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BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Electric Power Company; Wisconsin)
Energy Corporation; and W.E. Power, LLC; for a Certificate of) Docket No. 05-CE-130
Public Convenience and Necessity for Construction of Three)
Large Electric Generation Facilities, the Elm Road Generating)
Station, and Associated High Voltage Transmission)
Interconnection Facilities to be Located in Milwaukee and)
Racine Counties)

DIRECT TESTIMONY OF JOEL R. GAUGHAN
ON BEHALF OF APPLICANTS

20 **Q. Please state your name, business address and occupation.**

21 A. Joel R. Gaughan, We Energies, 231 West Michigan Street, Milwaukee, Wisconsin
22 53203. I am a Team Leader of the Forecasting and Load Research Team in the State
23 Regulatory Affairs Department.

24 **Q. Please describe your educational and business experience.**

25 A. I have a Bachelor of Science Degree in Economics from the University of Wisconsin -
26 Madison and a Master of Science Degree in Economics from the University of Illinois at
27 Urbana - Champaign. I was employed in the Information Systems Department of
28 Wisconsin Gas Company from January 1986 to May 1989, specializing in statistical
29 analysis and planning model support. In May 1989, I was hired by the Wisconsin
30 Electric Power Company where my responsibilities have included various aspects of the
31 development of long-term and short-term forecasts. I testified before the Public Service
32 Commission of Wisconsin in the Advance Plan 8 docket.

1 **Q. What is the purpose of your testimony?**

2 A. The purpose of my testimony is to support the electric peak demand and electric energy
3 generation forecasts that establish the need for new capacity proposed in the Power The
4 Future plan.

5 **Q. Would you please provide a summary of that forecast and your testimony?**

6 A. Yes. Electricity demand from Wisconsin Electric's customers is projected to grow 2.8
7 percent from 2003 through 2012. Wisconsin Electric native system load is projected to
8 grow by 2.5 percent per year during this period. Firm sales to nonnative wholesale
9 customers are projected to increase by 275 megawatts (MW) with total demand
10 obligation (e.g. native demand and non-native demand plus reserves) projected to grow
11 by 1995 MW through 2012. Table 1-1 (Demand Obligation Forecast), provided as an
12 exhibit in Jeff Knitter's testimony, shows projected demand obligation for the 2003-2012
13 period.

14 The testimony that follows provides a brief description of the process used that
15 supports the demand obligation forecast noted above. It will compare historical and
16 projected energy growth rates as well as provide similar comparisons of the major energy
17 drivers used in the forecast process. Growth of the major energy drivers are projected to
18 continue, but at lower rates than experienced in the past. Consistent with that, growth in
19 future energy sales is projected to continue, but also at a lower rate than has been
20 experienced in the past.

21 **Q. Would you please provide a description of the process used in developing these**
22 **forecasts?**

1 A. Yes. The process begins with the development of a Native System Energy forecast. This
2 forecast was developed using a “bottom-up” approach by aggregating sector level
3 (residential, commercial, industrial, municipal, etc.) sales forecasts, converting them to
4 rate classes and applying appropriate loss factors. The main driving variables for the
5 major retail sector forecasts are the number of customers and use per customer for the
6 residential sector, commercial employment and productivity for the commercial sector,
7 and industrial production for the industrial sector.

8 Once the Native System Energy forecast is completed, the Native System Peak
9 Demand forecast is developed. The main driving variables for the peak demand forecast
10 are monthly Native System energy and the number of central air conditioners.

11 Once the Native System Peak Demand forecast is completed, estimated load
12 management is subtracted and estimated firm sales are added to produce the total
13 Demand Obligation forecast. For capacity planning purposes, reserves are then added to
14 produce total capacity required to reliably serve the load.

15 **Q. When were these forecasts developed?**

16 A. The sector forecasts were developed in the third quarter of 2002, using historical billing
17 data through June 2002. The forecasts of economic and demographic variables were
18 drawn mainly from Economy.Com’s July 2002 forecast, the most recent available at the
19 time the forecasts were developed. In February 2003, a change was made to reflect the
20 expiration of a native municipal customer's contract in 2003 that had previously been
21 expected to occur in 2010. In April 2003, an additional two-part change was made, based
22 primarily on more current historical sales data. The first part of that change involved
23 moving 10 GWh / month out of the General Secondary rate class and into the

1 Residential rate class in 2003; the second part involved reducing the 2004 forecast for
2 the General Secondary class by 15 GWh / month to moderate its growth rate from 2003
3 to 2004. In sum, I estimate that these changes reduce the summer peak demand forecast
4 by approximately 50 MW in 2003, by approximately 75-80 MW in 2004, and by
5 approximately 50 MW from 2005 through 2009. They have no impact on the summer
6 peak demand forecasts beyond 2009.

7 **Q. Please describe in more detail how the forecast of residential and farm rate class**
8 **sales was developed?**

9 A. The residential sales forecast is the product of a use per customer forecast and a forecast
10 of the number of customers for each of three geographic areas within the service territory.
11 Electricity use per customer is forecasted by statistically relating historical sales, weather,
12 and appliance saturation. Use per customer is projected to grow at a 0.4 percent rate over
13 the 2000-2012 period compared to a rate of 1.1 percent over the 1990-2000 historical
14 period.

15 The customer forecast made use of Wisconsin Electric customer counts by
16 county, and forecast information from Economy.Com's July 2002 State Forecast.
17 Customer growth is projected to grow at a 1.0 percent rate over the 2000-2012 period
18 compared to a 1.3 percent rate over the 1990-2000 historical period. Coupling this
19 customer forecast with the results of the residential energy use per customer forecast
20 produces a forecast of total residential energy. A process similar to that used for the
21 residential rate class was used to develop the farm rate class forecast.

22 **Q. What is the forecast for combined residential and farm rate class customer sales?**

1 A. Sales are expected to grow from 7,634.8 gigawatt-hours (GWh) in 2000 to 9014.2 GWh
2 in 2012, which represents an annual compound growth rate of 1.4 percent over the
3 forecast period. This compares to a 1.9 percent weather adjusted growth rate experienced
4 in the 1990-2000 period and reflects lower use per customer and customer growth
5 expectations than experienced in the past.

6 **Q. How was the forecast for sales to business customers in the General Secondary (GS)
7 and General Primary (GP) rate classes developed?**

8 A. Forecasts are produced for each rate class by developing sales forecasts for industrial and
9 commercial sectors within each rate class. Electricity sales forecasts are developed for 12
10 manufacturing customer categories as well as forecasts for mining, pipelines and utilities.
11 Electricity consumption by manufacturing customers is modeled as a function of national
12 output levels as measured by Standard Industrial Classification (SIC)-specific industrial
13 production indices. National forecasts for these indices were provided by Economy.Com
14 (July 2002).

15 Electricity sales forecasts for commercial customers are developed where
16 electricity consumption is modeled as a function of weather and economic activity levels.
17 Economic activity level forecasts were provided by Economy.Com (July 2002).

18 **Q. Please briefly describe your assumptions for the national and local economies
19 through the year 2012.**

20 A. Economic growth, as measured by real Gross Domestic Product (GDP), is expected to
21 grow at a 2.9 percent compound rate in the 2000-2012 period according to
22 Economy.Com's July 2002 national forecast. This is a lower rate than the 3.2 percent
23 growth for the 1990-2000 historical period. Manufacturing industrial production is

1 expected to grow at lower rates in the 2000-2012 forecast period than has been
2 experienced in the 1990-2000 historical period for most SIC specific indices. Non-farm
3 employment is expected to grow at a 1.1 percent rate over the 2000-2012 forecast period
4 compared to a rate of 1.9 percent over the 1990-2000 historical period. Non-
5 manufacturing employment is expected to grow at a lower rate than has been experienced
6 while employment in the manufacturing sector is expected to continue the modest decline
7 experienced in the past. Non-farm Business Output per Hour is expected to grow at a 1.9
8 percent growth over the 2000-2012 forecast period compared to a rate of 2.0 percent in
9 the 1990-2000 historic period. These national trends are expected to be reflected in the
10 local economy as they have been in the past.

11 **Q. What is the forecast of sales to the commercial and industrial customers in the**
12 **General Secondary (GS) and General Primary (GP) rate classes?**

13 A. Combined sales to customers in these rate classes, excluding the mines in Michigan, are
14 expected to grow from 17,484.0 GWh in 2000 to 23,037.0 GWh in 2012, which
15 represents an annual compound growth rate of 2.3 percent over the forecast period. This
16 compares to a 2.9 percent weather adjusted growth rate experienced in the historic 1990-
17 2000 period.

18 **Q. Combining all retail rate classes, what is the forecast of sales?**

19 A. Retail sales, excluding the mines in Michigan, are expected to grow from 25,290.2 GWh
20 in 2000 to 32,218.8 GWh in 2012, an annual compound growth rate of 2.0 percent. This
21 is lower than the 2.5 percent weather adjusted annual growth experienced in the 1990-
22 2000 period. If we include the mines, forecasted growth is 1.8 percent versus historic
23 growth of 2.7 percent.

1 **Q. What about the municipal (sales for resale) forecast?**

2 A. Energy consumption by these customers is estimated individually and then aggregated to
3 produce a total municipal forecast. In this process, weather normalized sales are
4 determined with customer specific growth rates applied to produce a forecast. It is now
5 assumed for forecasting purposes that Wisconsin Electric will no longer serve native
6 municipal customers after their individual contracts expire. Consequently, sales to these
7 customers are nearly eliminated by 2012.

8 **Q. Would you please summarize the results of Wisconsin Electric's retail and
9 municipal energy sales forecast?**

10 A. Yes. Sales forecasts were developed for each of the retail and municipal sectors. For the
11 major retail classes, future growth projections are less than that experienced in the past
12 while the municipal sales practically disappear over the period. Combining these
13 produces sales growth of 5832.6 GWh over the forecast period, from 28,538.5 GWh in
14 2000 to 34,371.1 GWh in 2012. This represents an annual compound growth rate of 1.6
15 percent compared to 2.3 percent weather adjusted growth experienced in the 1990-2000
16 historical period.

17 If we exclude the mine load in Michigan, sales growth is projected to be 6146.8
18 GWh over the forecast period, from 26,082.2 GWh in 2000 to 32,229.0 GWh in 2012.
19 This represents an annual compound growth rate of 1.8 percent compared to 2.2 percent
20 weather adjusted growth experienced in the 1990-2000 historical period.

21 **Q. How does the retail and municipal sales forecast relate to the Native System Energy
22 forecast?**

1 A. The sales forecasts described above, estimated T&D (transmission and distribution)
2 losses associated with those sales, and internal company use are summed to produce the
3 Native System Energy forecast. For this forecast, Native System Energy is expected to
4 grow from a weather adjusted value of 30217.9 GWh in 2000 to 36,547.7 GWh in 2012,
5 representing a compound annual growth rate of 1.6 percent.

6 **Q. Given the Native System Energy forecast, please describe the process used and the**
7 **results of the Native System Peak Demand forecast?**

8 A. The basic assumption in forecasting the monthly system peak demands is that the higher
9 energy sales are in a given month, the higher, on average, will be the peak demand for the
10 corresponding month. In this forecast process, monthly system energy from the above
11 described Native System Energy forecast is a major driver of the peak demand forecast.
12 The number of summer weather-sensitive appliances, along with weather, are used to
13 address weather-sensitive load and therefore the monthly single peak demand.
14 Residential central air conditioners are the primary summer weather-sensitive appliances
15 used in this process. From 1990 to 2000, the estimated number of central air conditioner
16 units increased at an annual compound rate of 6.8 percent. In the 2000-2012 period, this
17 growth is expected to slow to an annual rate 2.6 percent, reflecting slower customer
18 growth and slower increases in total central air conditioner unit saturation than
19 experienced in the past.

20 The resultant Native System Peak Demand forecast, before any adjustment for
21 load management, is projected to grow from 5,777 MW in 2003 to 7,188 MW in 2012,
22 representing a compound annual growth rate of 2.5 percent.

1 **Q. What are you defining as firm sales, and what is the demand forecast for Firm**
2 **Sales?**

3 A. Firm Sales as defined herein are Wisconsin Electric's long-term (as opposed to
4 "opportunity") sales to Edison Sault Electric Company (ESE), Wisconsin Public Power
5 Inc. (WPPI) as well as "open season" sales associated with the addition of new coal-
6 based plants in the second half of the forecast period.

7 Wisconsin Electric provides balance of requirements service to ESE along with a
8 20 MW firm sale, which will roll into the Balance of Requirements sale in 2011. Total
9 firm sales to ESE are projected to increase from 53 MW in 2003 to 88 MW in 2012.

10 Wisconsin Electric has a power sales agreement with WPPI that extends through
11 April 30, 2025. Under this agreement, Wisconsin Electric is obligated to provide firm
12 power in amounts that WPPI is allowed to nominate pursuant to the terms of the
13 agreement. WPPI's nomination for the contract year beginning May 1, 2003 is 210 MW.
14 WPPI's nomination can increase over the years to a maximum of 300 MW beginning in
15 2009 and beyond. For PTF planning purposes, Wisconsin Electric assumes WPPI will
16 continue to nominate the maximum amount allowed under the agreement.

17 In addition to the above firm sales, Wisconsin Electric has a Memorandum of
18 Understanding with Municipal Electric Utilities of Wisconsin (MEUW) and Wisconsin
19 Federation of Cooperatives (WFC) that obligates Wisconsin Electric to offer 150 MW of
20 capacity (and associated energy) to all municipal and rural cooperative wholesale
21 customers in Wisconsin (excluding WPPI and BPMA as they have their own agreements
22 with Wisconsin Electric). The 50 MW increments of open season offers are staged
23 according to the proposed in-service dates for the PTF generating units.

1 This concept of "open season" sales was pursued vigorously by the
2 representatives of these entities and became popular among the eligible participants. We
3 expect this option to be fully used by municipal and rural cooperative wholesale
4 customers.

5 Overall, firm sales are projected to grow from 263 MW in 2003 to 538 MW in
6 2012.

7 Q. How are the impacts of market-driven energy efficiency improvements and existing
8 conservation programs incorporated into your forecasts?

9 A. Wisconsin Electric bases its forecasts of peak demand and energy upon actual billed,
10 booked, and generation level historical data which include, among other things, market-
11 driven efficiency improvements as well as the impacts of existing conservation
12 programs. By making the implicit assumption that comparable levels of conservation
13 will be achieved in the future, the need to explicitly incorporate the effects of specific
14 programs in the forecast period is eliminated

15 **Q. What are your assumptions regarding load management?**

16 A. An estimated total of 343 MW of load management is available for use in 2003, should it
17 be needed. This estimate does not include any load associated with the various voluntary
18 power buy-back programs implemented in 2000. In the forecast period, it is assumed we
19 will maintain the current 343 MW of load management.

20 **Q. What is your combined peak Demand Obligation forecast?**

21 A. The peak Demand Obligation forecast is produced by subtracting the estimates of load
22 management and adding the estimates of firm sales. For this forecast, Demand
23 Obligation is projected to grow from 5,926 MW in 2003 to 7,617 MW in 2012,

1 representing a compound annual growth rate of 2.8 percent. Adding 18 percent reserves,
2 capacity needs grow from 6,993 MW in 2003 to 8,988 MW in 2012, an increase of 1995
3 MW.

4 **Q. How do the forecasts you are presenting in this phase of the proceeding compare**
5 **with the forecasts presented in the first phase?**

6 A. The peak demand forecast presented in this phase of the proceeding is consistently lower
7 than the forecast presented in the first phase, primarily as a result of a lower energy sales
8 forecast. While the differences between the two forecasts vary somewhat from year to
9 year, the most recent annual peak Demand Obligation forecast is approximately 167 MW
10 lower than the forecast used in the first phase, averaged over the common 2003-2011
11 period. After accounting for the accompanying decrease in required reserves, the new
12 forecast is approximately 197 MW lower.

13 **Q. Do you consider this forecast reasonable?**

14 A. Yes. The forecasts is based upon reasonable assumptions and the results are reasonable
15 and in line with historical growth experienced.

16 **Q. Does this conclude your pre-filed direct testimony?**

17 A. Yes, it does.