EPA Agstar report states that electricity production from cattle manure fed anaerobic bio-digestion has the potential to produce 9.8 MW at 10% market penetration.[105] Based on the most recently available data from the U.S. Department of Agriculture, the potential of manure based generation in Michigan is roughly 100 MW with full penetration.

With 392 wastewater treatment facilities serving some 7.6 million Michigan residents, there is also a significant potential for energy production from the sludge produced during the process of cleaning and recycling wastewater.[106] This sludge can be used as a feedstock for a bio-digester, to produce useful methane for electricity generation. Michigan food processor waste is another potential digester feedstock option. The dynamic aspect of bio-digesters is that a high energy content feedstock, when blended with less energy latent material can produce much greater results than either material on its own.

The biogas potential in Michigan is significant and deserves further analysis by Consumers Energy for future energy needs. It is apparent that the mentioned technologies could fulfill a large portion of the stated future energy needs within the Consumers Energy service territory. It is recommended that these technologies and potential Michigan feedstocks be reviewed and analyzed in greater detail, in order to determine their potential contribution towards meeting baseload energy demands.

Hydroelectric Dams and Pumped Storage

Consumers Energy reports that while their existing hydro resources are valued components of their generating portfolio, future investment in new hydroelectric dams and new pumped storage facilities is unlikely in the state of Michigan due to a lack of necessary natural resources and cost. According to Consumers Energy, rivers with sufficient volumetric flows to support significant hydro capacity have already been developed. Furthermore, rivers classified as "Natural Rivers" by the Michigan Department of Natural Resources prohibits new dam construction.[107]

While it is true that the legal and societal obstacles facing new dam construction are prohibitive, there are ample opportunities to take advantage of existing impoundment sites in Michigan. Michigan has over 2000 dams, with approximately 100 currently producing power. Not all of these dams are capable of electric power production, but approximately 109 of these dams are retired hydroelectric or mechanical water power dams, with significant production capacity. Power produced at these dams could be a reliable source of baseload generation in Michigan.

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[104] http://www.grangernet.com/electric/Electric%20&%20Energy%20Services.HTM
[105] http://www.epa.gov/agstar/pdf/biogas%20recovery%20systems_screenres.pdf
[106] http://www.epa.gov/cwns/2004rtc/cwns2004rtc.pdf

[107] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 32

Development of these resources will take serious commitment, both financial and otherwise. Environmental and recreation impacts would have to be balanced with the benefits of an expanded renewable energy portfolio and a decrease in greenhouse gas emissions. Opportunities exist for stakeholder cooperation that could lead to both increased power production and increased environmental protection and river restoration. Adjustments to State and Federal regulation may be needed to ease the development of these hydroelectric resources.

Geothermal

Consumers Energy reports that this resource for energy is not available or feasible in Michigan and the cost of developing geothermal resources in Michigan for electric power production purposes is prohibitive.[108] Staff agrees in general with this assertion.

Distributed Generation

Consumers Energy identifies landfill gas generators, small wind or solar installations, anaerobic digester gas-to-energy facilities, and diesel or natural gas fired internal combustion engines as distributed technologies. Consumers Energy contends that while small scale distributed energy systems are growing in popularity, these systems produce energy at a cost that is at least four to five times as much as baseload options and are not reliable, available and cost effective alternatives to new baseload generation. Furthermore, Consumers Energy reports that it appears that a majority of the viable larger scale distributed renewable generation resources in the state are already developed and while additional resources may become available, it is not anticipated that they will affect the company's need for new baseload generation.[109]

Combined Heat and Power

Consumers Energy projects limited opportunities for new large scale cogeneration (also referred to as "Combined Heat and Power") in the near future. The basis cited for this projection of future CHP resources was based on the current economic climate in Michigan as it relates to new large scale industrial processes that require process steam of significant quantities.[110]

Consumers Energy currently has 1,442.4 MW of CHP capacity (owned and PPA) available in its resource mix. This includes, Ada Cogeneration Limited Partnership (Ada Cogeneration Plant) 29.4 MW; Michigan Power Limited Partnership (Michigan Power Plant) 123 MW; Midland Cogeneration Venture Limited Partnership (MC-Facility) 1,240 MW, and: T.E.S. Filer City Station Limited Partnership (Tondu Energy Systems Filer City Station) 50 MW.

While Staff recognizes the current economic situation in Michigan is unlikely to encourage investment by industrial customers in CHP, the potential for this resource to contribute to Consumers Energy generation mix is noteworthy. As part of the 21st CEP development process, a CHP potentials study was performed by the Alternative Technologies CHP Team. The

[108] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 34
[109] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 33
[110] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 33

estimated amount of large scale CHP reported in this effort revealed a total of 720 MW of potential output. Based on a variety of limiting factors, most notably high fuel (natural gas) cost and unfavorable utility standby rates, the Alternative Technologies CHP Team utilized a 25 percent penetration factor in its projected amount of achievable CHP resources in Michigan, yielding 180 MW of potential capacity.[111]

It should be noted that Consumers Energy provided no assessment of the potential for CHP either in its service territory or as a statewide assessment. Therefore, it is premature to conclude that CHP would not represent a significant part of their portfolio of alternatives. While CHP (both large and small scale) may not completely replace the need for new baseload generation in Consumers Energy portfolio, it can contribute towards reducing the overall amount of future capacity needed, in concert with renewable generation, energy efficiency and demand side management (DSM) programs.

Combustion Turbine and Combined Cycle

Consumers Energy evaluated natural gas combined cycle and simple cycle combustion turbines in terms of cost, reliability, availability, efficiency, technical feasibility, emissions and risk as alternatives to the proposed ASCPC facility.

In terms of these criteria, combined cycle and simple cycle combustion turbines have lower capital costs, relatively short construction lead times, and higher fuel costs than a coal plant. Consumers Energy indicates that combined cycle technology is mature and well proven. Combustion turbines are not designed for baseload generation. As a result of recent advances in combustion turbines, combined cycle plants have achieved higher cycle efficiencies and lower heat rates than ASCPC technology, thereby lowering the CO_2 emissions per MWh produced to less than half of a coal plant. Combined cycle technology has demonstrated high availabilities generally in the low 90 percent range and benefits from relatively short construction schedules (24 to 30 months). Both combined cycle and simple cycle turbines are subject to the significant risks associated with the natural gas price volatility.[112]

Table 7 below represents the busbar cost summary developed by Consumers Energy for the natural gas-fired technology alternatives.

Table 7: Consumers Energy Natural Gas Technology Cost Summary[113]

Technology	40-year Busbar Cost Excluding CO_2 Cost (2008 Dollars)	40-year Busbar Cost Including CO_2 Cost (2008 Dollars)
Natural Gas Combined Cycle	$243/MWh	$261/MWh
Natural Gas Combustion Turbine	$839/MWh	$866/MWh

[111] Page 149 of the 21st CEP – Appendix II of the Final Report.
[112] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 31-32
[113] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 36

Consumers Energy used capacity factors of 15% and 3% for the development of the combined cycle and combustion turbine busbar costs, respectively, based on BEI modeling and utilization of existing combined cycle and combustion turbine facilities.[114]

Consumers Energy contends that as part of their balanced resource approach, Zeeland Natural Gas Station was purchased in 2008 and that an additional natural gas combined cycle facility beyond Zeeland would not be prudent at this time.[115]

Public comments indicated that the levelized cost analysis is biased in favor of coal based on the use of unreasonably high natural gas prices, as well as, high coal plant and low natural gas plant capacity factors. Furthermore, public comments point to underutilized existing natural gas-fueled generation.

Although the capacity factors used in the busbar calculations are relatively low based upon the limited operating experience with the Zeeland plant, Consumers Energy does claim the full nameplate capacity of 868 MW in their resource adequacy calculations. If the resource adequacy calculations show a need for additional capacity based upon assumed retirements or for any other reason, it cannot be assumed that the need will be met by running the underutilized existing gas turbine plants in or near their territory if those natural gas plants are already included in their planned capacity mix.

Natural gas units have had lower capacity factors than traditional baseload units in the past due to the security-constrained economic dispatch that is employed by the regional market. Economic dispatch governs the electricity generation resources dispatched to supply the load on the system. Simply stated, economic dispatch is the process of distributing the required load demand among the available generation units such that the cost of operation is minimized. Accordingly, generation units with higher fuel costs, such as natural gas-fired turbines, are dispatched less than lower fuel cost generation units, such as coal-fired boilers. Natural gas-fired turbines are typically dispatched during the peak months of the year, or when there is a constraint somewhere on the system.

Consumers Energy's use of a 15% capacity factor for the development of a busbar cost for a combined cycle facility is in agreement with the most recent 12-month rolling average capacity factor for Zeeland calculated by Commission Staff using data from the Power Supply Revenue/Expense Statements submitted in accordance with 1982 PA 304 Section 6j(11). However, in a more robust IRP process, alternatives are screened over a range of capacity factors.

Purchased Power

Consumers Energy expects to purchase 15% of its net energy requirements from the Midwest ISO market in 2009. Without the addition of the proposed ASCPC facility, market purchases are projected by Consumers Energy to double to more than 32%. Consumers Energy indicates that energy market prices are driven to a large extent by natural gas prices, thus an increase in market

[114] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 36
[115] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 31

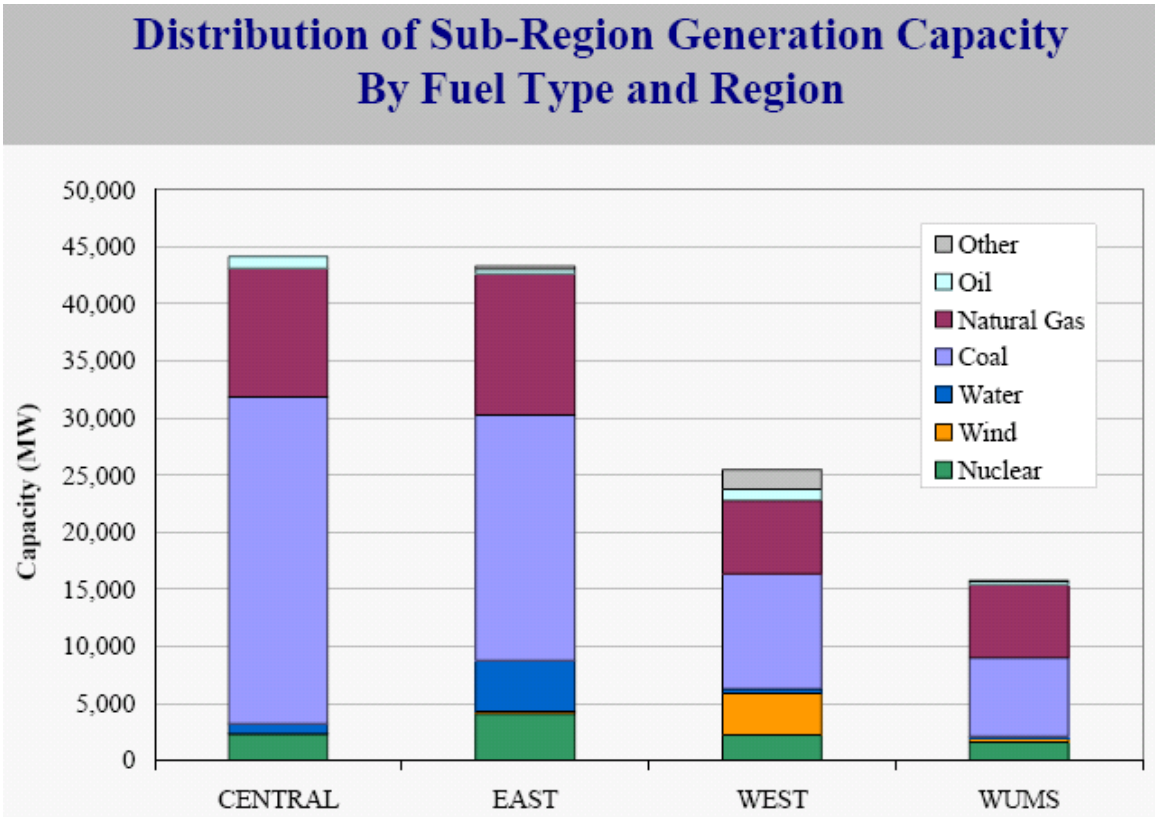
purchases would result in substantial cost increases for customers and significant risk due to volatile market prices. Consumers Energy maintains that the proposed ASCPC plan will mitigate this risk by reducing market purchase requirements to about 22% of net energy requirements and replace the gas-based energy market prices with lower priced and less volatile coal-based energy.[116]

A summary of Consumers Energy's existing Purchase Power Agreements is provided in Commission Case Number U-15415-R Exhibit A-27 (DFR-3). Exhibit A-27 summarizes the capacity and energy charges, recoverable as PSCR costs in accordance with prior Commission orders, paid to each Purchased Power and Cogeneration entity in 2008. In addition, Consumers Energy has prepared and provided a summary of the purchased power contract rates and Commission approval orders in Commission Case Number U-15415-R Exhibit A-28 (DFR-4), which summarizes the capability, energy and capacity rates for each of the Company's purchased power contracts, along with the Commission order which approved the capacity rates for each facility.[117]

Public comments contend that any needs that are not fully met by a combination of demand side options and renewables should be met with excess existing resources that are owned or through power purchase agreements or market purchases. Staff agrees that reliance on purchases may prove to be a viable option for the short term, but not necessarily for the long term. The Midwest ISO IMM's recently released 2008 SOM states that "Although the system's resources are adequate for the summer of 2009, new resources will be needed over the long-run to meet the needs of the system."[118] Furthermore, Midwest ISO indicated in a May 19, 2009 letter to Consumers Energy that the overall market footprint is projected to require an average of 1,400 MW of additional generating capacity annually between now and 2024, with the East region requiring 450 MW of that total addition annually.[119]

Purchases in the Midwest ISO region often include coal-fired generation. The Midwest ISO IMM's SOM report details the capacity by fuel type in the Midwest ISO region:[120]

[116] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 14
[117] http://efile.mpsc.state.mi.us/efile/docs/15415-R/0001.pdf pg. 13.
[118] 2008 MISO IMM's State of the Market Report, MISO IMM SOM Report 2008, http://www.midwestmarket.org/publish/Document/6ef35b_121e89707ed_-7dcf0a48324a/2008%20Midwest%20ISO%20State%20of%20the%20Market.pdf?action=download&_property=Attachment, , 6/26/09, p. 55.
[119] Consumers Energy EGAA, http://efile.mpsc.state.mi.us/efile/docs/15996/0001.pdf, p. 16
[120] MISO IMM SOM Report 2008, http://www.midwestmarket.org/publish/Document/6ef35b_121e89707ed_-7dcf0a48324a/2008%20Midwest%20ISO%20State%20of%20the%20Market.pdf?action=download&_property=Attachment, 6/26/09, p. 59.



Although approximately 52% of the capacity in the Midwest ISO is coal-fired, the Midwest ISO IMM reports that 77% of the electricity generated is from coal-fired units because they are typically baseloaded. Approximately 7% of the capacity is nuclear, and those units produce 15% of the energy in the Midwest ISO. Approximately 28% of the capacity in the Midwest ISO is fueled by natural gas, however, those units produce less than 5% of the energy in the region. Reliance on power purchase agreements or market purchases in the Midwest ISO region brings on the associated risks of using a significant amount of coal-fired generation.

Public comments also stated that the relatively under-utilized natural gas fired generation in the region should be purchased prior to considering construction of any new facility. According to the Midwest ISO IMM's SOM report, natural gas, oil-fired and dual-fired resources set the unconstrained energy price in the Midwest ISO during 23% of the hours in 2008, however, nearly half of all real-time energy costs were incurred when these resources were on the margin.

Should there be excess natural gas capacity to purchase that which has not been claimed as capacity for resource adequacy needs elsewhere, contracts for that natural gas capacity may not be any more attractive for customers than reliance on the Midwest ISO market. Reliance on the energy market for purchases exposes customers to a significant amount of risk, from both higher energy prices from natural gas, and potential future costs associated with carbon legislation, and should not be considered an effective long-term alternative at this time.

Conclusions

Staff acknowledges that a generation asset, such as has been proposed by Consumers Energy, represents a significant financial investment with a variety of associated risks. Significant changes have taken place on many fronts, including a slowing national and state economy, new state policy initiatives on energy efficiency and renewable energy, and pending federal legislation on the regulation of carbon emissions. With these issues in mind, Staff contends that a full spectrum of risks should have been considered within the framework of Consumer Energy's EGAA as it relates to long-term investment decisions of this nature.

Consumers Energy's EGAA filing does not constitute an IRP as required by 2008 PA 286 for the request of a CON. Scenario analyses, using various sensitivities, including a reasonable range of values for the key input assumptions such as capital costs, fuel prices, CO_2 costs, load and energy requirements were not conducted as part of this analysis.

In accordance with the MOU, Staff reviewed Consumers Energy's EGAA for the proposed coal-fired electricity generating plants to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs. Staff provides the following findings:

- Consumers Energy's long-term capacity need is unjustified without the explicit retirement of existing coal capacity in its baseload generation fleet. Given Consumers Energy's load growth assumption of approximately 0.3% per year, coupled with anticipated effects of energy efficiency and demand reduction initiatives, the long-term projected capacity need before the assumed expiration of the Palisades Purchase Power Agreement (PPA) in 2022 is based primarily on assumed retirement of approximately 950 MW of existing coal capacity.
- Staff notes that the proposed ASCPC plant is one alternative out of a range of alternatives that may be used to fill the projected capacity need. Other alternatives that may fill all or portions of the projected capacity need include; energy efficiency and load management; renewable resources; or a combination of a number of alternatives that could include lesser amounts of purchased power.

Appendices

A. MDEQ - Commission Memorandum of Understanding

B. Commission Order in Docket Number U-15958

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
MICHIGAN PUBLIC SERVICE COMMISSION
AND THE
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

This Memorandum of Understanding (MOU) between the Michigan Department of Environmental Quality (MDEQ), and the Michigan Public Service Commission (MPSC), is entered into for the sole purpose of clarifying each agency's role and responsibility regarding the alternatives analysis review and technical assistance for the proposed coal-fired electricity generating plant applications currently pending before the MDEQ.

The MDEQ implements Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Part 55 is intended to protect human health and the environment from adverse impacts from the discharge of air contaminants. Consistent with state and federal law, specifically Rule 336.2817(2) of the Michigan Air Pollution Control Rules and Section 165(a)(2) of the federal Clean Air Act, the MDEQ is requesting that coal-fired power plant permit applicants conduct an analysis of alternatives to the proposed facility. The analysis will consider alternatives that would reduce emissions and will provide information regarding cost, reliability, availability, and technical feasibility of the alternatives examined.

The MPSC and the MDEQ acknowledge the benefit of clarifying each agency's role and responsibilities with respect to the alternatives analysis.

The MPSC performs the following:

- Assures the safe and reliable energy services at reasonable prices.
- Promotes the state's economic growth and enhances the quality of life of its communities through adoption of new technologies like efficient renewable energy resources.
- Provides regulatory oversight in a prudent and efficient manner while implementing legislative and constitutional requirements.

The MDEQ performs the following:

- Administers programs and enforces laws designed to protect human health and the environment from adverse impacts from the discharge of air contaminants.
- Administers an air use permitting program for the installation, construction, reconstruction, relocation, modification and operation of sources of air pollutants pursuant to R 336.1201 through R 336.1299, including coal-fired power plants.

<u>The MPSC and the MDEQ agree to the following</u>:

1. The MPSC will provide technical assistance to the MDEQ on all matters of electric generation need in the state, as it relates to determinations on the alternatives analysis.

2. The MPSC will review the alternatives analysis for the proposed coal-fired electricity generating plants to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs.

3. The MDEQ will review the alternatives analysis for the coal-fired electricity generating plants to assess impacts of the plants and alternatives on human health and the environment.

The MPSC and the MDEQ agree to cooperate in the implementation of the provisions outlined in this MOU.

This agreement shall be effective upon the signature of both parties and remain in effect until terminated by either party. Termination may be made by either party upon 30 days written notice.

In witness thereof, the parties sign their names as evidence of their approval of this Memorandum of Understanding.

FOR THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY:

Steven E. Chester, Director — Date: 4-1-09

FOR THE MICHIGAN PUBLIC SERVICE COMMISSION:

Orjiakor Isiogu, Chairman — Date: 4-1-09

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * * *

In the matter, on the Commission's own motion, to establish procedures for the Commission Staff to conduct an alternatives analysis review and to provide other technical assistance to the Department of Environmental Quality pursuant to a Memorandum of Understanding between the Commission and the Department of Environmental Quality related to proposed coal-fired electricity generating plants.	)	Case No. U-15958

At the April 30, 2009 meeting of the Michigan Public Service Commission in Lansing, Michigan.

PRESENT: Hon. Orjiakor N. Isiogu, Chairman
Hon. Monica Martinez, Commissioner
Hon. Steven A. Transeth, Commissioner

ORDER

On April 1, 2009, the Commission entered into a Memorandum of Understanding (MOU) with the Michigan Department of Environmental Quality (DEQ). An executed copy of the MOU appears as the initial entry in this docket. Reduced to its essence, the MOU constitutes a clarification of each participant's role and responsibility in satisfying the requirements regarding an alternatives analysis review and the provision of other technical assistance to the DEQ by the Commission related to the DEQ's task of issuing permits in response to applications filed under Part 55, Air Pollution Control of the Natural Resources and Environmental Protection Act, 1994 PA 451, MCL 324.101 et seq., R 336.2817(2), and Section 165(a)(2) of the federal Clean Air Act, 42 USC 7475(a)(2) for authority to construct a new coal-fired electricity generating plant.

Pursuant to the MOU, the Commission has agreed to do both of the following tasks:

1. Provide technical assistance to the DEQ on all matters of electric generation need in the state as it relates to determinations on the alternatives analysis.

2. Review the alternatives analysis for the proposed coal-fired electricity generating plants to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs.

It will be the responsibility of the DEQ to review the alternatives analysis for the proposed coal-fired electricity generating plants to assess impacts of the plants and alternatives on human health and the environment.

Toward this end, the Commission directs the Commission Staff (Staff) to perform the following activities:

A. As required, the Regulatory Affairs Division shall open separate dockets for each investigation and shall manage the files and information gathered as part of the process. Although the investigation process established by this order will not be conducted as a contested case proceeding, the information in the dockets opened for each investigation shall be available to the general public pursuant to the Commission's e-file system.

B. The Electric Reliability Division shall assume the lead role in all technical investigations required by the MOU. The Electric Reliability Division shall contact existing DEQ permit applicants within 3 business days of the issuance of this order to inform each applicant of the review process established by the Commission. Subsequently, the Electric Reliability Division shall contact new DEQ permit applicants within 3 business days of discovery of the filing of a permit application to inform the new applicants of the review process established by the Commission.

C. Each permit applicant shall submit an electric generation alternatives analysis (EGAA) to the Commission. Each EGAA shall include all of the following information:

- Consideration of alternatives that would reduce emissions of the criteria pollutants [nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), particulate matter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), lead (Pb), other hazardous air pollutants, including mercury (Hg), and carbon dioxide (CO_2)] from the proposed facility;

- The analysis should address cost, reliability, availability, and technical feasibility of the alternatives examined. Cost should be presented in a manner that facilitates a comparative analysis (i.e., dollars per megawatt-hour (MWh) for each option);

- Reduced generating capacity – description of future energy requirements and the adequacy of existing supplies. Provide the basis for the proposed design and address whether smaller boilers, a reduced number of boilers, or no new boilers are viable options in light of the other alternatives addressed;

- Improved energy efficiency at existing units – description of the energy efficiency measures available at existing units owned or controlled by the applicant to fully or partially offset the emissions from the proposed facility;

- Potential supply resources – description of the technologies considered for new generation including the consideration of renewable energy sources, clean fuels (primary fuel and fuel alternatives), and lower emitting technologies.

    - Renewable energy sources (i.e., wood, other biomass, etc.)
    - Clean fuels (i.e., low sulfur coal, etc.)
    - Lower emitting technologies
        - Natural gas
        - Wind
        - Solar
        - Hydroelectric
        - Nuclear
        - Wave Energy
        - Geothermal
        - Combined Heat and Power
        - Other innovative fuel combustion techniques
        - Cleaner technologies
        - Sequestering activities

- Demand side management/reduction – description of load management, energy efficiency, and distributed generation as a means of affecting forecasted load requirements;

- Combinations of these alternatives raised in public comments received during the DEQ public comment period.

D. The Staff and the applicant shall meet approximately 7 days after submittal of the Electric Generation Alternatives Analysis with weekly update meetings thereafter, as necessary.

E. After the filing of an EGAA with the Commission, the public shall have 30 days to comment on the filing.

F. After conclusion of the public comment period, the Staff shall within 60 days review the filed comments, continue review of the EGAA filing, perform any required analysis, and develop and prepare a report to the DEQ. In developing this report, the Staff shall give consideration to all reasonable and relevant filed comments. The applicant shall provide the Staff with any information necessary to assist the Staff in the evaluation and review of the EGAA filing.

G. In accordance with the MOU, the Staff will review the alternatives analysis for the proposed coal-fired electricity generating plants to assess whether energy efficiency, renewable energy, or other alternatives meet future electricity needs.

THEREFORE, IT IS ORDERED that the Commission Staff shall perform the tasks described in this order upon the filing of an electric generation alternatives analysis by an applicant.

The Commission reserves jurisdiction and may issue further orders as necessary.

MICHIGAN PUBLIC SERVICE COMMISSION

Orjiakor N. Isiogu, Chairman

Monica Martinez, Commissioner

Steven A. Transeth, Commissioner

By its action of April 30, 2009.

Mary Jo Kunkle, Executive Secretary

PROOF OF SERVICE

STATE OF MICHIGAN)

Case No. U-15958

County of Ingham)

Mignon Middlebrook being duly sworn, deposes and says that on April 30, 2009 A.D. she served a copy of the attached Commission orders by first class mail, postage prepaid, or by inter-departmental mail, to the persons as shown on the attached service list.

Mignon Middlebrook

Digitally signed by Mignon Middlebrook
DN: cn=Mignon Middlebrook, c=US, o=MPSC
Date: 2009.05.01 08:15:03 -04'00'

Mignon Middlebrook

Subscribed and sworn to before me
this 30th day of April 2009

Sharron A. Allen 2009.05.01 15:10:46 -04'00'

Sharron A. Allen
Notary Public, Ingham County, MI
My Commission Expires August 16, 2011

Steve Chester
Director, DEQ
Constitution Hall
525 W. Allegan St.
6th Floor, South Tower
Lansing, MI

PROOF OF SERVICE

STATE OF MICHIGAN)

Case No. U-15958

County of Ingham)

Lisa Felice being duly sworn, deposes and says that on April 30, 2009 A.D. she served a copy of the attached **Commission Order (Commission's Own Motion) via e-mail transmission**, to the persons as shown on the attached service list (Listserv Distribution List).

Lisa Felice

Lisa Felice

Subscribed and sworn to before me
this 30th day of April 2009

Sharron A. Allen 2009.05.01 15:08:28 -04'00'

Sharron A. Allen
Notary Public, Ingham County, MI
My Commission Expires August 16, 2011

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