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January 31, 2020

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Ms. Cheryl Blundon
Director Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: Accuracy of Nostradamus Load Forecasting at Newfoundland and Labrador Hydro 2019 Annual Report

Newfoundland and Labrador Hydro ("Hydro") has historically filed semi-annual reports on the Nostradamus load forecasting tool in mid-November and mid-May. On January 18, 2018 the Board of Commissioners of Public Utilities ("Board") modified the filing schedule for submission of an annual report, to be filed on November 15th each year. On November 6, 2018, the Board accepted Hydro's request to change the annual filing date of the Nostradamus report each year from November 15th to January 31st, enabling Hydro to provide an annual report based on a calendar year. The analysis contained within this report encompasses data from the period of January 2019 to the end of December 2019.

Please find enclosed the original and eight copies of Hydro's report entitled "Accuracy of Nostradamus Load Forecasting at Newfoundland and Labrador Hydro 2019 Annual Report."

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/sk

cc: **Newfoundland Power**
Mr. Gerard M. Hayes

Consumer Advocate
Mr. Dennis M. Browne, Q.C, Browne Fitzgerald Morgan & Avis

Industrial Customer Group
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Praxair Canada Inc.
Ms. Sheryl E. Nisenbaum

ecc: **Board of Commissioners of Public Utilities**
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Accuracy of Nostradamus Load Forecasting at Newfoundland and Labrador Hydro
2019 Annual Report

January 31, 2020

A report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro
a nalcor energy company

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1 Nostradamus Load Forecasting

1.1 Nostradamus

Newfoundland and Labrador Hydro ("Hydro") uses software called Nostradamus[1] for short-term load forecasting with a time frame of seven days. The Nostradamus user guide provides the following description of the software, stating:

> The Nostradamus Neural Network Forecasting system is a flexible neural network-based forecasting tool developed specifically for utility demand forecasting. Unlike conventional computing processes, which are programmed, neural networks use sophisticated mathematical techniques to train a network of inputs and outputs. Neural networks recognize and learn the joint relationships (linear or non-linear) between the ranges of variables considered. Once the network learns these intricate relationships, this knowledge can then easily be extended to produce accurate forecasts.[2]

The Nostradamus model is trained using a sequence of continuous historic periods of hourly weather and demand data. The model then forecasts system demand for a seven day horizon using predictions of weather parameters.

1.2 Short-Term Load Forecasting

Hydro uses its short-term load forecast to manage the power system and ensure adequate generating resources are available to meet customer demand.

1.2.1 Utility Load

Hydro has a contract with Wood PLC[3] ("Wood") to provide the weather parameters in the form of hourly weather forecasts that are provided twice daily for the next seven days. At the same time as the weather forecast data are provided, Wood also provides recent observed data at the same locations as used in the forecasts.[4] The actual and forecast data are automatically retrieved from Wood and input to the Nostradamus database.

Nostradamus can use a variety of weather parameters for forecasting, provided a sufficient historical record is available for training. Hydro currently uses air temperature, wind speed, and cloud cover. Nostradamus can use each variable more than once, for example both the current and forecast air

[1] The product is provided by Ventyx (an ABB Company).
[2] "Nostradamus User Guide," Ventyx (an ABB Company), Release 8.2, EMDDB-0170-1405-06, May 2014
[3] Formerly Amec Foster Wheeler.
[4] St. John's, Gander, and Deer Lake

temperatures are used in forecasting load. Wind chill does not need to be used explicitly, as the neural network function of Nostradamus forms its own relationships between load, wind, and temperature.

Nostradamus uses weather data for St. John's, Gander, and Deer Lake as well as a parameter that indicates daily daylight hours. Training and verification periods are selected to provide a sufficiently long period to ensure that a range of weather parameters are included (e.g., high and low temperatures), but short enough that the historic load is still representative of loads that can be expected in the future. The most recent training and validation exercises used data from July 1, 2016 to October 31, 2019.

Demand data for the Island Interconnected System[5] is automatically input to Nostradamus each hour. Newfoundland Power and Hydro's total utility load (conforming)[6] is input in the Nostradamus model. Industrial load (non-conforming),[7] which is not a function of weather, is forecast outside of the Nostradamus program and added to the forecasts provided by Nostradamus to derive the total load forecast.

The Nostradamus model creates separate sub-models for weekdays, weekends, and holidays during the training process to account for the variation in customer use of electricity. Nostradamus has separate holiday groups for statutory holidays and for days that are known to have unusual loads, for instance, the days between Christmas and New Year's Day, and the school Easter Break.[8]

1.2.2 Industrial Load

Industrial load tends to be almost constant, as industrial processes are independent of weather. Under the current procedure, the power-on-order for each Industrial Customer, plus the expected owned generation from Corner Brook Pulp and Paper Limited ("CBPP"), are used as the industrial load forecasts. Industrial Customer loads can be modified based on some knowledge of customer loads, for instance a decrease due to reduced production at CBPP or a ramp up in the load expected at Vale Newfoundland

[5] Load forecasts for the Avalon Peninsula are still generated but are no longer a focus since the in-service of the third transmission line from Bay d'Espoir (TL 267).
[6] Conforming load refers to load that changes consistently with the load pattern of an area.
[7] Non-conforming load refers to load that changes abnormally with respect to the load pattern of an area.
[8] Training the Nostradamus model is a process that is performed on an approximately annual basis. The goal is to improve the forecasting accuracy by providing Nostradamus with updated data and trends of recent loads and weather. This helps ensure that variables such as load growth and extreme weather are properly accounted for when predicting future load requirements.

and Labrador Limited. The expected load can be modified in one or more cells of a 7 by 24-hour grid, or the default value can be modified to be used indefinitely.[9]

1.2.3 Supply and Demand Status Reporting

Since December 2014, Hydro has submitted periodic reports on the accuracy of Nostradamus load forecasting in relation to the Board of Commissioners of Public Utilities ("Board") Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System. Direction from the Board on January 18, 2018 indicated that the reporting frequency should change to annually commencing in November 2018.[10] The daily forecast peak, as of 7:20 a.m., is reported to the Board in the daily Supply and Demand Status Report.

The weather forecast for the next seven days and the observed weather data for the previous day are input into Nostradamus at approximately 5:00 a.m. and 2:00 p.m. Nostradamus is then run in every hour of the day, with the most recent forecast available for reference in monitoring and managing both available and spinning reserves. The within-day forecast updates are primarily used to manage spinning reserve, in particular in advance of the forecast system peaks.

1.3 Potential Sources of Variance

As with any forecasting analysis, there will be discrepancies between the forecasted and actual values. Typical sources of variance in the load forecasting are as follows:

- Differences in the industrial load forecast due to unexpected changes in industrial customer loads. For example, if an industrial customer were to undergo maintenance or increase production to meet customer demand, the actual load would deviate from the scheduled load;
- Inaccuracies in the weather forecast, particularly temperature, wind speed, or cloud cover; and
- Non-uniform customer behaviour, which results in unpredictability.

[9] In Hydro's Energy Management System, there is functionality to modify the industrial load value when the Newfoundland and Labrador System Operator is aware of circumstances where an industrial customer will be reducing load. For example, if an industrial customer is completing maintenance, the forecasted load can be modified to provide a more accurate load forecast.
[10] On November 6, 2018, the Board accepted Hydro's request to change the annual filing date of this report to January 31 which allows the report to cover the previous calendar year.

2 Forecast Accuracy Summary

2.1 Analysis

This report examines the accuracy of the Hydro forecasting process for January 2019 through December 2019. All tables and figures referenced throughout the report are contained in Appendix A. Table 1 presents the daily forecast total peak, the actual total peak, and the available Island supply, as included in Hydro's daily Supply and Demand Status Reports submitted to the Board. The data are also presented in Figure 1 (a&b).

The total peak load during the period varied between 682 MW (September 1, 2019) and 1,782 MW (February 20, 2019). The available Island supply varied from 1,115 MW to 2,241 MW; Island Interconnected System reserves were sufficient throughout the period.

Table 2 presents error statistics for the total peak forecasts for the forecast period. Figure 2 (a&b) is a plot of the total forecast and actual total peaks, as shown in Figure 1, but with the addition of a bar chart showing the difference between the two data series, in MW. In both the tables and the figures, a positive error is an overestimate; a negative error is an underestimate.

Figure 2 reveals that the forecasting process consistently overestimates the peak of the total load. This is typically a result of an overestimate in the industrial load forecast; often CBPP.

Table 3 presents error statistics for the peak utility forecast (i.e. the portion of the forecast actually determined by the Nostradamus model). The industrial forecast is not included in the values presented in Table 3. Figure 3 (a&b) plots the data and error for the utility peak. Examination of the utility forecast focuses more clearly on the accuracy of Nostradamus, as error in the industrial forecast introduces error to the total forecast, making the total forecast look worse, or at times better, than it is.

2.2 Data Adjustments and Forecast Issues

In analysing the data there are instances that require adjustments. In these instances, the data for affected hours is replaced using interpolation so that in future when the data for this period is used in training, Nostradamus will use a value not affected by the event.

On January 23, 2019, erroneous data was recorded for the Island utility load due to a temporary loss of communications caused by operational data being switched from the primary server to the backup

server. The erroneous data was replaced with the last accurate forecast value generated at 12:20 p.m. so that in the future, when the data during this period is used for training, Nostradamus will use a value that is not affected by the erroneous data.

On February 20, 2019 and again on February 21, 2019, a request was made by Newfoundland Power to Hydro for a short-term voltage reduction in order to reduce its peak. Therefore, the actual Island utility load values in Nostradamus were adjusted upward during these hours by 20 MW (estimated from the observed decrease in the load when the voltage reduction was put in place).

On April 6, 2019 and again on April 7, 2019, erroneous data was recorded for the Island utility load due to incorrect Bay d'Espoir generation readings. The erroneous data was replaced with the correct data for affected hours.

On October 1, 2019 a loss of communications from Bay d'Espoir Unit 7 affected the Island utility load calculation causing an erroneous data point in Nostradamus. The erroneous data was replaced with the estimated generation from Bay d'Espoir Unit 7 for the hour affected.

2.3 Days of High Error

The shaded dates in Tables 2 and 3 indicate the days of high error in the load forecast. The days with the highest error (up to three days per month) are selected for more detailed analysis, which includes the days of:

- January 6, 22, and 25, 2019;
- February 17 and 18, 2019;
- March 2, 3, and 27, 2019;
- April 3, 19, and 24, 2019;
- May 25, 2019;
- June 5, 6, and 18, 2019;
- July 13, 14, and 29, 2019;
- August 13, 15, and 18, 2019;
- September 1, 14, and 25, 2019;

- October 19 and 23, 2019;
- November 1, 3, and 13, 2019; and
- December 10, 11, and 19, 2019.

2.3.1 January 6, 2019

On January 6, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,395 MW; the actual reported peak was 1,314 MW. The absolute difference was 81 MW, 6.2% of the actual peak. Figure 4 includes an hourly plot of the load forecast and the actual load for January 6, 2019 to assist in determining the sources of the differences between actual and forecast loads.

Figure 4(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,393 MW; the actual peak was 1,310 MW[11] and it occurred earlier at 12:00 p.m. At that time, the total load forecast was 1,347 MW resulting in an overestimate of only 2.8%.

Figure 4(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,206 MW; the actual peak was 1,150 MW and occurred at 12:00 p.m.

Figure 4(c) shows a comparison between the forecast and actual temperatures for January 6, 2019. The forecast was for temperatures to increase to 5°C after 12:00 p.m. and then to decrease back down to 1°C by the end of the day. The actual temperature followed the same trend, but was approximately 1°C to 2°C lower than forecast until 5:00 p.m. when the temperature increased slightly higher than forecast before dropping back to 1°C below what was forecast. This variation would not likely have had an effect on the overestimate of load forecast at peak.

As shown in Figure 4(d), the wind forecast estimated relatively high wind speed throughout the day; however, the actual wind speed during both morning and evening peak was lower than forecast, likely

[11] The actual total peak reported in the daily Supply and Demand Status Reports is based on a five minute time step; however, Nostradamus reports on an hourly time step, sometimes resulting in a different peak value.

contributing to the lower load than forecast. As shown in Figure 4(e), the cloud cover forecasted 100% cloud cover until dusk. Actual cloud cover data was not available for this day.

The discrepancy between actual and forecast load for January 6, 2019 was a combination of error in the industrial load forecast and wind speed forecast and likely non-uniform customer behaviour as this day occurred during a weekend. The forecast improved after 8:00 p.m. An overestimation of the load results in more than enough reserve being available.

2.3.2 January 22, 2019

On January 22, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,455 MW; the actual reported peak was 1,322 MW. The absolute difference was 133 MW, 10.1% of the actual peak. Figure 5 includes an hourly plot of the load forecast for January 22, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 5(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,456 MW; the actual peak was 1,312 MW and was at 6:00 p.m.

Figure 5(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,264 MW; the actual peak was 1,143 MW and occurred at 6:00 p.m.

Figure 5(c) shows the actual temperature in St. John's compared to the forecast. The forecast was for temperatures to drop steadily through the day, reaching -5°C by the end of the day. The temperatures were fairly consistent until 6:00 p.m. when the temperature ceased declining as forecast, resulting in lower load than forecast during the evening.

Figure 5(d) shows the actual wind speed in St. John's compared to the forecast. At time of peak the actual wind speed was lower than forecast which would have also contributed to a lower load than forecast. Figure 5(e) shows the actual cloud cover in St. John's compared to the forecast; it was consistent until noon when the data was not available for the rest of the day.

The discrepancy between actual and forecast load January 22, 2019 was a combination of error in industrial load forecast and poor weather forecasting at time of peak. An overestimation of the load results in more than enough reserve being available.

2.3.3 January 25, 2019

On January 25, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,310 MW; the actual reported peak was 1,184 MW. The absolute difference was 126 MW, 10.6% of the actual peak. Figure 6 includes an hourly plot of the load forecast for January 25, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 6(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 7:00 p.m. peak of 1,309 MW; the actual peak was 1,184 MW and it occurred earlier at 8:00 a.m. At that time, the total load forecast was 1,224 MW resulting in an overestimate of only 3.4%.

Figure 6(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that the error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 7:00 p.m. of 1,117 MW; the actual peak was 1,013 MW and occurred at 8:00 a.m.

Figure 6(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was underestimated by 2°C to 4°C from 4:00 a.m. until 6:00 p.m. when the forecast aligned with the actual for the remainder of the day. The higher than forecast temperatures would have contributed to the overestimated load forecast.

Figure 6(d) shows the actual wind speed in St. John's compared to the forecast. For the entire day the actual wind speed was relatively accurate compared to the forecast. Figure 6(e) shows the actual cloud cover in St. John's compared to the forecast. The forecast was fairly accurate during daylight hours.

The discrepancy between actual and forecast load for January 25, 2019 was primarily a result of error in the temperature forecast and error in industrial load forecast contributing to error in the total load forecast. An overestimation of the load results in more than enough reserve being available. The forecast improved slightly in the evening.

2.3.4 February 17, 2019

On February 17, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,435 MW; the actual reported peak was 1,272 MW. The absolute difference was 163 MW, 12.8% of the actual peak. Figure 7 includes an hourly plot of the load forecast for February 17, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 7(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 6:00 p.m. peak of 1,436 MW; the actual peak was 1,267 MW and occurred at 7:00 p.m.

Figure 7(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 6:00 p.m. of 1,251 MW; the actual peak was 1,137 MW and occurred at 7:00 p.m.

Figure 7(c) shows the actual temperature in St. John's compared to the forecast. The forecast was fairly aligned with the actual temperature until noon when it was 1°C warmer than forecast for the remainder of the day. This variation could have contributed to the overestimation of load forecast at peak.

Figure 7(d) shows the actual wind speed in St. John's compared to the forecast. The forecast was for higher winds than occurred. This could also have contributed to the overestimation of load forecast at peak. Figure 7(e) shows the actual cloud cover in St. John's compared to the forecast; it was more overcast during daylight hours than forecast; however, this would not have contributed to the overestimation of the load forecast at peak.

The discrepancy between actual and forecast load for February 17, 2019 was a combination of error in industrial load forecast contributing to error in the total load forecast, temperature, and wind speed forecast error and likely non-uniform customer behaviour as this day occurred during a weekend. An overestimate of the load results in more than enough reserve being available. The forecast remained poor for the remainder of the day.

2.3.5 February 18, 2019

On February 18, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,565 MW; the actual reported peak was 1,491 MW. The absolute difference was 74 MW, 5.0% of the actual peak. Figure 8 includes an hourly plot of the load forecast for February 18, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 8(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 1,560 MW; the actual peak was 1,480 MW and it occurred later at 6:00 p.m. At that time, the total load forecast was 1,541 MW resulting in an overestimate of 4.1%.

Figure 8(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 6:00 p.m. of 1,346 MW; the actual peak was 1,375 MW and occurred at 8:00 a.m.

Figures 8 (c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast load for February 18, 2019 was primarily a result of error in industrial load forecast contributing to error in the total load forecast. An overestimate of the load results in more than enough reserve being available. The forecast remained poor for the rest of the day.

2.3.6 March 2, 2019

On March 2, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,465 MW; the actual reported peak was 1,372 MW. The absolute difference was 93 MW, 6.8% of the actual peak. Figure 9 includes an hourly plot of the load forecast for March 2, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 9(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 10:00 a.m. peak of 1,465 MW; the actual peak was 1,365 MW and it occurred later at 8:00 p.m. At that time, the total load forecast was 1,389 MW resulting in an overestimate of only 1.8%.

Figure 9(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in

the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 10:00 a.m. of 1,280 MW; the actual peak was 1,234 MW and occurred at 9:00 a.m.

Figure 9(c) shows the actual temperature in St. John's compared to the forecast. The forecast followed the same trend as the actual temperature through the day, but was 1°C to 3°C higher during daylight hours. The higher than forecast temperatures would have contributed to the overestimated load forecast.

Figure 9(d) shows the actual wind speed in St. John's compared to the forecast. The wind speed forecast was fairly aligned with the actual wind speed through the day. This variation would not have contributed to the overestimation of load forecast at peak. Figure 9(e) shows the actual cloud cover in St. John's compared to the forecast. The cloud cover was slightly overestimated during the daylight hours, but not enough to suggest a contribution to the forecast error.

The discrepancy between actual and forecast load for March 2, 2019 was primarily a result of error in industrial load forecast contributing to error in the total load forecast and likely non-uniform customer behaviour as this day occurred during a weekend. The load forecast did not improve through the day. An overestimate of the load results in more than enough reserve being available.

2.3.7 March 3, 2019

On March 3, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,545 MW; the actual reported peak was 1,448 MW. The absolute difference was 97 MW, 6.7% of the actual peak. Figure 10 includes an hourly plot of the load forecast for March 3, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 10(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,544 MW; the actual peak was 1,446 MW and it occurred earlier at 10:00 a.m. At that time, the total load forecast was 1,479 MW resulting in an overestimate of only 2.3%.

Figure 10(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in

the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,359 MW; the actual peak was 1,275 MW and occurred at 10:00 a.m.

Figure 10(c) shows the actual temperature in St. John's compared to the forecast. The forecast was fairly aligned with the actual temperature through the day. This variation would not have contributed to the overestimation of load forecast at peak.

Figure 10(d) shows the actual wind speed in St. John's compared to the forecast. The forecast wind speed was overestimated through the day, which would have contributed to a lower load than forecast. Figure 10(e) shows the actual cloud cover in St. John's compared to the forecast. The forecast was overestimated for the majority of daylight hours.

The discrepancy between actual and forecast load for March 3, 2019 was primarily a result of error in industrial load forecast contributing to error in the total load forecast and error in wind speed and cloud cover forecast and likely non-uniform customer behaviour as this day occurred during a weekend. The load forecast did not improve throughout the day. An overestimate of the load results in more than enough reserve being available.

2.3.8 March 27, 2019

On March 27, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,490 MW; the actual reported peak was 1,389 MW. The absolute difference was 101 MW, 7.3% of the actual peak. Figure 11 includes an hourly plot of the load forecast for March 27, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 11(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 1,489 MW; the actual peak of 1,374 MW did occur at 8:00 a.m.

Figure 11(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 8:00 a.m. of 1,304 MW; the actual peak was 1,262 MW.

Figure 11(c) shows the actual temperature in St. John's compared to the forecast. The forecast was fairly aligned with the actual temperature through the day. This variation would not have contributed to the

overestimation of load forecast at peak. Figure 11(d) shows the actual wind speed in St. John's compared to the forecast. The forecast wind speed was overestimated through the day, which would have contributed to a lower load than forecast at peak. Figure 11(e) shows the actual cloud cover in St. John's compared to the forecast. At peak it was slightly cloudier than forecast, but would not explain the error in load forecast.

The discrepancy between actual and forecast load for March 27, 2019 was primarily a result of error in industrial load forecast contributing to error in the total load forecast and error in the wind speed forecast. An overestimate of the load results in more than enough reserve being available. Updates slightly improved the forecast through the day.

2.3.9 April 3, 2019

On April 3, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,295 MW; the actual reported peak was 1,217 MW. The absolute difference was 78 MW, 6.4% of the actual peak. Figure 12 includes an hourly plot of the load forecast for April 3, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 12(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 1,295 MW; the actual peak of 1,211 MW did occur at 8:00 a.m.

Figure 12(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible. The hourly forecast predicted a utility peak at 8:00 a.m. of 1,110 MW; the actual peak was 1,094 MW.

Figures 12 (c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast load for April 3, 2019 was primarily a result of error in industrial load forecast contributing to error in the total load forecast. An overestimate of the load results in more than enough reserve being available. Updates improved the forecast through the day.

2.3.10 April 19, 2019

On April 19, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,170 MW; the actual reported peak was 1,242 MW. The absolute difference was 72 MW, 5.8% of the actual peak. Figure 13 includes an hourly plot of the load forecast for April 19, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 13(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 9:00 a.m. peak of 1,172 MW; the actual peak was 1,242 MW and occurred at 5:00 p.m. At that time, the total load forecast was 1,052 MW resulting in an underestimate of 15.3%.

Figure 13(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was similar to the error in the forecast of total load at peak; suggesting that industrial load forecast did not contribute to the error in the total load forecast. The hourly forecast predicted a utility peak at 9:00 a.m. of 987 MW; the actual peak was 1,071 MW and occurred at 5:00 p.m.

Figure 13(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was similar during daylight hours; however, was underestimated by 2°C at peak. This could have contributed to the load forecast error at peak.

Figure 13(d) shows the actual wind speed in St. John's compared to the forecast. The actual wind speed was relatively accurate for the entire day. Figure 13(e) shows the actual cloud cover in St. John's compared to the forecast. During daylight hours the forecast was materially underestimated.

The discrepancy between actual and forecast load for April 19, 2019 was primarily a result of error in the temperature and cloud cover forecast resulting in the underestimation of the load forecast. Updates did not improve the forecast through the day.

2.3.11 April 24, 2019

On April 24, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,260 MW; the actual reported peak was 1,339 MW. The absolute difference was 79 MW, 5.9% of the actual peak. Figure 14 includes an hourly plot of the load forecast for April 24, 2019 as well as actual load chart to assist in determining the sources of the differences between actual and forecast loads.

Figure 14(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 9:00 a.m. peak of 1,258 MW; the actual peak was 1,331 MW and occurred at 12:00 p.m. At that time, the total load forecast was 1,219 MW resulting in an underestimate of 8.4%.

Figure 14(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was slightly higher than the error in the forecast of total load, suggesting that industrial load forecast did not contribute to the error

in the total load forecast. The hourly forecast predicted a utility peak at 9:00 a.m. of 1,073 MW; the actual peak was 1,159 MW and occurred at 12:00 p.m.

Figure 14(c) shows the actual temperature in St. John's compared to the forecast. Colder than forecast temperatures, particularly during the mid-day and evening hours, likely contributed to load forecast error.

Figure 14(d) shows the actual wind speed in St. John's compared to the forecast. Through most of the day and at the time of the peak the actual wind speed was slightly lower than forecast, but that was insufficient to counteract the effect of the lower temperature. Figure 14(e) shows the actual cloud cover in St. John's compared to the forecast; cloud cover was accurate through the entire day.

The discrepancy between actual and forecast load for April 24, 2019 was likely error in the temperature forecast and non-uniform customer behaviour as this day occurred during the week of Easter Break, which resulted in the underestimated load forecast at peak. Updates improved the forecast through the day.

2.3.12 May 25, 2019

On May 25, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 940 MW; the actual reported peak was 856 MW. The absolute difference was 84 MW, 9.8% of the actual peak. Figure 15 includes an hourly plot of the load forecast for May 25, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 15(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 11:00 a.m. peak of 941 MW; the actual peak was 854 MW and occurred at 9:00 a.m. At that time, the total load forecast was 913 MW resulting in an overestimate of 6.9%.

Figure 15(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 11:00 a.m. of 756 MW; the actual peak was 711 MW and occurred at 10:00 a.m.

Figure 15(c) shows the actual temperature in St. John's compared to the forecast; the forecast trend for the day was accurate but the temperature was up to 2°C higher than forecast at peak. Warmer than forecast temperatures could have contributed to the error in the forecast at peak.

Figure 15(d) shows the actual wind speed in St. John's compared to the forecast; the forecast trend for the day was also fairly accurate but the wind speed at peak was lower than forecast, further contributing to the error in load forecast.

Figure 15(e) shows the actual cloud cover in St. John's compared to the forecast. Cloud cover was slightly underestimated during daylight hours; however, that was insufficient to counteract the effect of the high temperature and lower wind speed at peak.

The discrepancy between actual and forecast load for May 25, 2019 was largely due to error in industrial load forecast contributing to error in the total load forecast as well as errors in the temperature and wind speed forecast. An overestimate of the load results in more than enough reserve being available. The accuracy of the forecast did not improve through the day.

2.3.13 June 5, 2019

On June 5, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 835 MW; the actual reported peak was 750 MW. The absolute difference was 85 MW, 11.3% of the actual peak. Figure 16 includes an hourly plot of the load forecast for June 5, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 16(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 833 MW; the actual peak was 740 MW.

Figure 16(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed. The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast significantly contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 8:00 a.m. of 648 MW; the actual peak was 662 MW.

Figures 16(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast load for June 5, 2019 was likely due to errors in the industrial load forecast. The accuracy of the forecast did not improve through the day. An overestimation of the load results in more than enough reserve being available.

2.3.14 June 6, 2019

On June 6, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 845 MW; the actual reported peak was 915 MW. The peak of 915 MW, as reported to the Board, includes a Maritime Link export of 50 MW,[12] which occurred from 4:00 p.m. until midnight on June 6, 2019. The Island Interconnected System demand at the time of peak was 865 MW. The absolute difference, inclusive of the export, was 70 MW, 7.7% of the actual peak. Exclusive of the export activity, the absolute difference was 20 MW, 2.3% of the Island Interconnected System peak. Figure 17 includes an hourly plot of the load forecast for June 6, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 17(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 843 MW; the actual peak was 859 MW.

Figures 17(b), (c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast load was primarily attributable to export activity over the Maritime Link.[13]

2.3.15 June 18, 2019

On June 18, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 880 MW; the actual reported peak was 821 MW. The absolute difference was 59 MW, 7.2% of the actual peak. Figure 18 includes an hourly plot of the load forecast for June 18, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 18(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 880 MW; the actual peak was 816 MW.

Figure 18(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 8:00 a.m. of 695 MW; the actual peak was 705 MW and occurred at 9:00 a.m.

[12] At this time Nostradamus does not account for exports over the Maritime Link in its forecasting.
[13] The decision to export during peak periods is carefully coordinated and includes conservative consideration of the load forecast and available supply.

Figures 18(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast load for June 18, 2019 was likely due to errors in industrial load forecast. The accuracy of the forecast improved throughout the day. An overestimation of the load results in more than enough reserve being available.

2.3.16 July 13, 2019

On July 13, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 765 MW; the actual reported peak was 711 MW. The absolute difference was 54 MW, 7.6% of the actual peak. Figure 19 includes an hourly plot of the load forecast for July 13, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 19(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 11:00 a.m. peak of 766 MW; the actual peak was 711 MW and occurred at 12:00 p.m.

Figure 19(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 11:00 a.m. of 586 MW; the actual peak was 581 MW and occurred at 12:00 p.m.

Figures 19(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for July 13, 2019 was likely due to the errors in industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast did not improve through the day. An overestimate of the load results in more than enough reserve being available.

2.3.17 July 14, 2019

On July 14, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 775 MW; the actual reported peak was 720 MW. The absolute difference was 55 MW, 7.6% of the actual peak. Figure 20 includes an hourly plot of the load forecast for July 14, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 20(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 1:00 p.m. peak of 777 MW; the actual peak was 714 MW and occurred at 12:00 p.m.

Figure 20(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 1:00 p.m. of 597 MW; the actual peak was 604 MW and occurred at 12:00 p.m.

Figures 20(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for July 14, 2019 was likely due to errors in the industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast remained poor through the day. An overestimate of the load results in more than enough reserve being available.

2.3.18 July 29, 2019

On July 29, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 800 MW; the actual reported peak was 748 MW. The absolute difference was 52 MW, 7.0% of the actual peak. Figure 21 includes an hourly plot of the load forecast for July 29, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 21(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 12:00 p.m. peak of 800 MW; the actual peak was 744 MW.

Figure 21(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 12:00 p.m. of 611 MW; the actual peak was 593 MW and occurred at 5:00 p.m.

Figures 21(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for July 29, 2019 was likely due to error in the industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The

forecast improved slightly through the day. An overestimate of the load results in more than enough reserve being available.

2.3.19 August 13, 2019

On August 13, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 775 MW; the actual reported peak was 719 MW. The absolute difference was 56 MW, 7.8% of the actual peak. Figure 22 includes an hourly plot of the load forecast for August 13, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 22(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 774 MW; the actual peak was 718 MW.

Figure 22(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible, meaning that error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 585 MW; the actual peak was 588 MW.

Figures 22(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for August 13, 2019 was likely due to error in the industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast remained poor through the day. An overestimate of the load results in more than enough reserve being available.

2.3.20 August 15, 2019

On August 15, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 755 MW; the actual reported peak was 709 MW. The absolute difference was 46 MW, 6.5% of the actual peak. Figure 23 includes an hourly plot of the load forecast for August 15, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 23(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 757 MW; the actual peak was 701 MW and occurred at 1:00 p.m. At that time, the total load forecast was 748 MW resulting in an overestimate of 6.7%.

Figure 23(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 569 MW; the actual peak was 564 MW and occurred at 12:00 p.m.

Figures 23(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for August 15, 2019 was likely due to error in the industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast remained poor through the day. An overestimate of the load results in more than enough reserve being available.

2.3.21 August 18, 2019

On August 18, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 740 MW; the actual reported peak was 690 MW. The absolute difference was 50 MW, 7.2% of the actual peak. Figure 24 includes an hourly plot of the load forecast for August 18, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 24(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 12:00 p.m. peak of 738 MW; the actual peak was 685 MW.

Figure 24(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 12:00 p.m. of 549 MW; the actual peak was 542 MW.

Figures 24(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for August 18, 2019 was likely due to error in the industrial load forecast. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast remained poor through the day. An overestimate of the load results in more than enough reserve being available.

2.3.22 September 1, 2019

On September 1, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 745 MW; the actual reported peak was 682 MW. The absolute difference was 63 MW, 9.2% of the actual peak. Figure 25 includes an hourly plot of the load forecast for September 1, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 25(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 9:00 p.m. peak of 746 MW; the actual peak was 669 MW and occurred at 11:00 a.m. At that time, the total load forecast was 732 MW resulting in an overestimate of 9.4%.

Figure 25(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 9:00 p.m. of 558 MW; the actual peak was 524 MW and occurred at 12:00 p.m.

Figure 25(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was slightly overestimated for the majority of the day; however, the temperature remained relatively warm and thus is not expected to have affected the total load. The forecast temperature at peak was accurate.

Figure 25(d) shows the actual wind speed in St. John's compared to the forecast. The forecast was fairly accurate until 5:00 p.m. when it was overestimated for the remainder of the day. Figure 25(e) shows the actual cloud cover in St. John's compared to the forecast. The forecast was underestimated from 4:00 a.m. until 10:00 a.m. where it was relatively accurate for the remainder of the day.

The discrepancy between actual and forecast utility load for September 1, 2019 was likely due to error in the industrial load forecast and non-uniform customer behaviour as this day occurred on a weekend and the day before a statutory holiday. Discrepancy in weather is not expected to have impacted the total actual load during the summer season. The forecast did not improve through the day. An overestimate of the load results in more than enough reserve being available.

2.3.23 September 14, 2019

On September 14, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 820 MW; the actual reported peak was 750 MW. The absolute difference was 70 MW, 9.3% of the actual peak. Figure 26 includes an hourly plot of the load forecast for September 14, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 26(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 10:00 a.m. peak of 819 MW; the actual peak was 733 MW and occurred at 8:00 p.m. At that time, the total load forecast was 760 MW resulting in an overestimate of only 3.7%.

Figure 26(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed. The error in the forecast of the utility load was negligible. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 10:00 a.m. of 631 MW; the actual peak of 611 MW did occur at 10:00 a.m.

Figures 26(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for September 14, 2019 was likely due to error in the industrial load forecast. The forecast improved slightly through the day. An overestimate of the load results in more than enough reserve being available.

2.3.24 September 25, 2019

On September 25, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 885 MW; the actual reported peak was 938 MW. The absolute difference was 53 MW, 5.7% of the actual peak. Figure 27 includes an hourly plot of the load forecast for September 25, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 27(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 10:00 a.m. peak of 885 MW; the actual peak was 936 MW and occurred at 5:00 p.m. At that time, the total load forecast was 876 MW resulting in an underestimate of 6.4%.

Figure 27(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was higher than the error in the forecast of total load, suggesting that industrial load forecast did not contribute to the error in the

total load forecast. The hourly forecast predicted a utility peak at 10:00 a.m. of 696 MW; the actual peak was 772 MW and occurred at 5:00 p.m.

Figure 27(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was overestimated by 1°C to 2°C for the entire day.

Figure 27(d) shows the actual wind speed in St. John's compared to the forecast. The forecast was overestimated for the entire day; however, wind speed was low and likely not to contribute to the load forecast error. Figure 27(e) shows the actual cloud cover in St. John's compared to the forecast. The forecast was overestimated for the majority of the day.

The discrepancy between actual and forecast utility load for September 25, 2019 was likely a result of error in temperature and cloud cover forecast. The forecast did improve slightly after the peak occurred.

2.3.25 October 19, 2019

On October 19, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 855 MW; the actual reported peak was 785 MW. The absolute difference was 70 MW, 8.9% of the actual peak. Figure 28 includes an hourly plot of the load forecast for October 19, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 28(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 7:00 p.m. peak of 855 MW; the actual peak was 771 MW and occurred at 6:00 p.m.

Figure 28(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was negligible. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 7:00 p.m. of 666 MW; the actual peak was 648 MW.

Figures 28(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for October 19, 2019 was largely a result of error in industrial load forecast. An overestimate of the load results in more than enough reserve being available. The forecast did not improve through the day.

2.3.26 October 23, 2019

On October 23, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,000 MW; the actual reported peak was 944 MW. The absolute difference was 56 MW, 5.9% of the actual peak. Figure 29 includes an hourly plot of the load forecast for October 23, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 29(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted an 8:00 a.m. peak of 999 MW; the actual peak was 940 MW.

Figure 29(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load at time of peak was negligible. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 8:00 a.m. of 810 MW; the actual peak was 811 MW.

Figures 29(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for October 23, 2019 was largely a result of error in industrial load forecast and possibly due to non-uniform customer behaviour as this day occurred on a weekend. An overestimate of the load results in more than enough reserve being available. The forecast improved through the day.

2.3.27 November 1, 2019

On November 1, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 935 MW; the actual reported peak was 853 MW. The absolute difference was 82 MW, 9.6% of the actual peak. Figure 30 includes an hourly plot of the load forecast for November 1, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 30(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 9:00 a.m. peak of 933 MW; the actual peak was 846 MW and occurred at 8:00 a.m.

Figure 30(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 9:00 a.m. of 744 MW; the actual peak was 690 MW and occurred at 8:00 a.m.

Figure 30(c) shows the actual temperature in St. John's compared to the forecast. The temperature was underestimated by 1°C to 2°C for the majority of the day. The warmer than forecast temperatures likely contributed to the load forecast error.

Figure 30(d) shows the actual wind speed in St. John's compared to the forecast. The actual wind speed was slightly lower than forecast until 1:00 p.m. when it was slightly higher than forecast until 6:00 p.m. where it was back to lower than forecast. The lower than forecast wind speed at peak likely contributed to the load forecast error. Figure 30(e) shows the forecast and actual cloud cover. The forecast was relatively accurate for most of the day.

The discrepancy between actual and forecast utility load for November 1, 2019 was a result of error in industrial load forecast and the weather forecast. An overestimate of the load results in more than enough reserve being available.

2.3.28 November 3, 2019

On November 3, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 925 MW; the actual reported peak was 1,007 MW. The absolute difference was 82 MW, 8.1% of the actual peak. Figure 31 includes an hourly plot of the load forecast for November 3, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 31(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 4:00 p.m. peak of 925 MW; the actual peak was 996 MW and occurred at 5:00 p.m.

Figure 31(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was higher than the error in the forecast of total load, suggesting that industrial load forecast did not contribute to the error in the total load forecast. The hourly forecast predicted a utility peak at 4:00 p.m. of 782 MW; the actual peak was 912 MW and occurred at 5:00 p.m.

Figure 31(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was overestimated by 1°C to 2°C for the majority of the day which likely contributed to the error in the total load forecast.

Figure 31(d) shows the actual wind speed in St. John's compared to the forecast. The forecast was relatively accurate through the day. Figure 31(e) shows the actual cloud cover in St. John's compared to

the forecast. The forecast was underestimated in the morning and overestimated in the afternoon into evening. Again, this does not explain the discrepancy in the load forecast.

The discrepancy between actual and forecast utility load for November 3, 2019 was primarily a result of error in the temperature forecast and non-uniform customer behaviour as this day was on a weekend. The forecast did not improve throughout the day.

2.3.29 November 13, 2019

On November 13, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,040 MW; the actual reported peak was 941 MW. The absolute difference was 99 MW, 10.5% of the actual peak. Figure 32 includes an hourly plot of the load forecast for November 13, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 32(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,038 MW; the actual peak of 940 MW did occur at 5:00 p.m.

Figure 32(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was slightly lower than the error in the forecast of total load, meaning that error in the industrial load forecast contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 895 MW; the actual peak was 824 MW.

Figure 32(c) shows the actual temperature in St. John's compared to the forecast. The temperature forecast was relatively accurate through the day and within 1°C of forecast at time of peak.

Figure 32(d) shows the actual wind speed in St. John's compared to the forecast. The forecast was overestimated for the majority of the day. This could have contributed to the overestimate of the load forecast. Figure 32(e) shows the actual cloud cover in St. John's compared to the forecast. The forecast was fairly accurate through the day; however, was slightly overestimated at peak.

The discrepancy between actual and forecast utility load for November 13, 2019 was primarily a result of errors in industrial load forecast and wind speed. An overestimate of the load results in more than enough reserve being available. The forecast improved slightly after peak.

2.3.30 December 10, 2019

On December 10, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,210 MW; the actual reported peak was 1128 MW. The absolute difference was 82 MW, 7.3% of the actual peak. Figure 33 includes an hourly plot of the load forecast for December 10, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 33(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,211 MW; the actual peak was 1,127 MW.

Figure 33(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was materially lower than the error in the forecast of total load. This suggests the error in the industrial load forecast materially contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,018 MW; the actual peak of 998 MW did occur at 5:00 p.m.

Figures 33(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for December 10, 2019 was primarily a result of errors in industrial load forecast. The forecast did not improve as the day went on. An overestimate of the load results in more than enough reserve being available.

2.3.31 December 11, 2019

On December 11, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,260 MW; the actual reported peak was 1,195 MW. The absolute difference was 65 MW, 5.4% of the actual peak. Figure 34 includes an hourly plot of the load forecast for December 11, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 34(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,261 MW; the actual peak was 1,185 MW and occurred at 6:00 p.m.

Figure 34(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was materially lower than the error in the forecast of total load. This suggests the error in the industrial load forecast materially

contributed to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,068 MW; the actual peak of 1,052 MW did occur at 5:00 p.m.

Figures 34(c), (d), and (e) are provided for context; however, the discrepancy between actual and forecast utility load for December 11, 2019 was primarily a result of errors in industrial load forecast. The forecast did not improve until after peak. An overestimate of the load results in more than enough reserve being available.

2.3.32 December 19, 2019

On December 19, 2019, the forecast peak at 7:20 a.m., as reported to the Board, was 1,510 MW; the actual reported peak was 1,398 MW. The absolute difference was 112 MW, 8.0% of the actual peak. Figure 35 includes an hourly plot of the load forecast for December 19, 2019 as well as several plots to assist in determining the sources of the differences between actual and forecast loads.

Figure 35(a) shows the hourly distribution of the load forecast compared to the actual load. The hourly forecast predicted a 5:00 p.m. peak of 1,512 MW; the actual peak was 1,393 MW and occurred at 8:00 p.m. At that time, the total load forecast was 1,431 MW; resulting in an overestimate of only 2.7%.

Figure 35(b) shows the hourly distribution of the utility load forecast only (i.e., the load forecast with the industrial component removed). The error in the forecast of the utility load was materially lower than the error in the forecast of total load, meaning that error in the industrial load forecast was a large contributor to the error in the total load forecast. The hourly forecast predicted a utility peak at 5:00 p.m. of 1,319 MW; the actual peak of 1,258 MW did occur at 5:00 p.m.

Figure 35(c) shows the actual temperature in St. John’s compared to the forecast. The temperature forecast was lower than actual by approximately 2°C until late evening. This likely contributed to the total forecast error.

Figure 35(d) shows the actual wind speed in St. John’s compared to the forecast. The forecast was overestimated for most of the day. This could also have contributed to the overestimation of load. Figure 35(e) shows the actual cloud cover in St. John’s compared to the forecast. The forecast was underestimated during daylight hours; however, would not explain the overestimation of load.

The discrepancy between actual and forecast load for December 19, 2019 was likely a result of errors in the industrial load forecast, as well as temperature and wind speed forecast. An overestimate of the

load results in more than enough reserve being available. The forecast improved slightly but not until after peak occurred.

3 Forecast Accuracy Review

Tables 4 and 5 summarize the average and maximum error in the peak of the utility load forecast by month for the 12 months of the reporting period. The absolute percent error varied between 1.3% and 3.3% with an average of 2.1%. There does not appear to be any seasonal correlation. The maximum absolute error varied between 2.7% and 14.2%. The maximum error appears to be lower during the summer months and higher in the shoulder and winter months. The average error was negative in 9 months of the year, positive in 1 month, and no error was seen in 2 months of the year. On average, the forecast typically underestimates the load, though the average understatement is -0.5% of actual peak. The maximum errors were positive in all 12 months (i.e., for maximum errors) the forecast typically overestimates, rather than underestimates, the load.

Table 6 summarizes the error at the ten highest utility loads during the reporting period. The highest loads in this reporting period occurred in February (nine instances) and January (one instance). Five of the occurrences in February happened between February 20 and 25, 2019, during a period of historically high system demand requirements. As Nostradamus would not have had historical data to learn from in training, it is expected that there would be some error during this period. Two of the ten maximum loads were overestimated; eight were underestimated. The average error varied from -5.8% to 1.8%; the overall average was -1.2%. The absolute percent error varied from 0.2% to 5.8%, with an average of 1.7%. These statistics confirm that there is no correlation between high load and high error in the load forecast.

Table 7 summarizes the result of the investigations into instances of high forecast error. Most errors occur as a result of errors in the industrial forecast and errors in the weather forecast, largely driven by errors in temperature and wind speed forecasting. Some errors remain unexplained; they result from unpredictable customer behavior that can occur on a weekend day or during a statutory holiday that is not modelled by Nostradamus. Out of the selected 32 instances of high forecast error, 13 occurred on a weekend day, and 19 occurred on a weekday.

Appendix A

Tables and Figures

newfoundland labrador hydro
a nalcor energy company

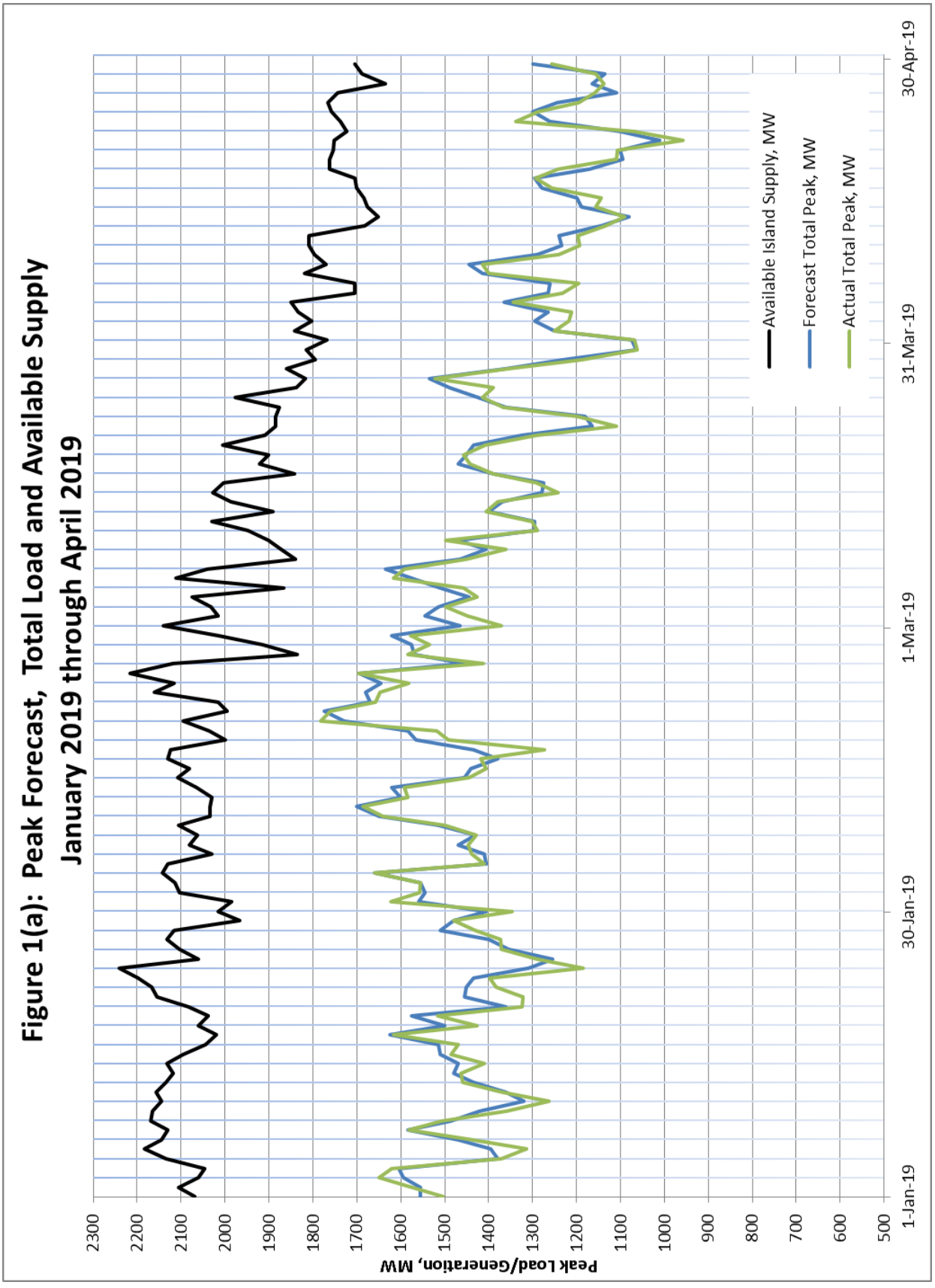
Figure 1(a): Peak Forecast, Total Load and Available Supply
January 2019 through April 2019
Peak Load/Generation, MW
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
1-Jan-19
30-Jan-19
1-Mar-19
31-Mar-19
30-Apr-19
Available Island Supply, MW
Forecast Total Peak, MW
Actual Total Peak, MW

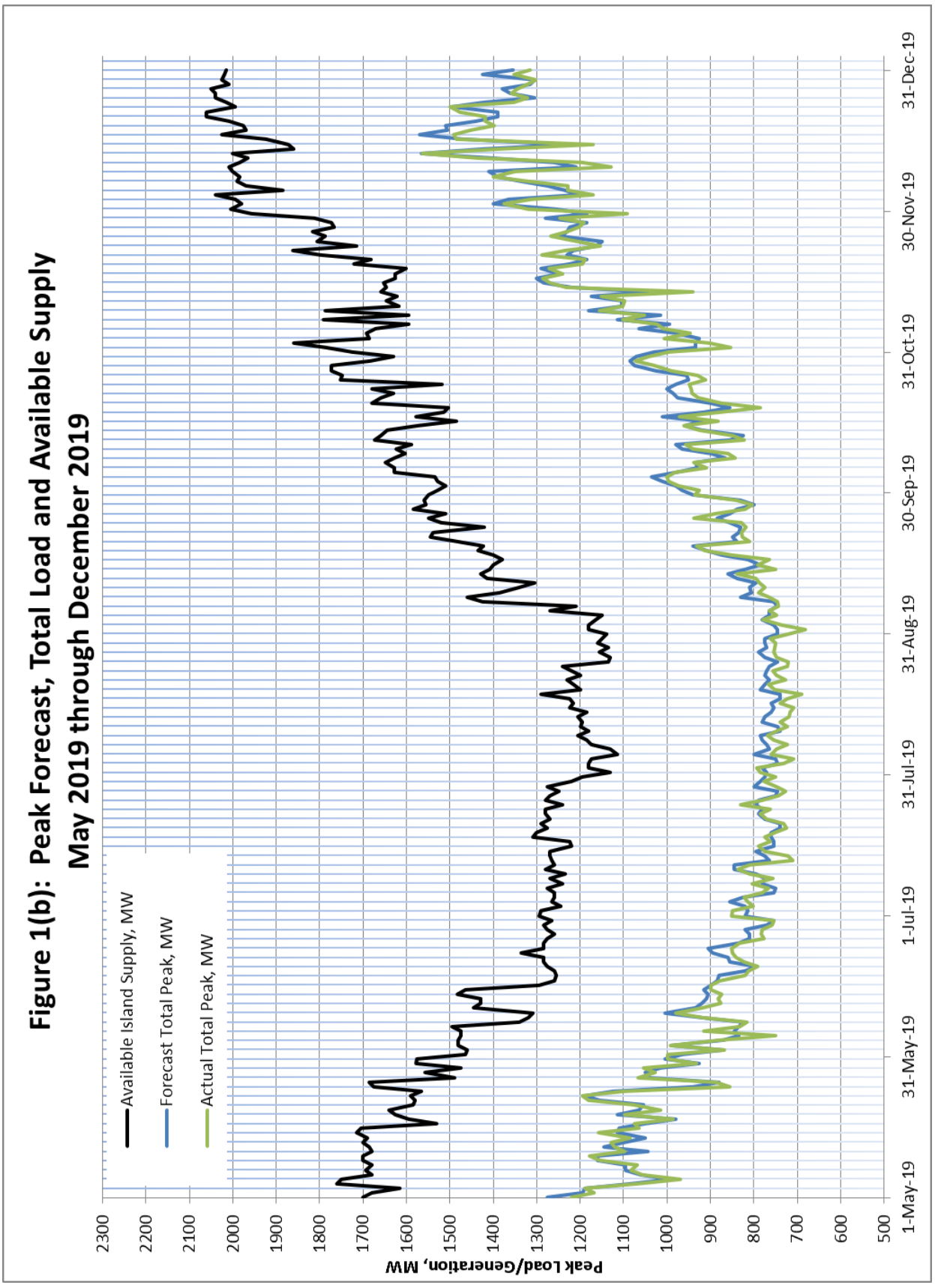
Figure 1(b): Peak Forecast, Total Load and Available Supply
May 2019 through December 2019
Available Island Supply, MW
Forecast Total Peak, MW
Actual Total Peak, MW
Peak Load/Generation, MW
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
1-May-19
31-May-19
1-Jul-19
31-Jul-19
31-Aug-19
30-Sep-19
31-Oct-19
30-Nov-19
31-Dec-19

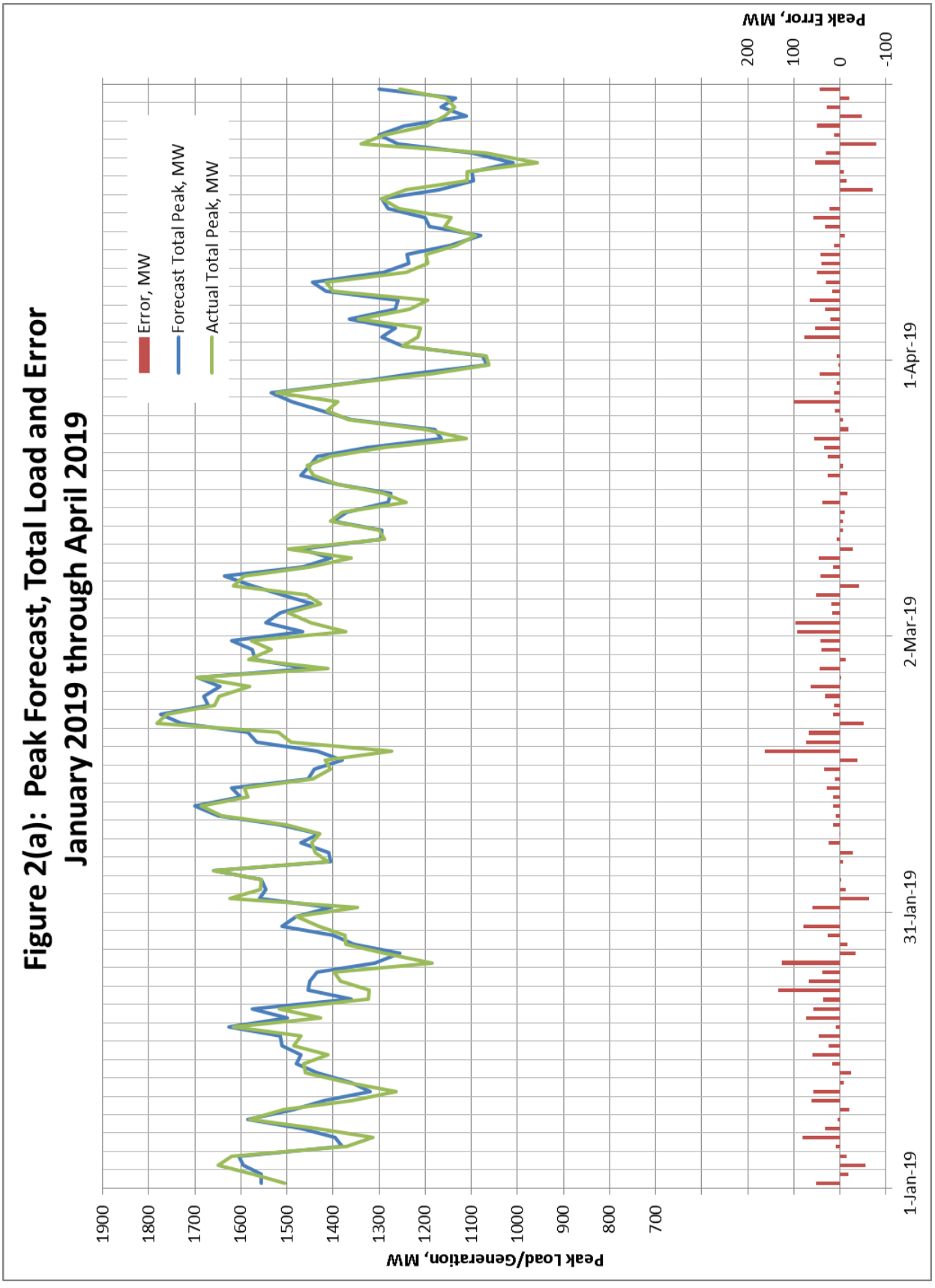
Figure 2(a): Peak Forecast, Total Load and Error
January 2019 through April 2019
Error, MW
Forecast Total Peak, MW
Actual Total Peak, MW
Peak Load/Generation, MW
Peak Error, MW
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
200
100
0
-100
1-Jan-19
31-Jan-19
2-Mar-19
1-Apr-19

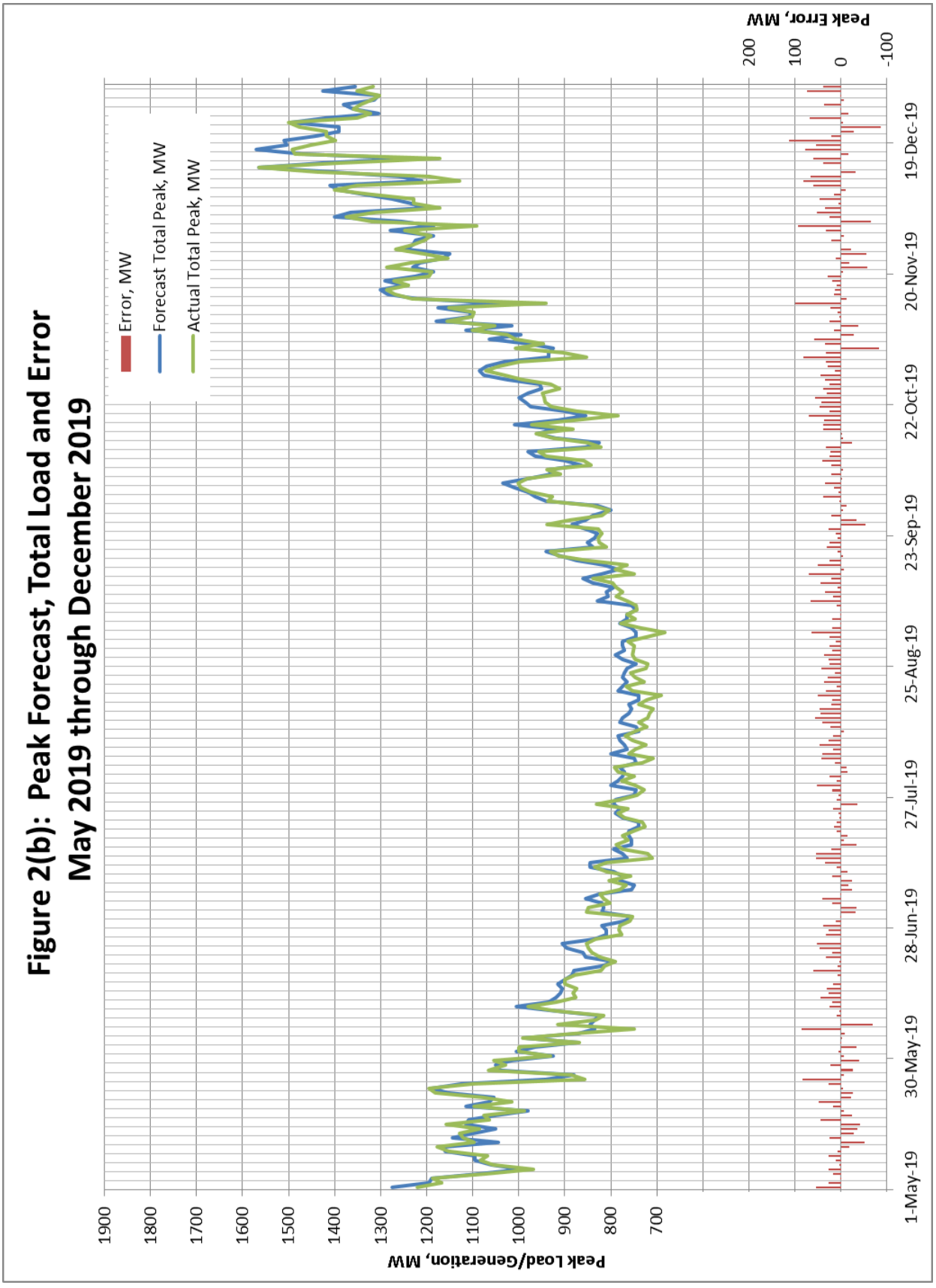
Figure 2(b): Peak Forecast, Total Load and Error
May 2019 through December 2019
Error, MW
Forecast Total Peak, MW
Actual Total Peak, MW
Peak Load/Generation, MW
Peak Error, MW
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
200
100
0
-100
1-May-19
30-May-19
28-Jun-19
27-Jul-19
25-Aug-19
23-Sep-19
22-Oct-19
20-Nov-19
19-Dec-19

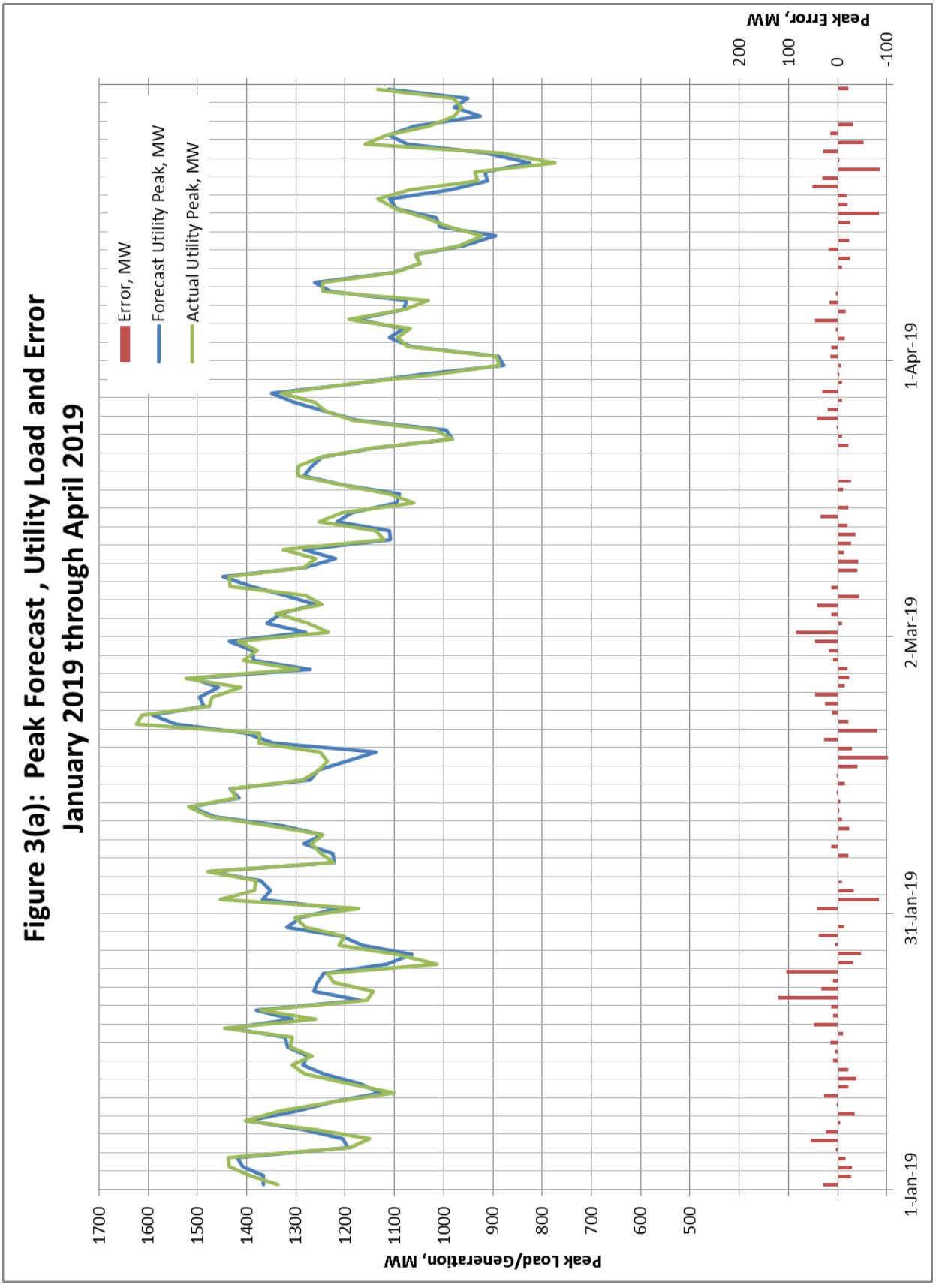
Figure 3(a): Peak Forecast , Utility Load and Error
January 2019 through April 2019
Error, MW
Forecast Utility Peak, MW
Actual Utility Peak, MW
Peak Load/Generation, MW
Peak Error, MW
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
200
100
0
-100
1-Jan-19
31-Jan-19
2-Mar-19
1-Apr-19

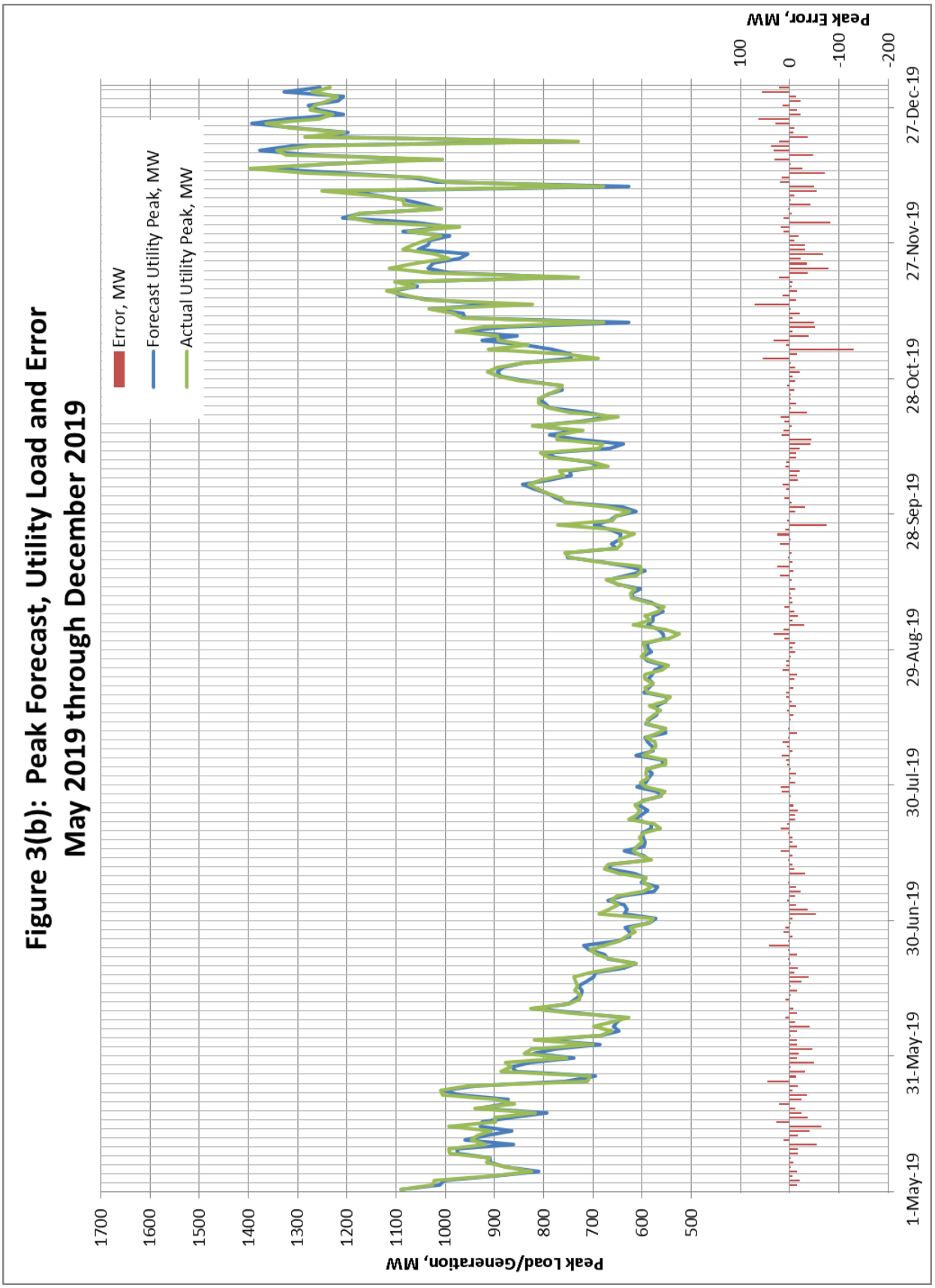
Figure 3(b): Peak Forecast, Utility Load and Error
May 2019 through December 2019
Error, MW
Forecast Utility Peak, MW
Actual Utility Peak, MW
Peak Load/Generation, MW
Peak Error, MW
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
100
0
-100
-200
1-May-19
31-May-19
30-Jun-19
30-Jul-19
29-Aug-19
28-Sep-19
28-Oct-19
27-Nov-19
27-Dec-19

Figure 4 Accuracy Analysis - Jan 06, 2019

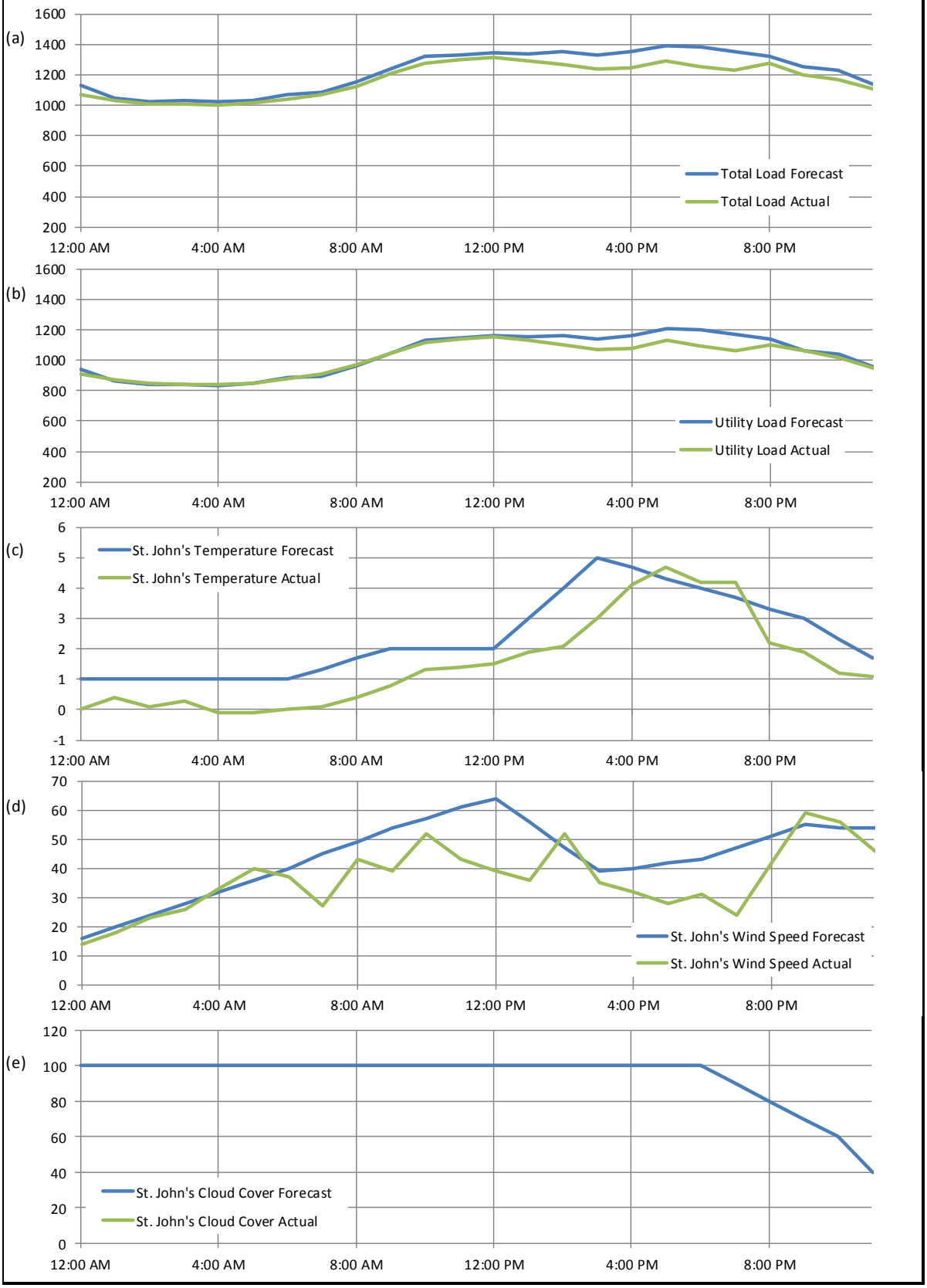

Figure 5 Accuracy Analysis - Jan 22, 2019

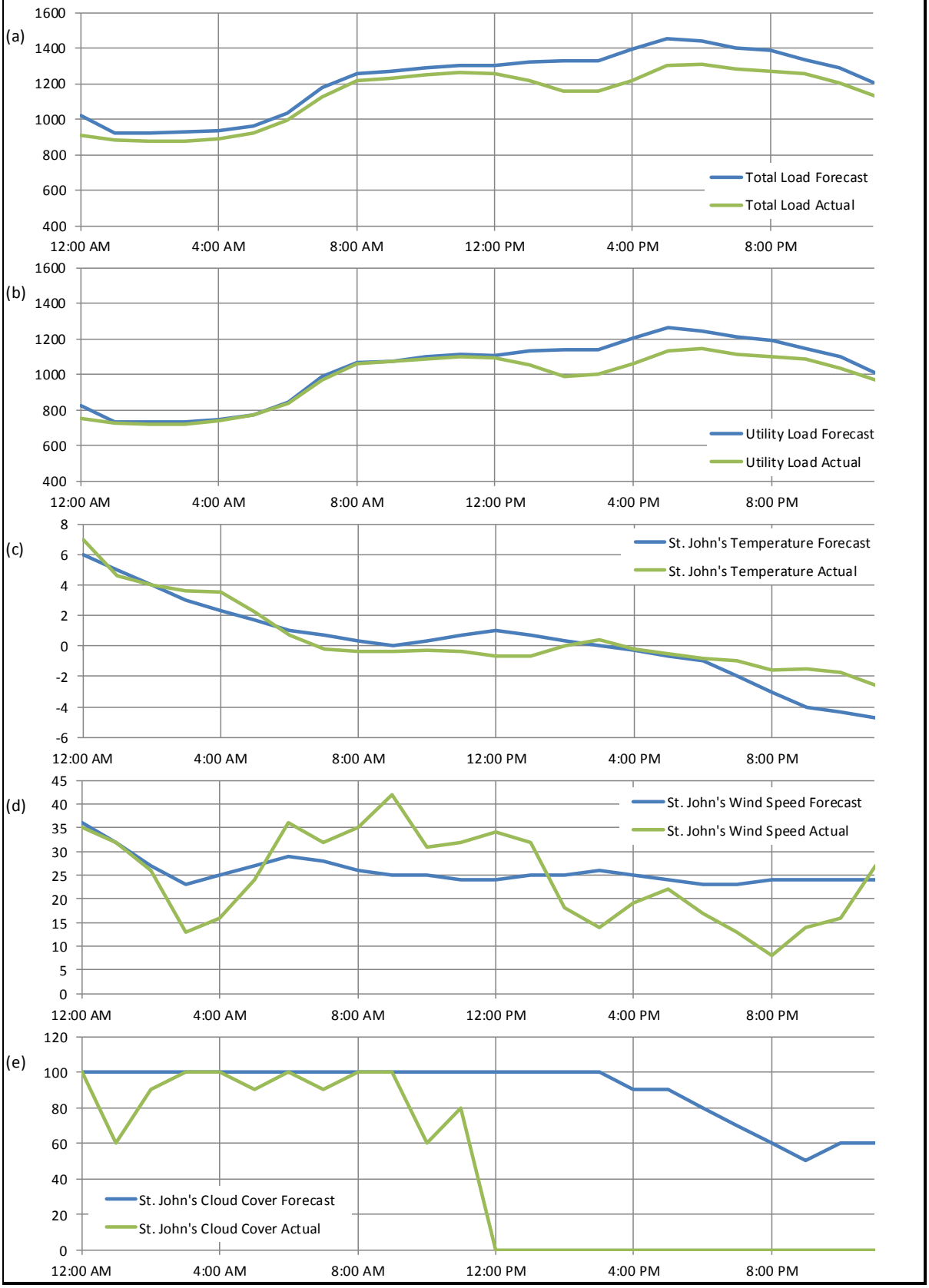

Figure 6 Accuracy Analysis - Jan 25, 2019

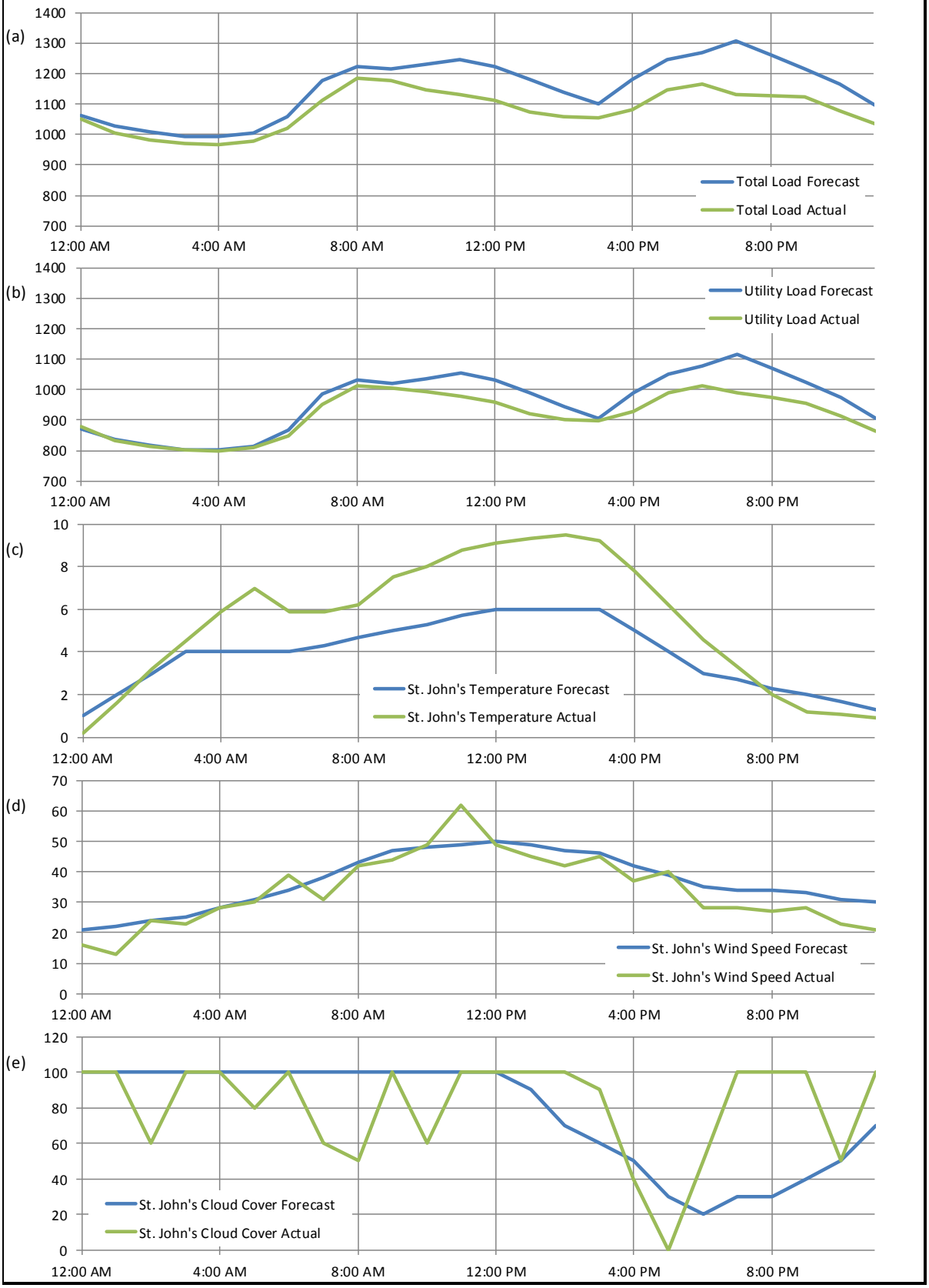

Figure 7 Accuracy Analysis - Feb 17, 2019

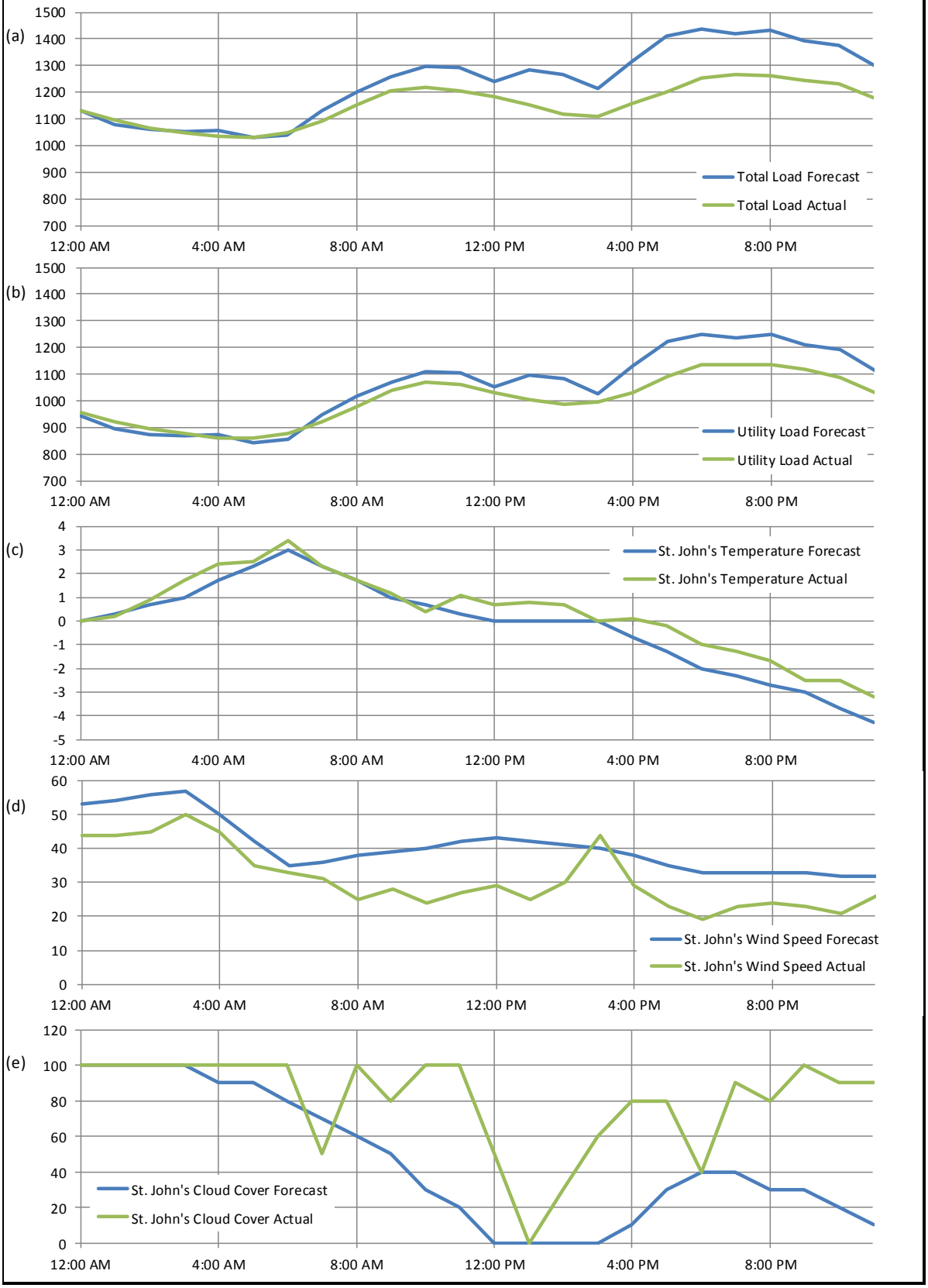

Figure 8 Accuracy Analysis - Feb 18, 2019

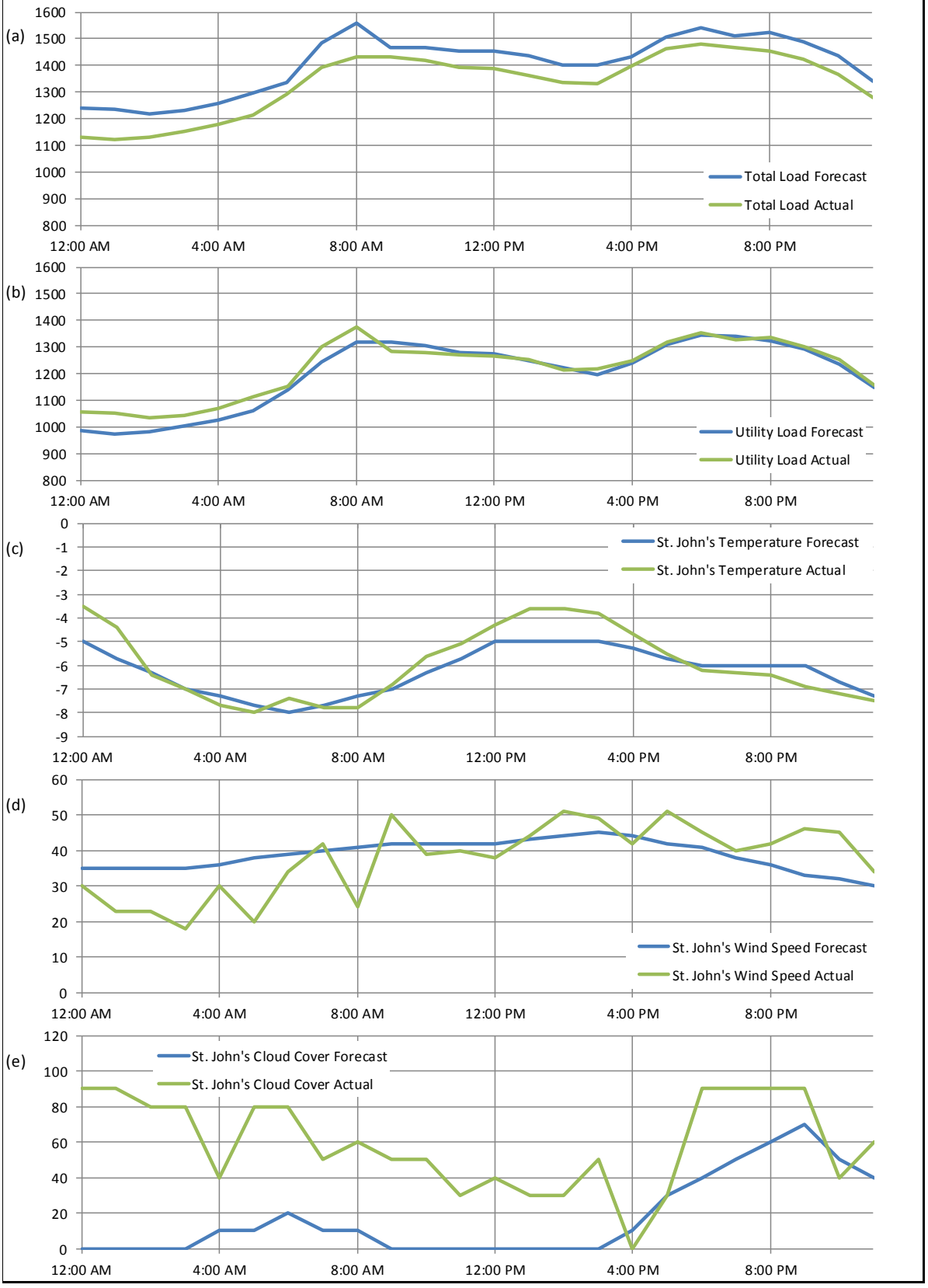

Figure 9 Accuracy Analysis - Mar 02, 2019

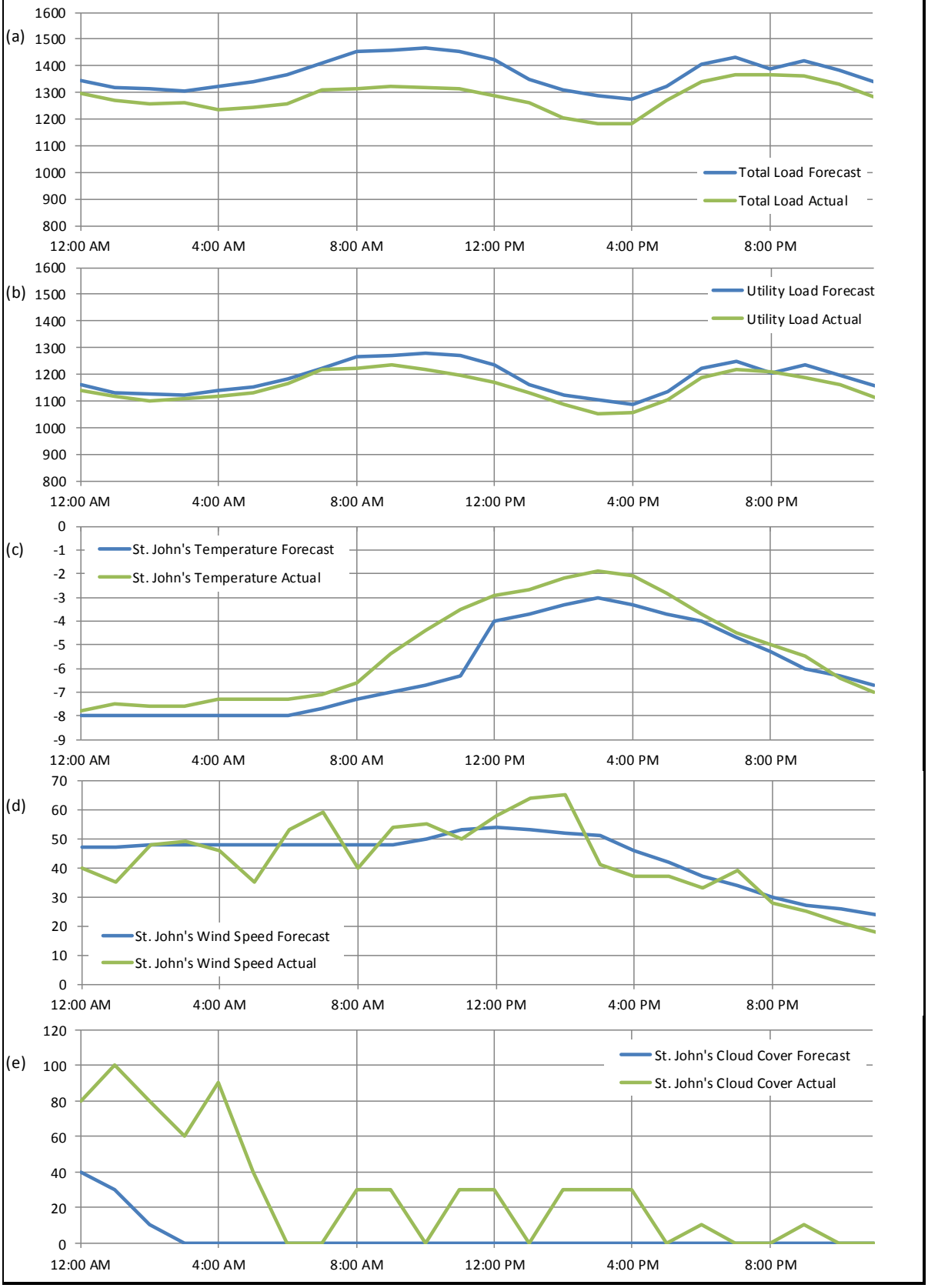

Figure 10 Accuracy Analysis - Mar 03, 2019

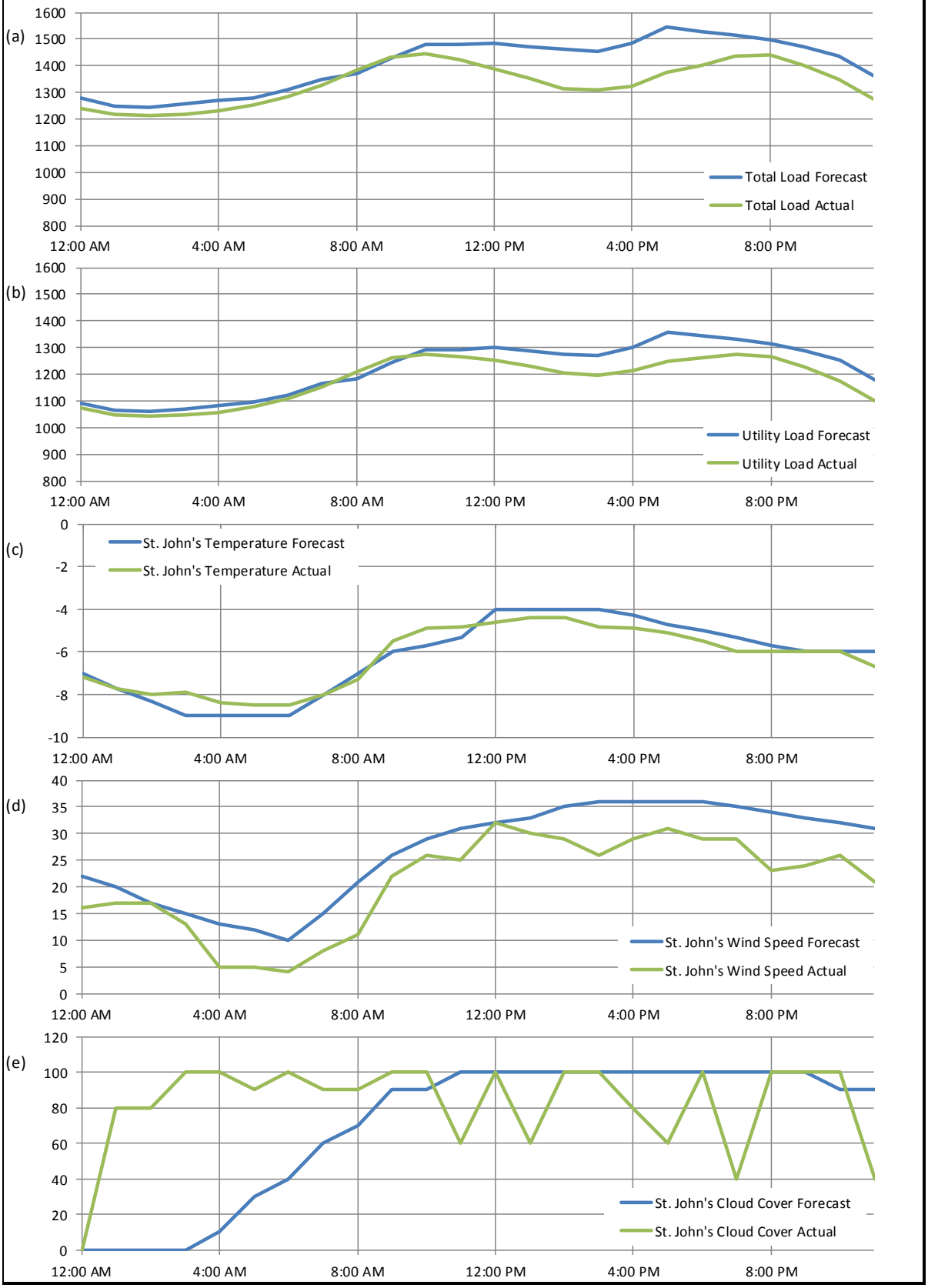

Figure 11 Accuracy Analysis - Mar 27, 2019

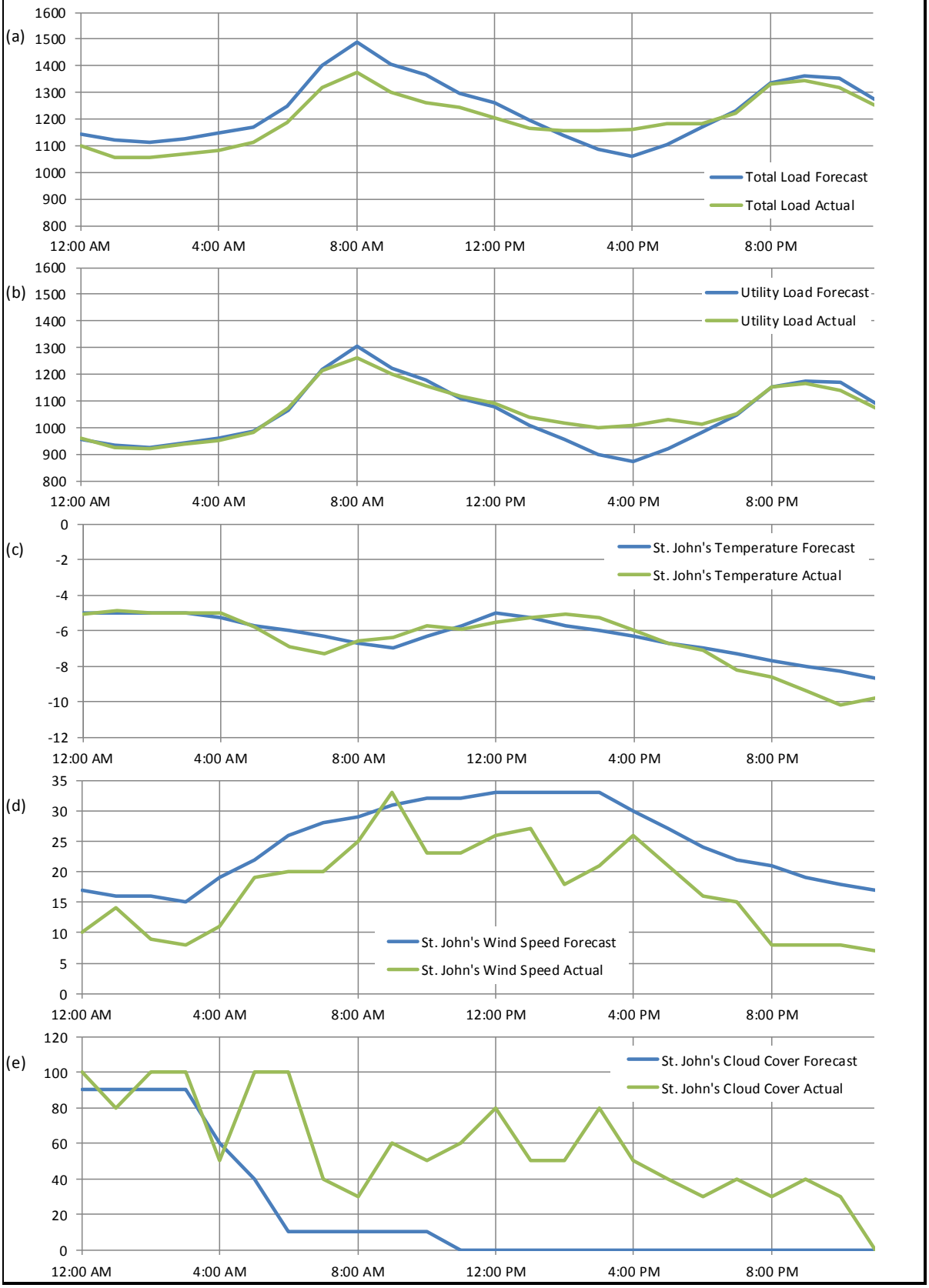

Figure 12 Accuracy Analysis - Apr 03, 2019

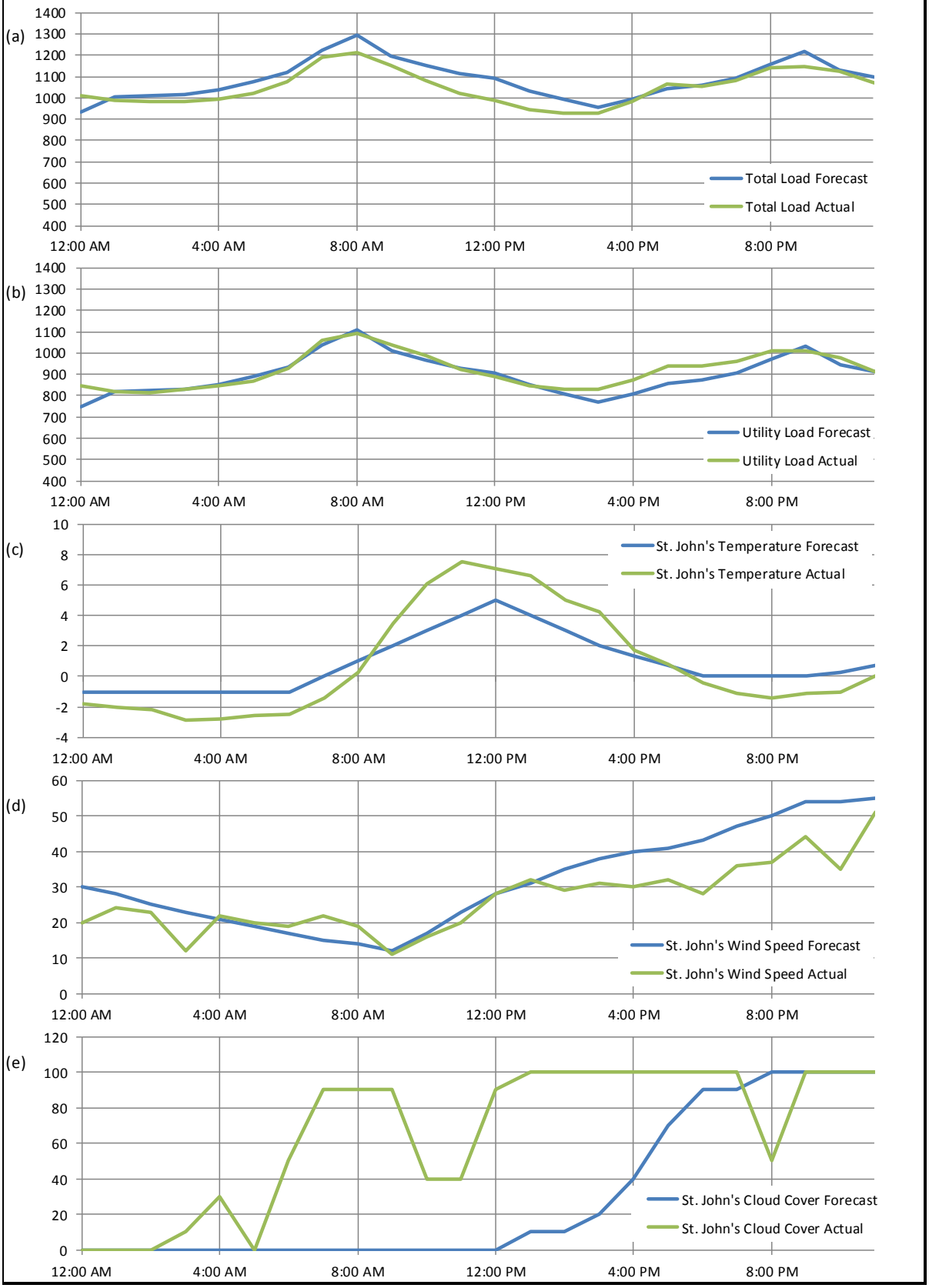

Figure 13 Accuracy Analysis - Apr 19, 2019

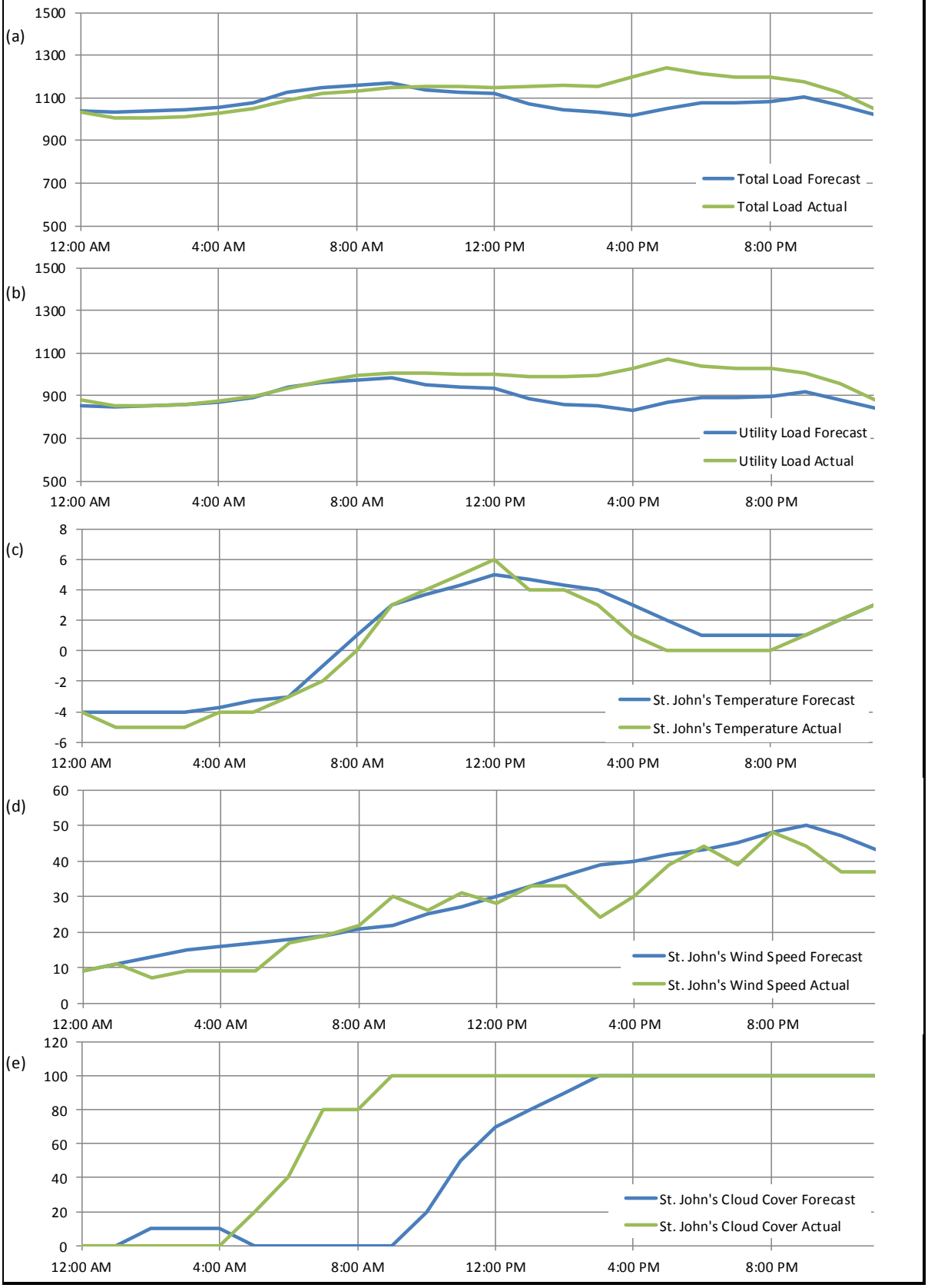

Figure 14 Accuracy Analysis - Apr 24, 2019

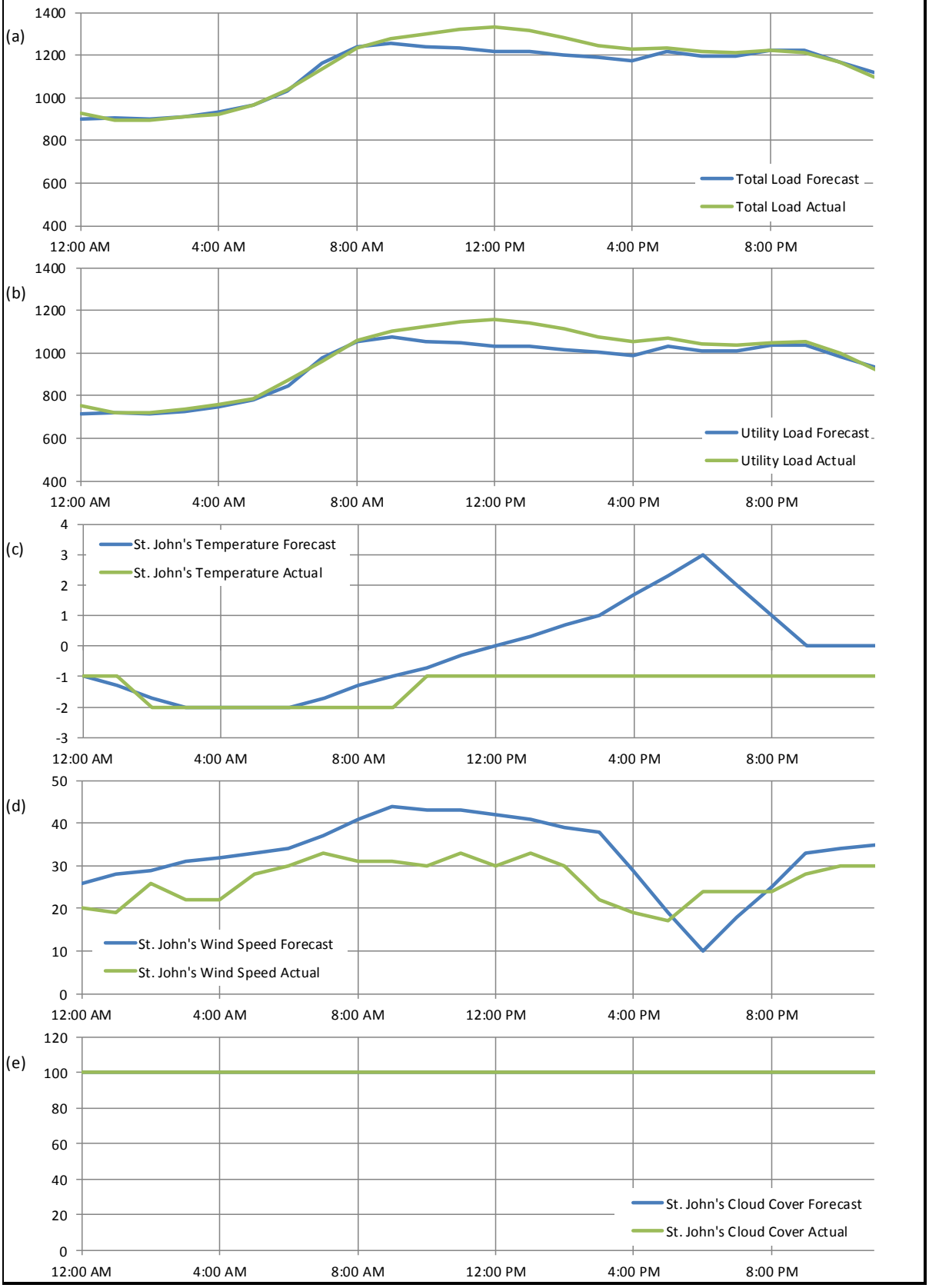

Figure 15 Accuracy Analysis - May 25, 2019

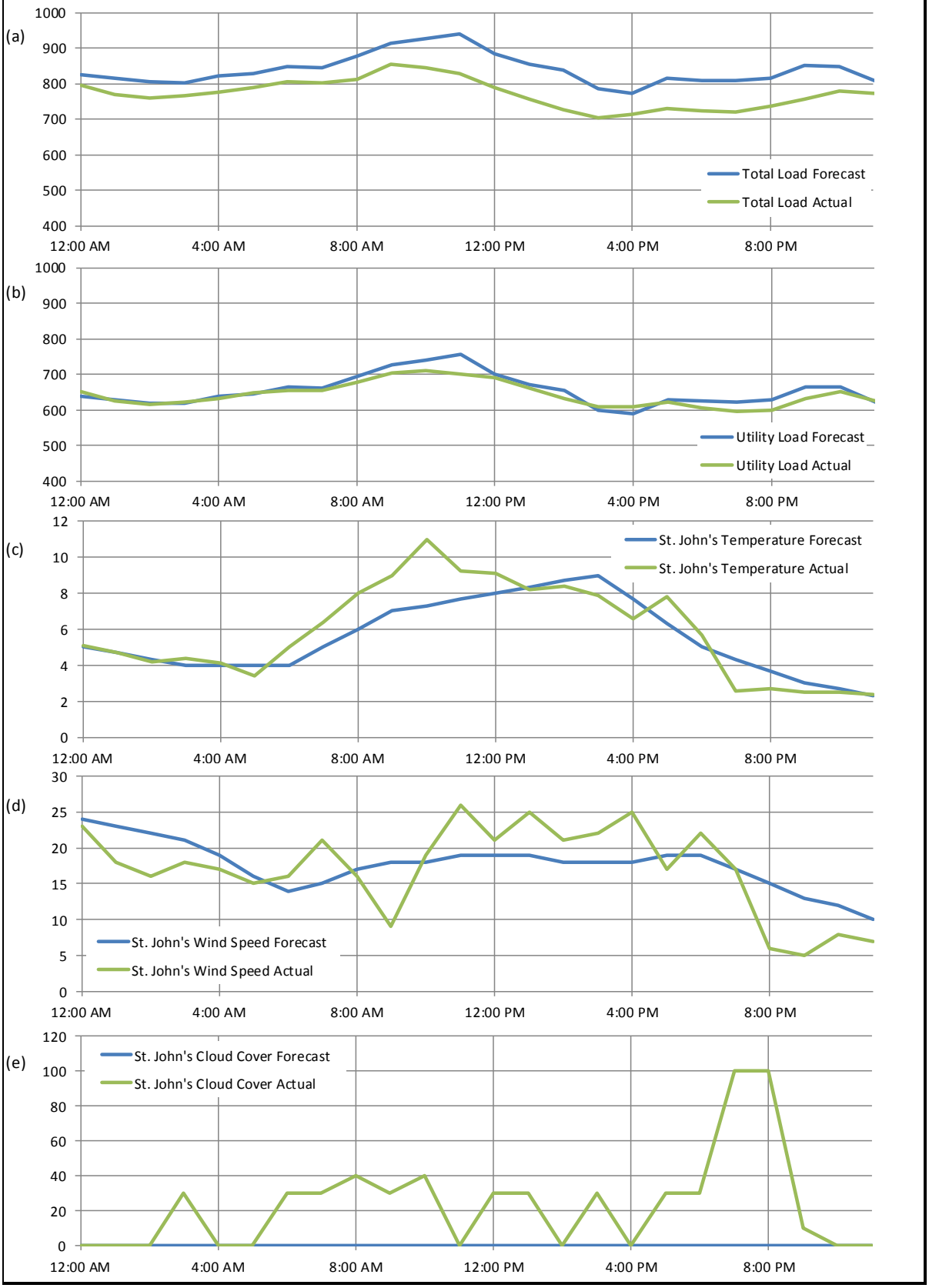

Figure 16 Accuracy Analysis - Jun 05, 2019

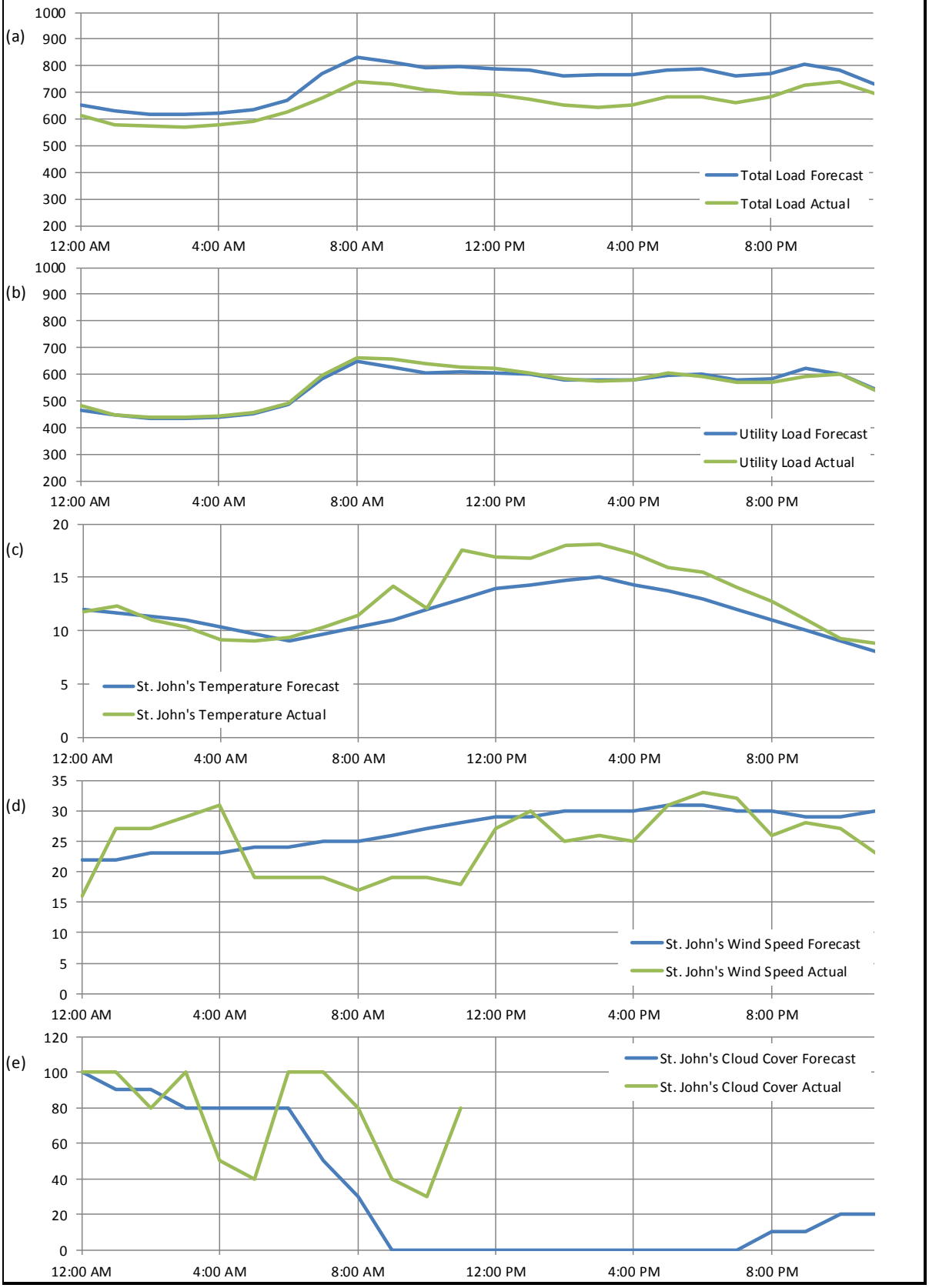

Figure 17 Accuracy Analysis - Jun 06, 2019

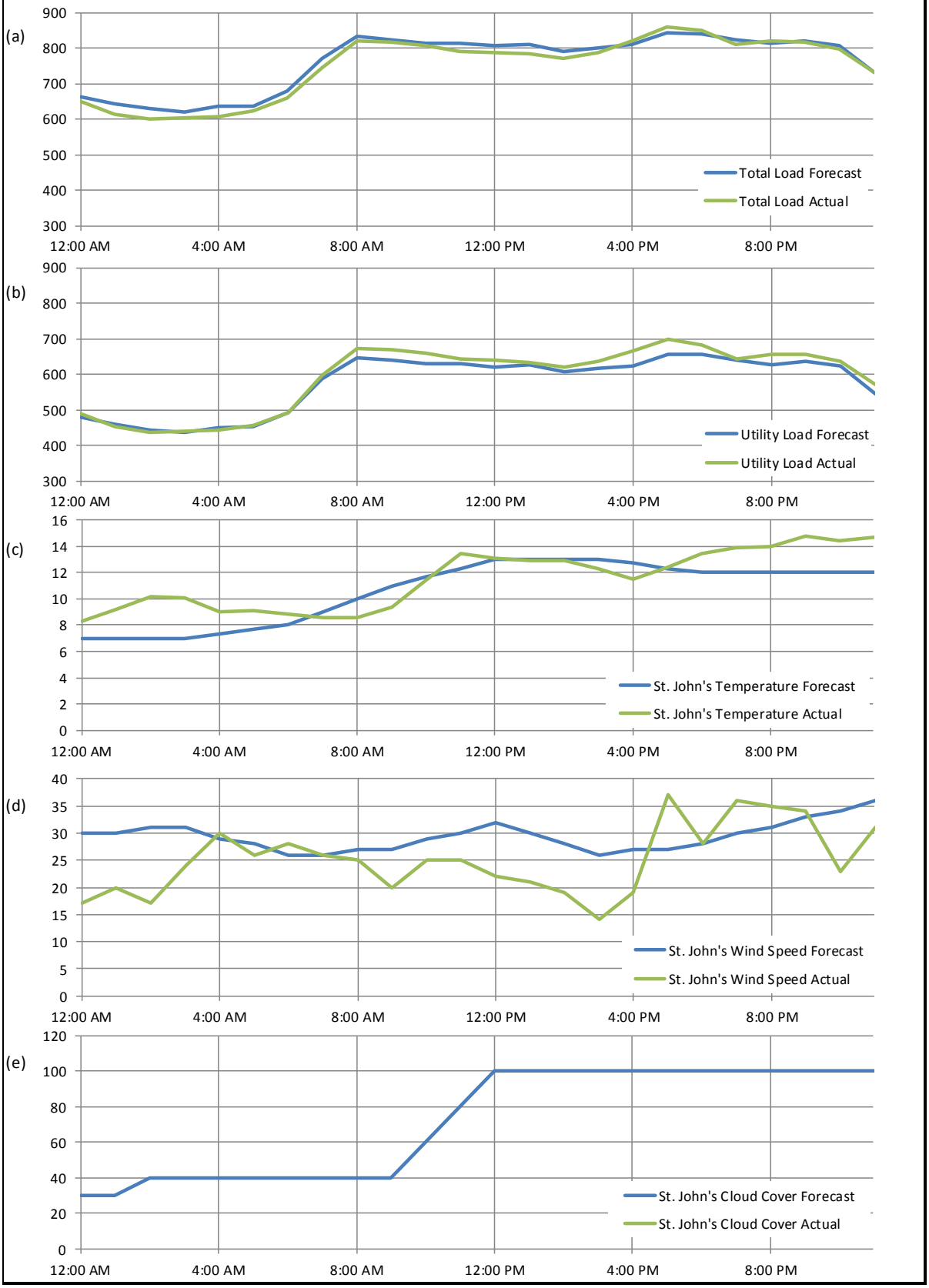

Figure 18 Accuracy Analysis - Jun 18, 2019

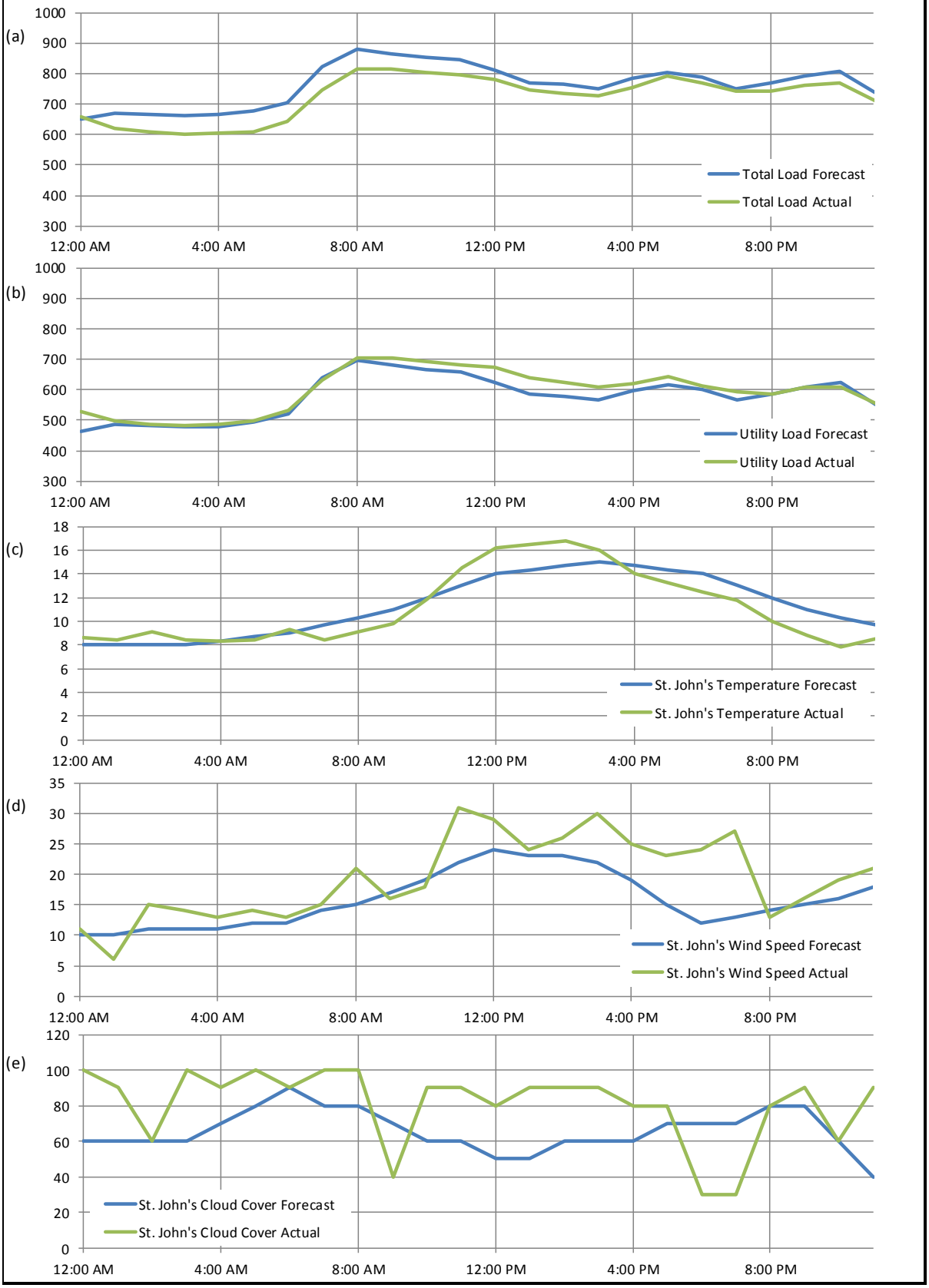

Figure 19 Accuracy Analysis - Jul 13, 2019

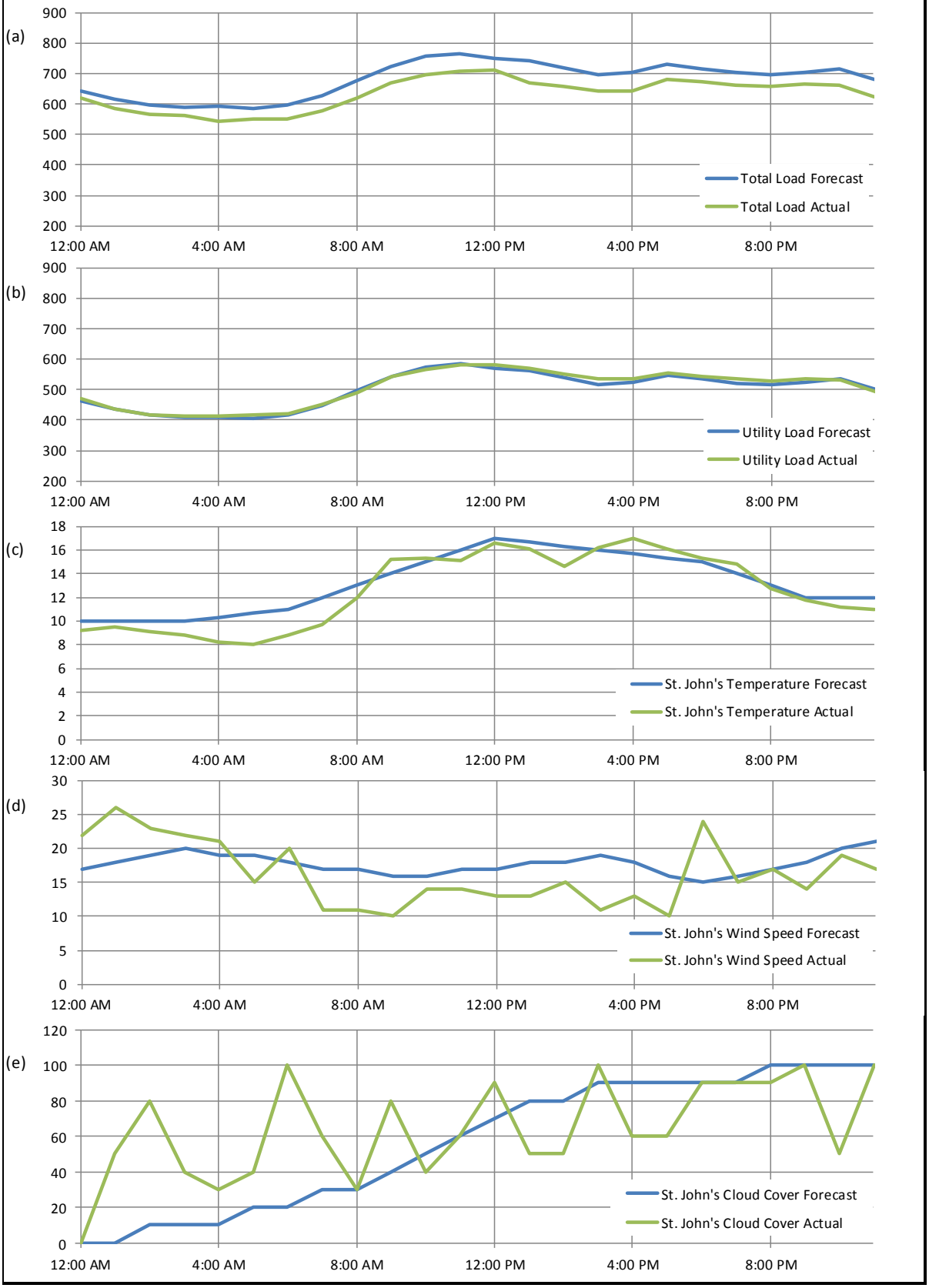

Figure 20 Accuracy Analysis - Jul 14, 2019

Figure 21 Accuracy Analysis - Jul 29, 2019

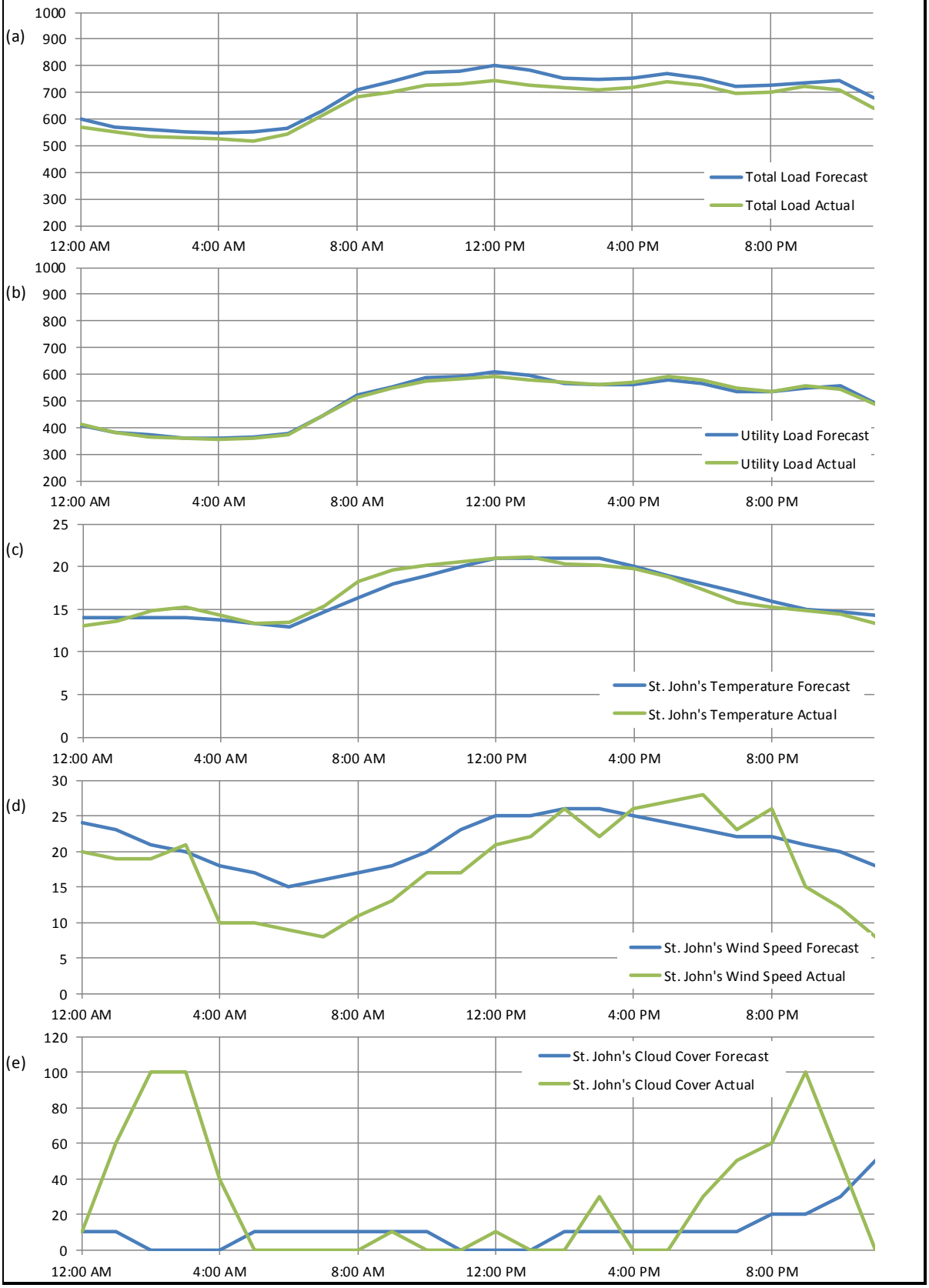

Figure 22 Accuracy Analysis - Aug 13, 2019

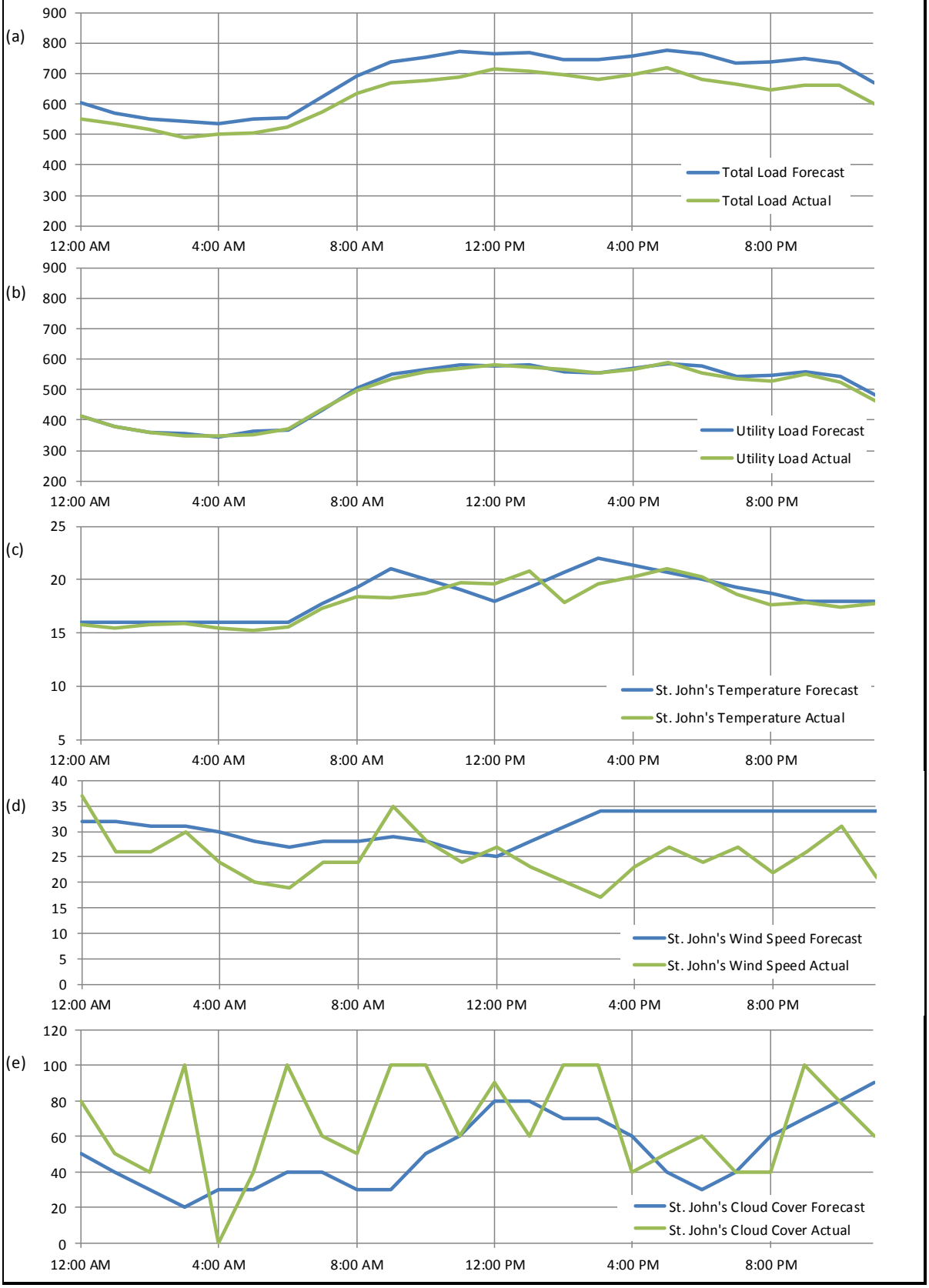

Figure 23 Accuracy Analysis - Aug 15, 2019

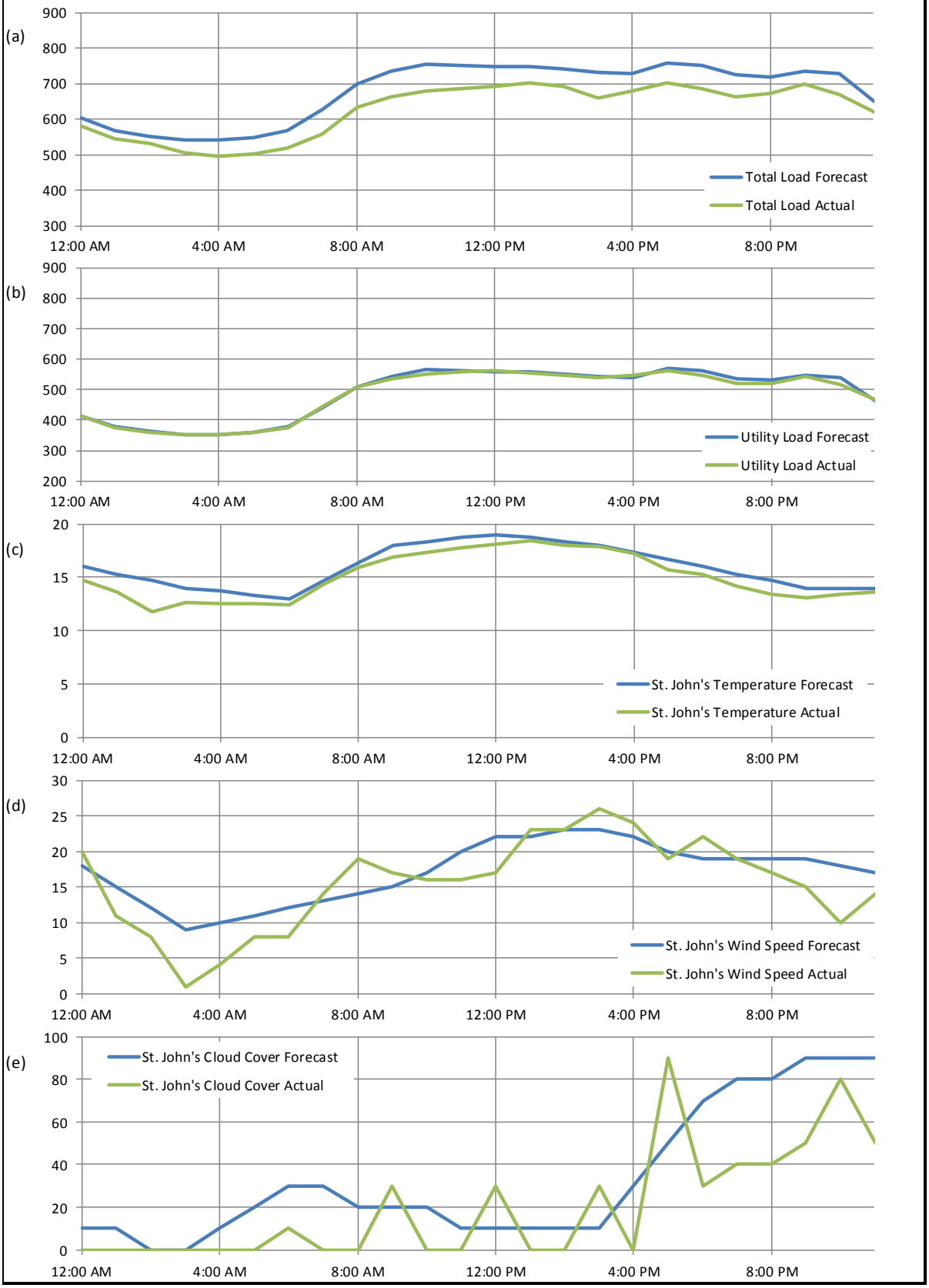

Figure 24 Accuracy Analysis - Aug 18, 2019

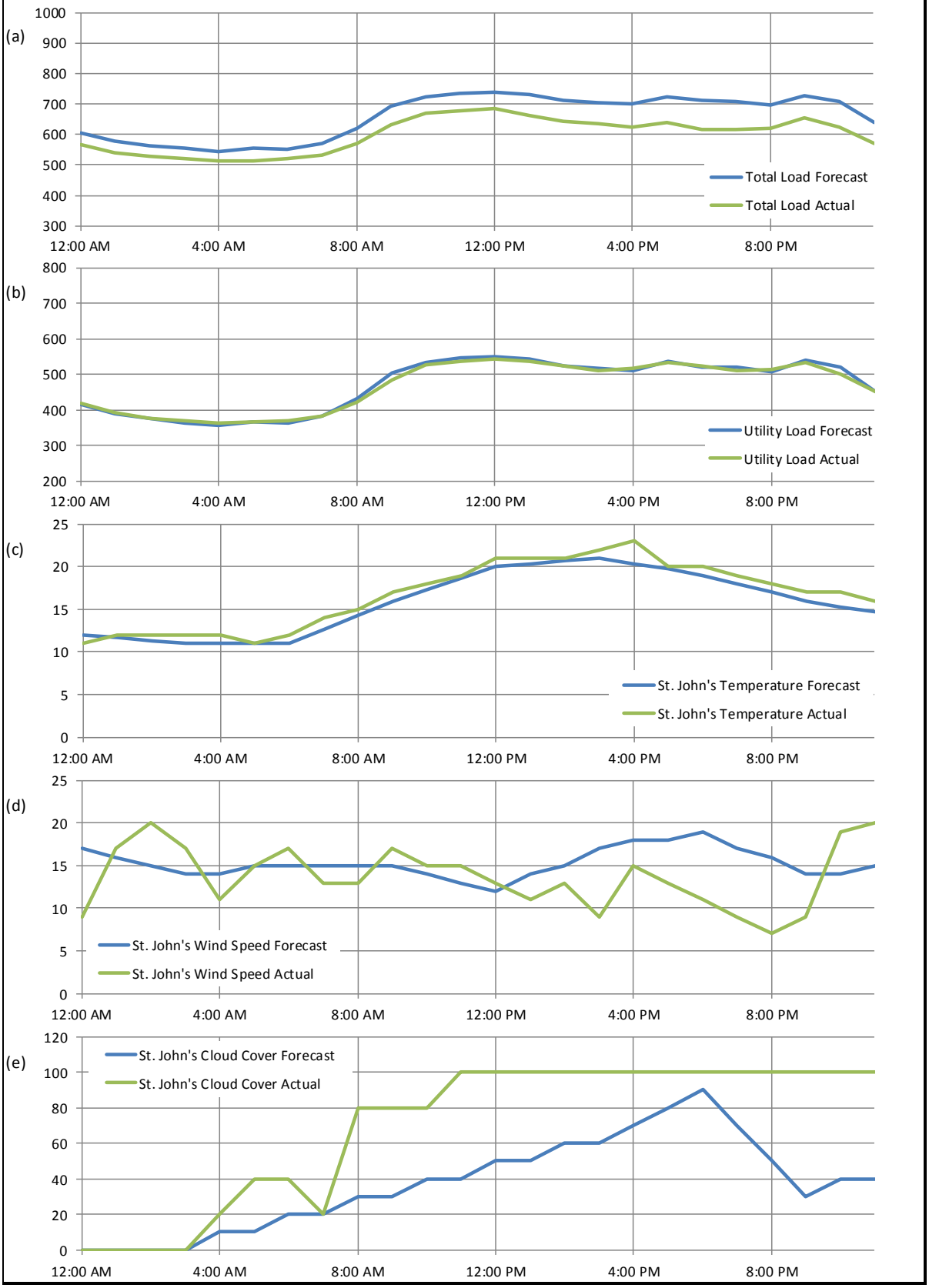

Figure 25 Accuracy Analysis - Sep 01, 2019

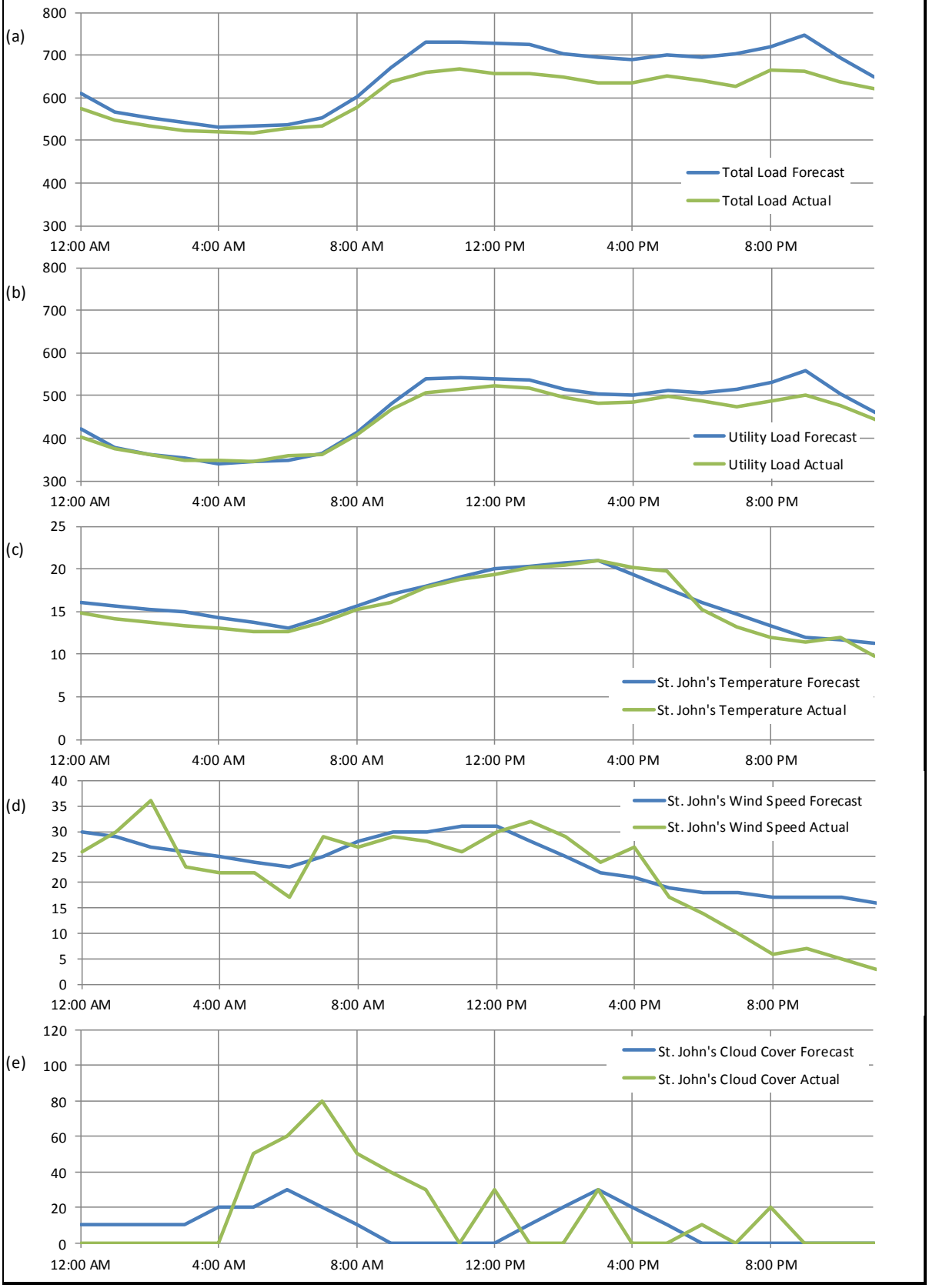

Figure 26 Accuracy Analysis - Sep 14, 2019

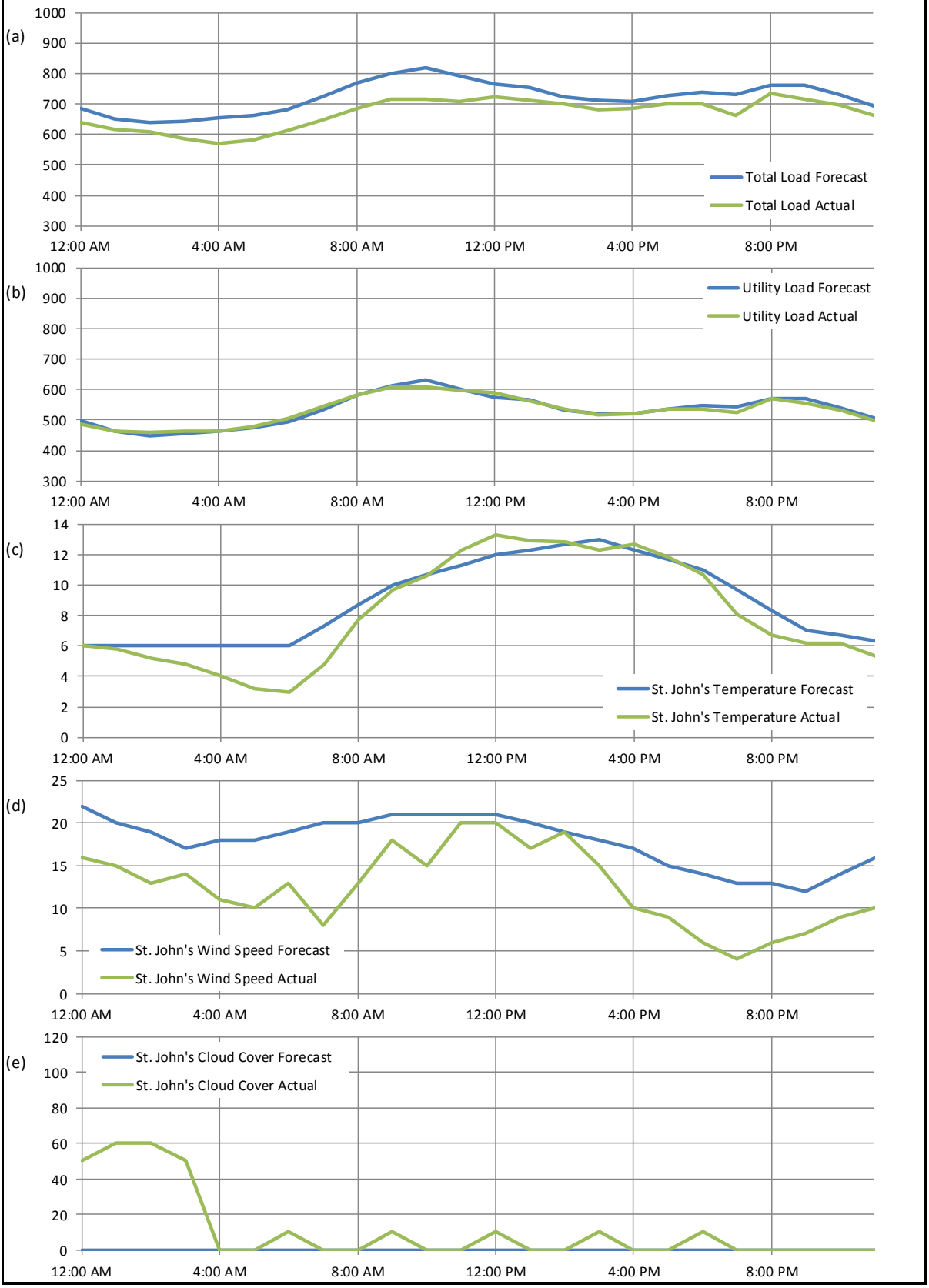

Figure 27 Accuracy Analysis - Sep 25, 2019

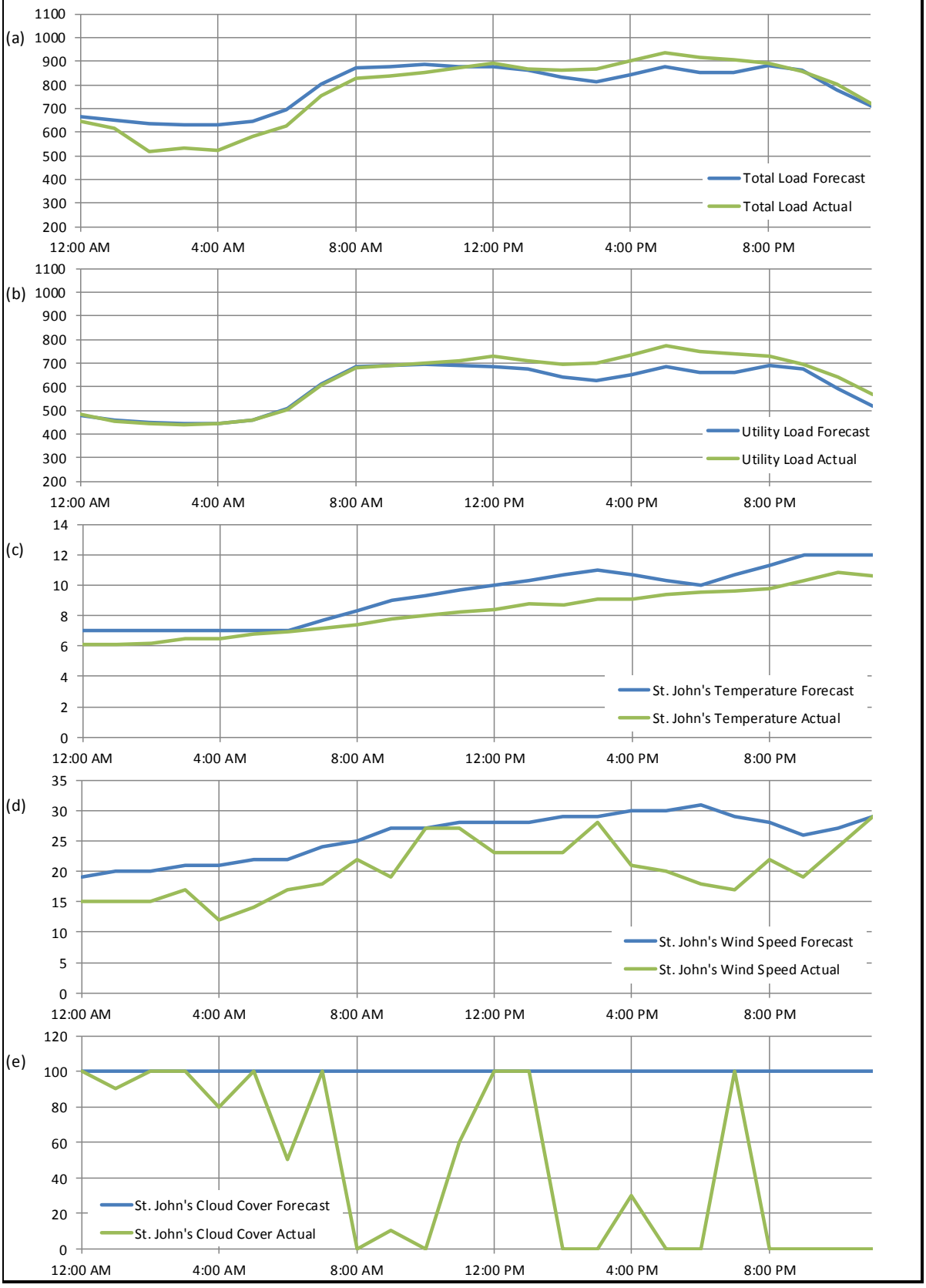

Figure 28 Accuracy Analysis - Oct 19, 2019

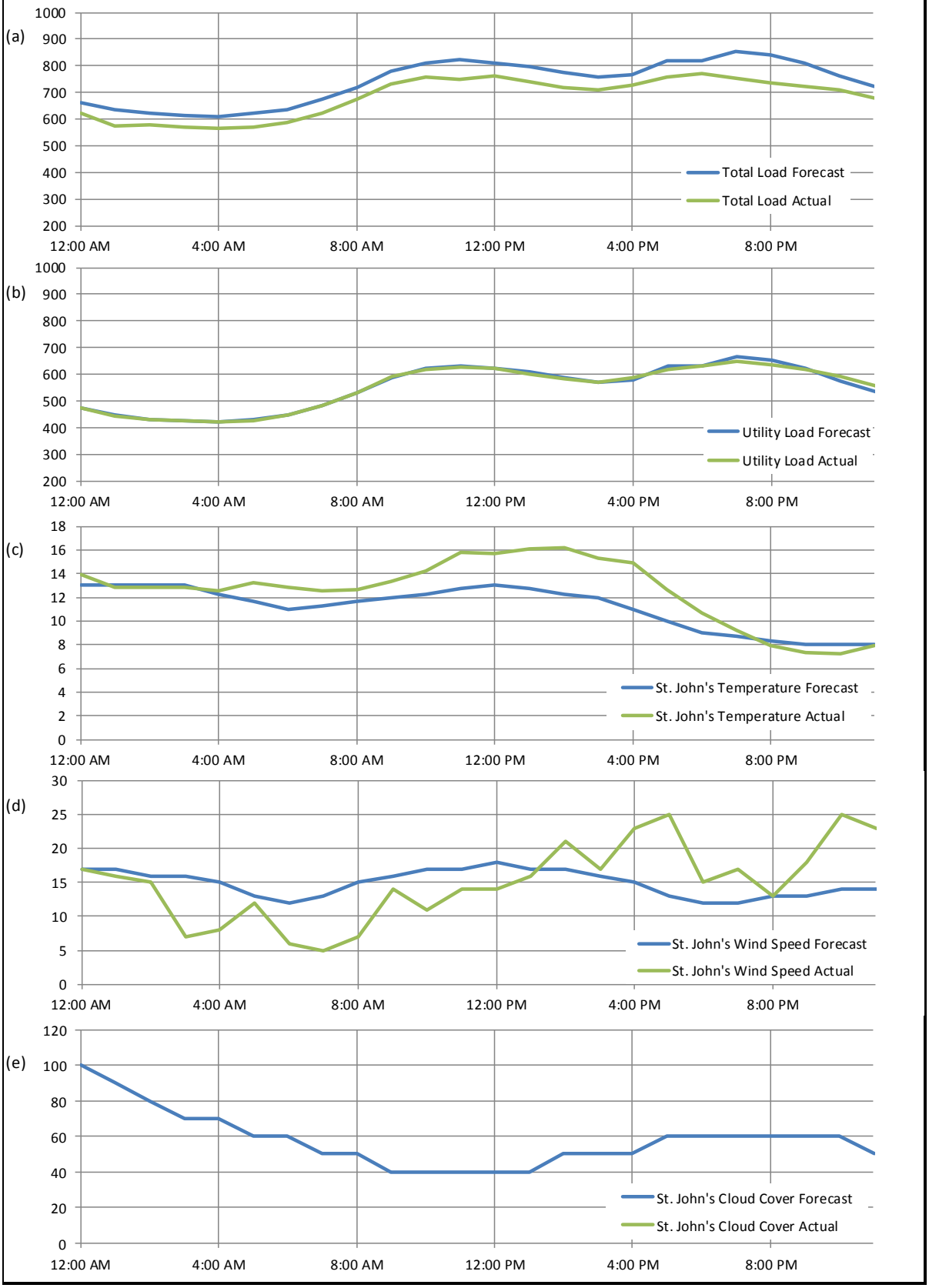

Figure 29 Accuracy Analysis - Oct 23, 2019

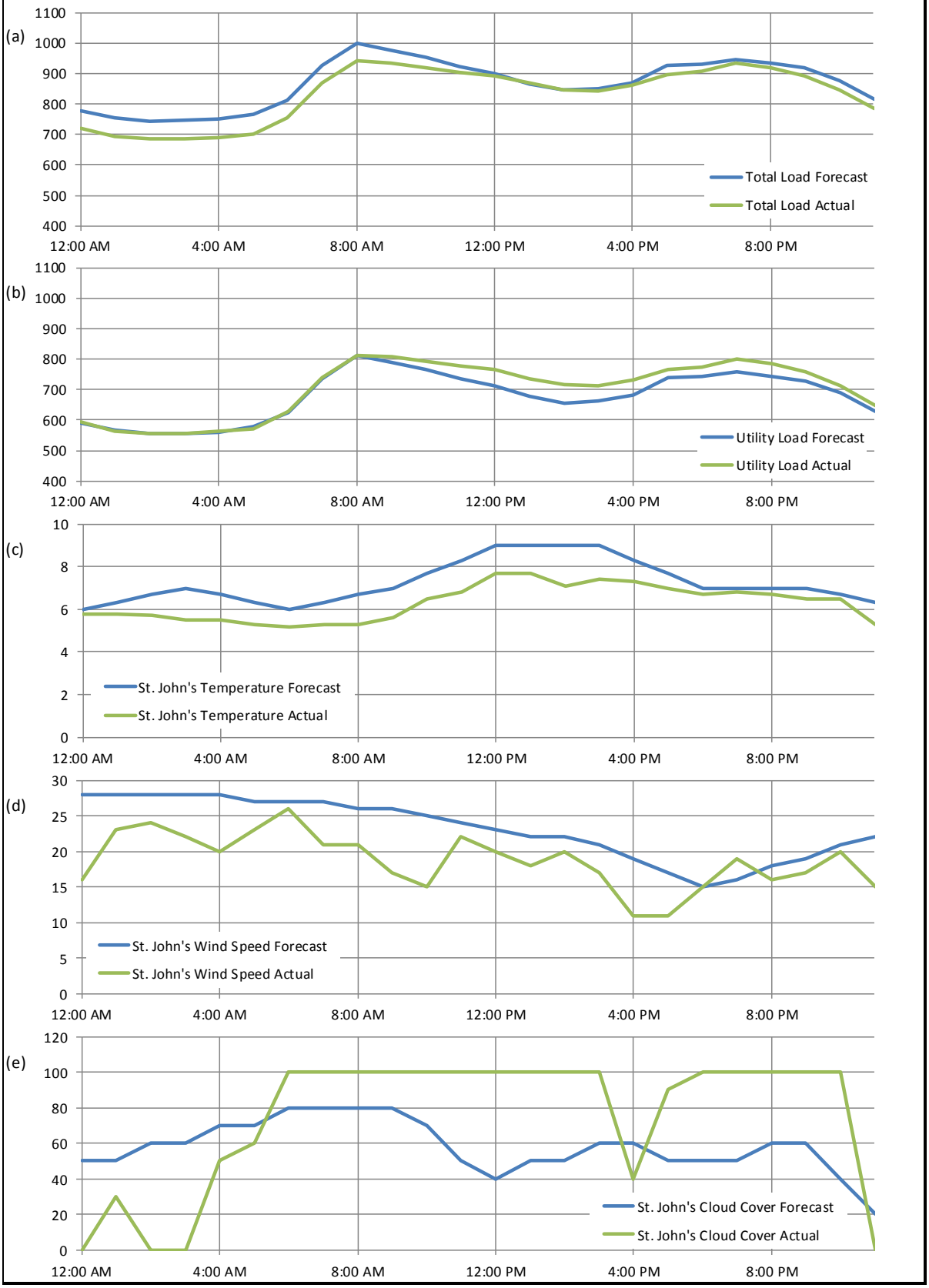

Figure 30 Accuracy Analysis - Nov 01, 2019

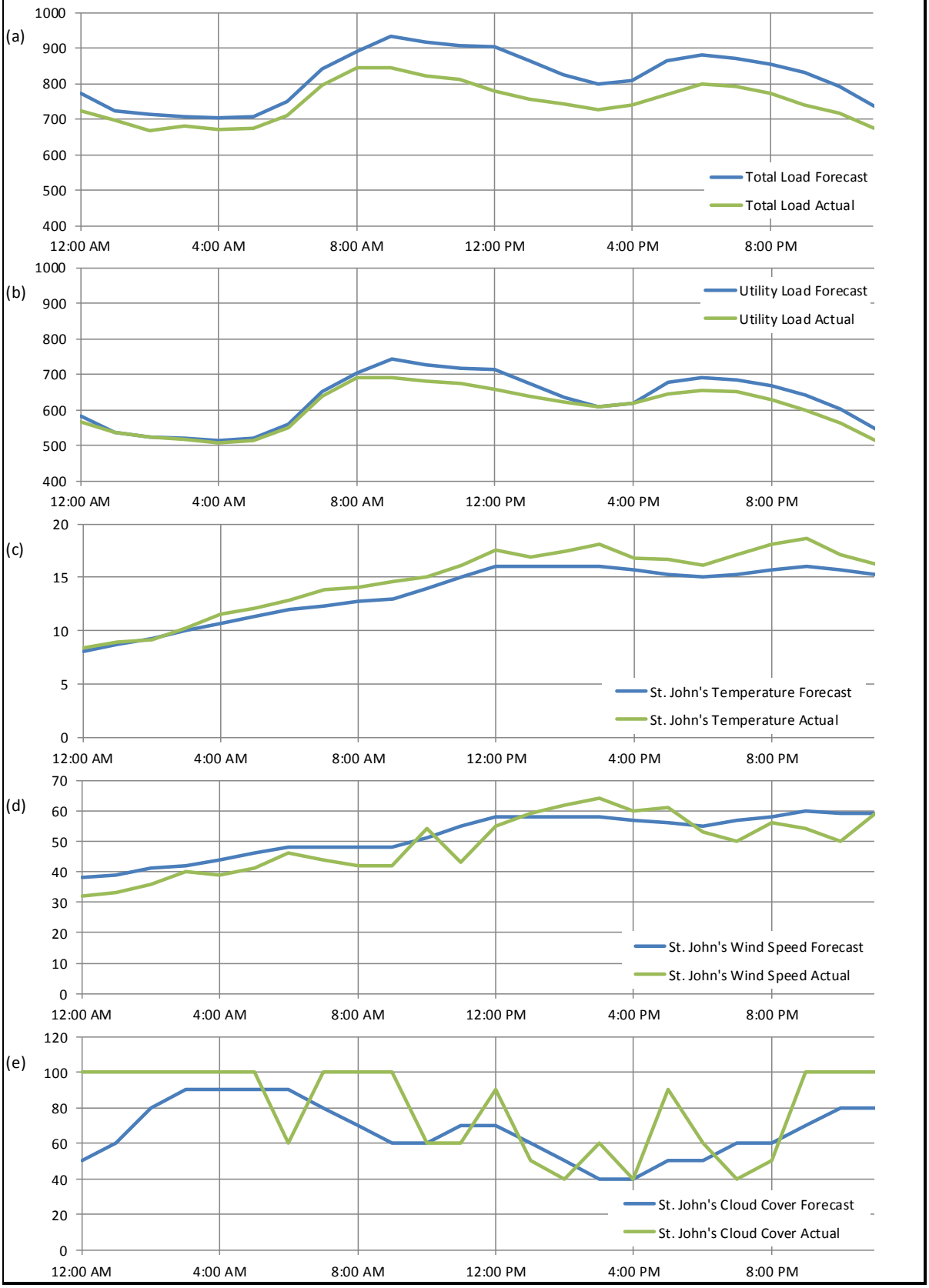

Figure 31 Accuracy Analysis - Nov 03, 2019

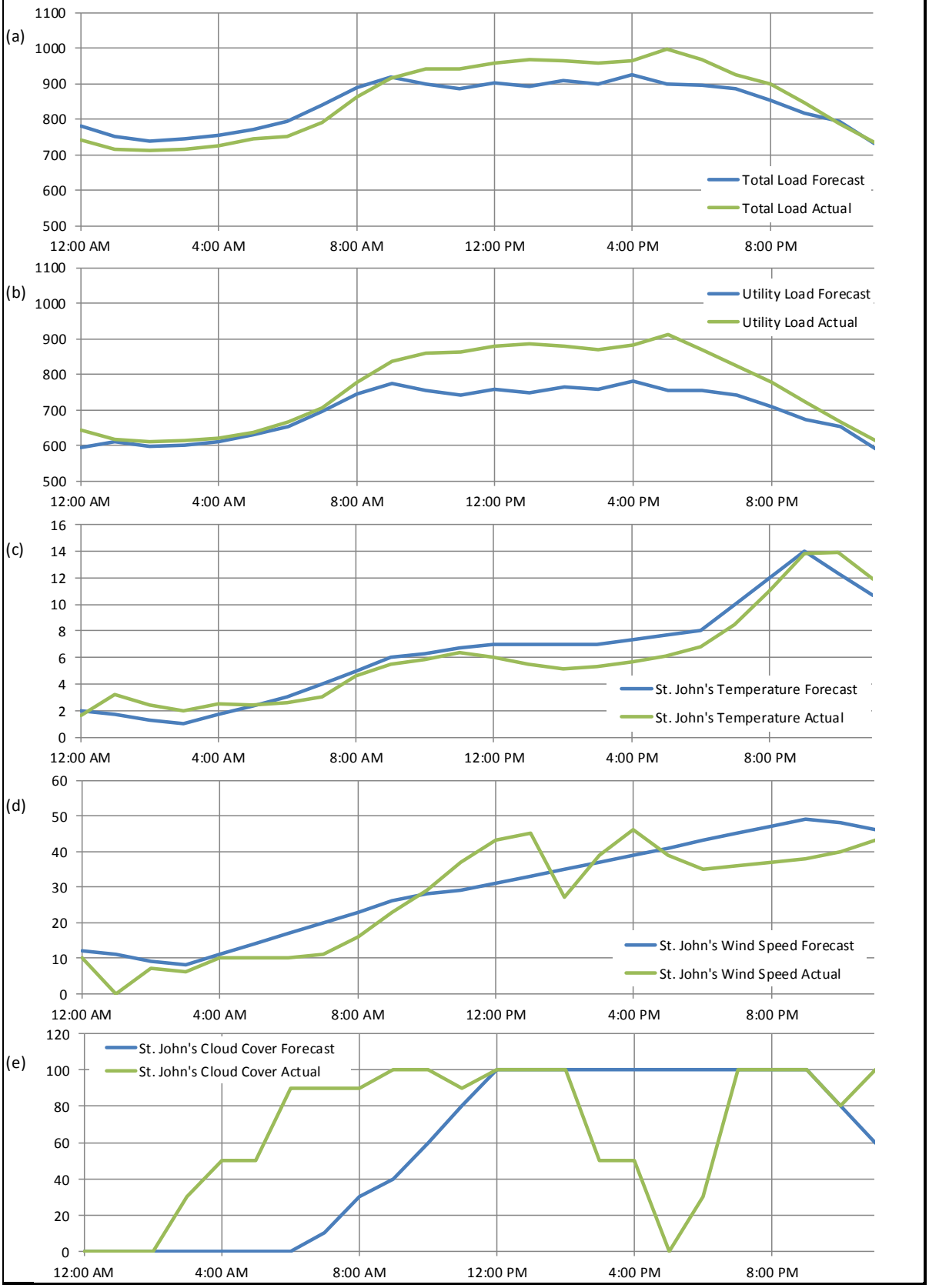

Figure 32 Accuracy Analysis - Nov 13, 2019

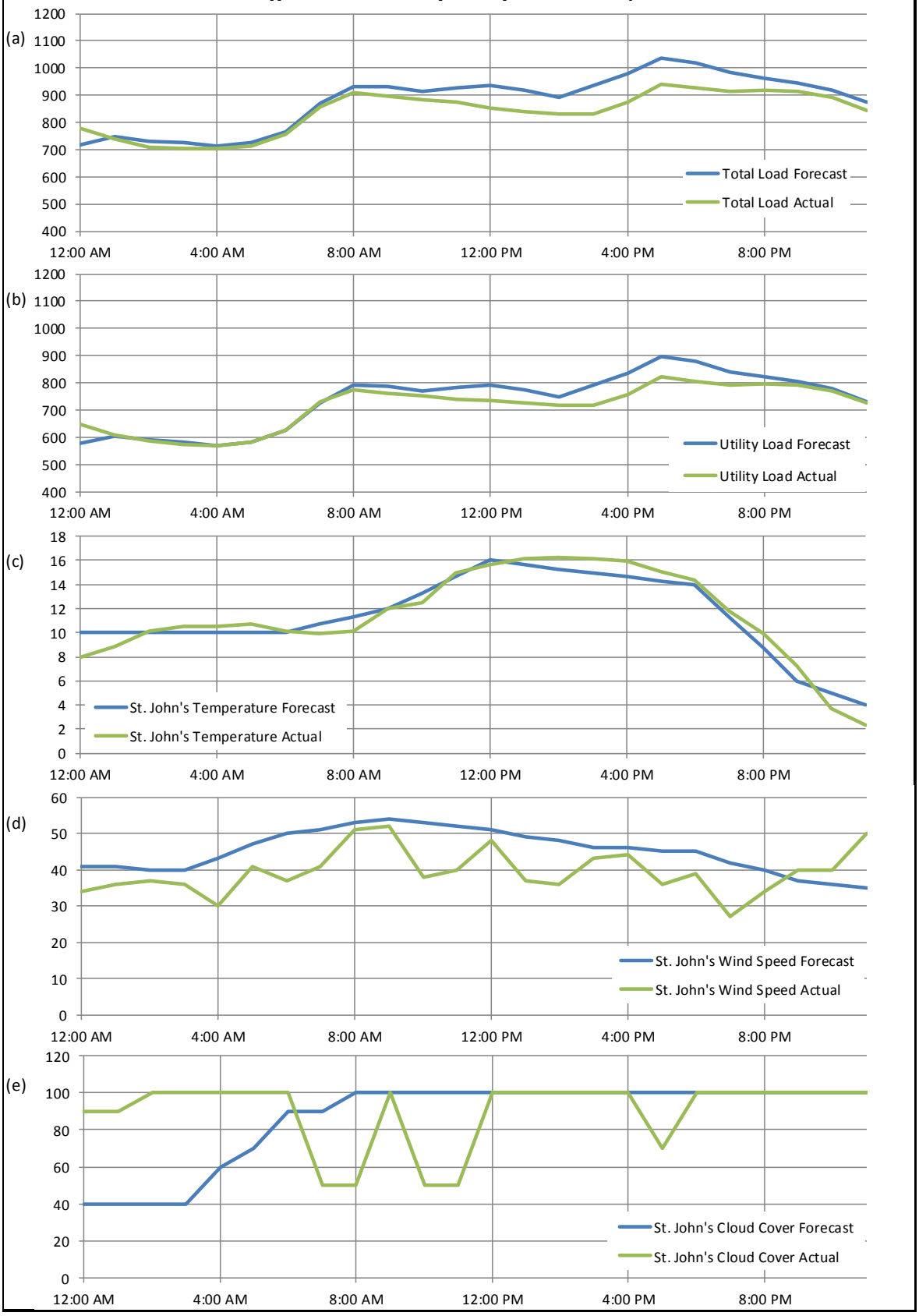

Figure 33 Accuracy Analysis - Dec 10, 2019

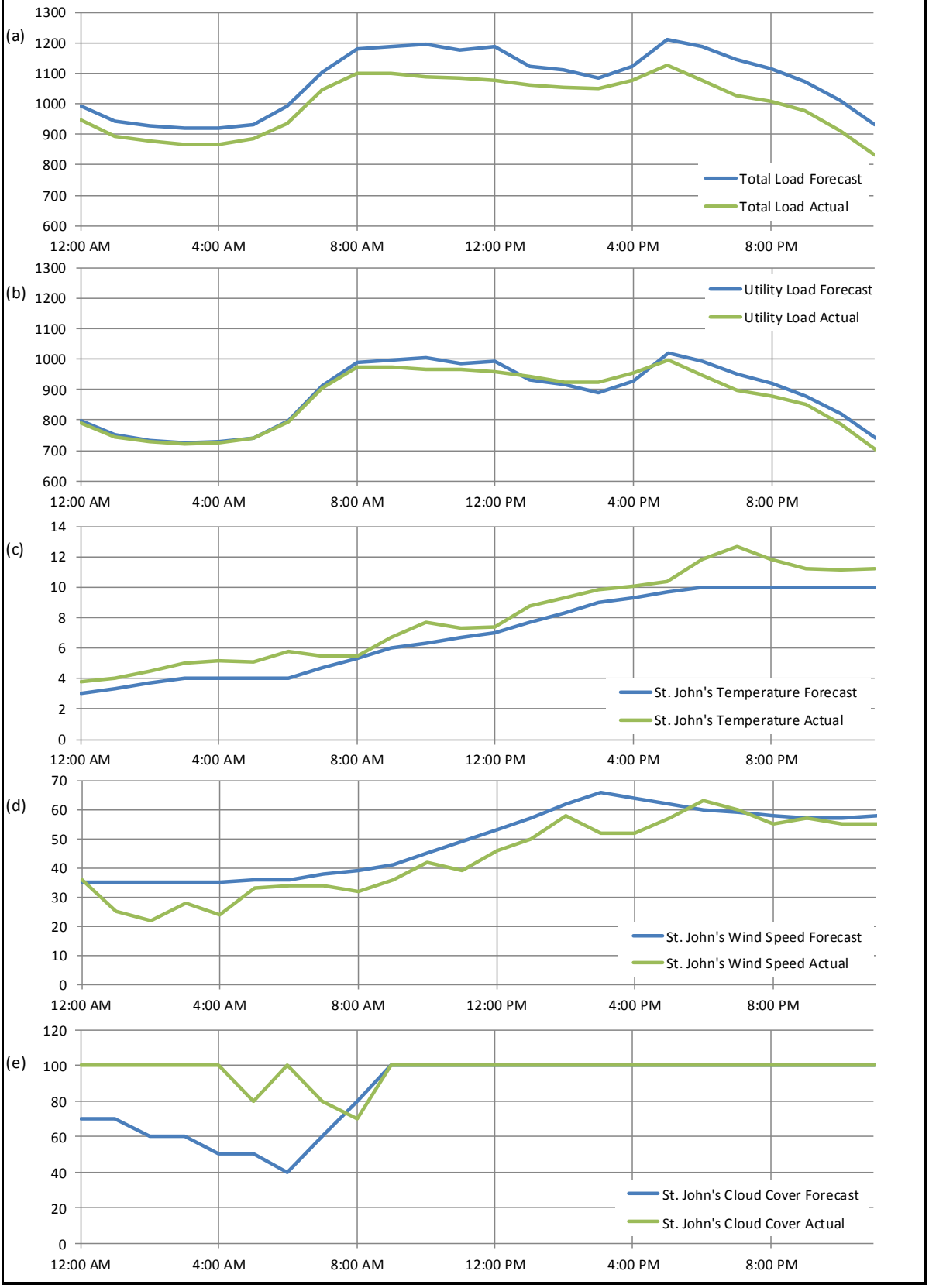

Figure 34 Accuracy Analysis - Dec 11, 2019

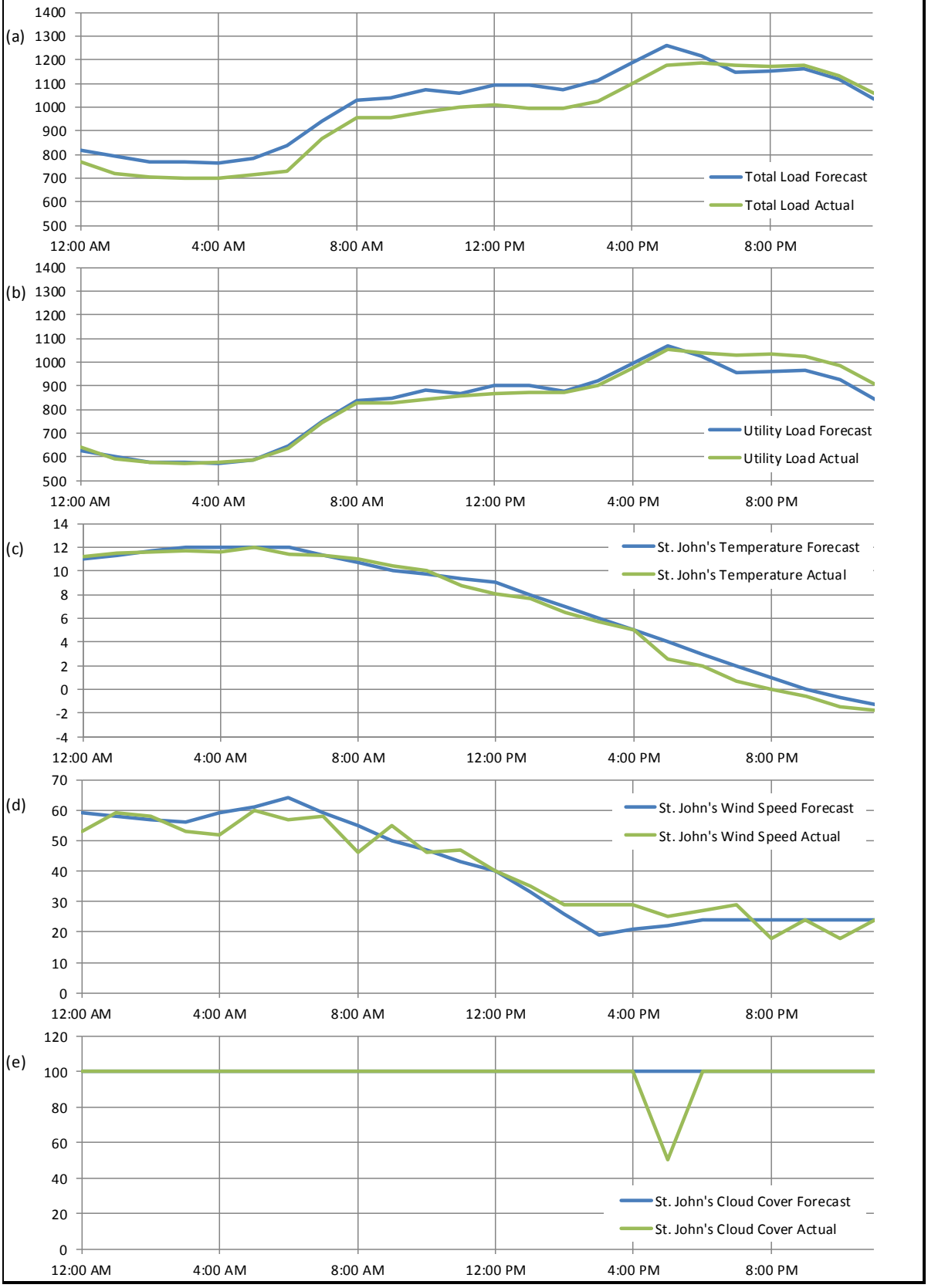

Figure 35 Accuracy Analysis - Dec 19, 2019

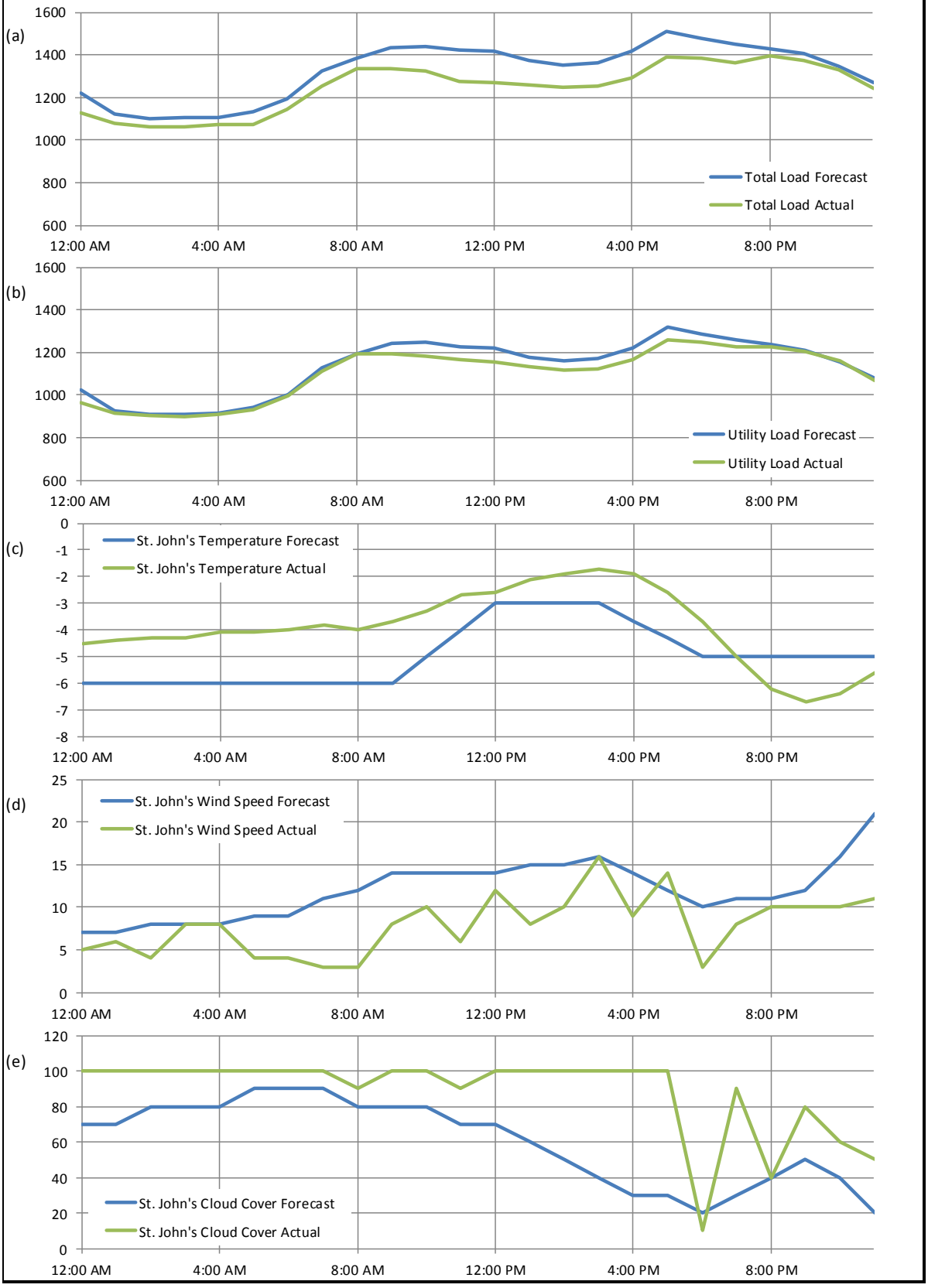

Table 1: Load Forecasting Data (MW)[14]

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
1-Jan-2019	1,555	1,504	2,070	515
2-Jan-2019	1,555	1,573	2,105	550
3-Jan-2019	1,595	1,650	2,061	466
4-Jan-2019	1,605	1,620	2,046	441
5-Jan-2019	1,380	1,371	2,134	754
6-Jan-2019	1,395	1,314	2,184	789
7-Jan-2019	1,470	1,437	2,145	675
8-Jan-2019	1,585	1,581	2,131	546
9-Jan-2019	1,485	1,506	2,170	685
10-Jan-2019	1,420	1,358	2,166	746
11-Jan-2019	1,320	1,263	2,145	825
12-Jan-2019	1,360	1,369	2,156	796
13-Jan-2019	1,435	1,460	2,134	699
14-Jan-2019	1,480	1,463	2,118	638
15-Jan-2019	1,470	1,411	2,132	662
16-Jan-2019	1,510	1,485	2,095	585
17-Jan-2019	1,515	1,469	2,045	530
18-Jan-2019	1,625	1,617	2,020	395
19-Jan-2019	1,500	1,427	2,060	560
20-Jan-2019	1,575	1,517	2,038	463
21-Jan-2019	1,360	1,324	2,084	724
22-Jan-2019	1,455	1,322	2,155	700
23-Jan-2019	1,450	1,383	2,167	717
24-Jan-2019	1,435	1,397	2,197	762
25-Jan-2019	1,310	1,184	2,241	931
26-Jan-2019	1,255	1,289	2,060	805
27-Jan-2019	1,355	1,372	2,104	749
28-Jan-2019	1,400	1,374	2,132	732
29-Jan-2019	1,510	1,430	2,117	607
30-Jan-2019	1,480	1,479	1,966	486
31-Jan-2019	1,405	1,346	2,016	611
Minimum	1,255	1,184	1,966	395
Average	1,460	1,429	2,109	650
Maximum	1,625	1,650	2,241	931

[14] Forecast Reserve does not include adjustments for interruptible load, the impact of voltage reduction, or scheduled off-Island imports.

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
1-Feb-2019	1,560	1,623	1,985	425
2-Feb-2019	1,545	1,557	2,103	558
3-Feb-2019	1,555	1,556	2,114	559
4-Feb-2019	1,660	1,660	2,143	483
5-Feb-2019	1,405	1,411	2,130	725
6-Feb-2019	1,410	1439	2,030	620
7-Feb-2019	1,470	1,446	2,082	612
8-Feb-2019	1,430	1,429	2,062	632
9-Feb-2019	1,515	1,501	2,106	591
10-Feb-2019	1,650	1,641	2,035	385
11-Feb-2019	1,700	1,686	2,035	335
12-Feb-2019	1,600	1,585	2,030	430
13-Feb-2019	1,620	1,592	2,065	445
14-Feb-2019	1,455	1,444	2,107	652
15-Feb-2019	1,440	1,405	2,082	642
16-Feb-2019	1,380	1,418	2,131	751
17-Feb-2019	1,435	1,272	2,125	690
18-Feb-2019	1,565	1,491	2,000	435
19-Feb-2019	1,585	1,518	2,037	452
20-Feb-2019	1,730	1,782	2,095	365
21-Feb-2019	1,775	1,760	1,995	220
22-Feb-2019	1,670	1,658	2,015	345
23-Feb-2019	1,680	1,647	2,161	481
24-Feb-2019	1,645	1,581	2,117	472
25-Feb-2019	1,695	1,697	2,216	521
26-Feb-2019	1,455	1,412	2,119	664
27-Feb-2019	1,570	1,583	1,835	265
28-Feb-2019	1,575	1,534	1,915	340
Minimum	1,380	1,272	1,835	220
Average	1,563	1,547	2,067	503
Maximum	1,775	1,782	2,216	751
1-Mar-2019	1,620	1,578	2,015	395
2-Mar-2019	1,465	1,372	2,140	675
3-Mar-2019	1,545	1,448	2,015	470
4-Mar-2019	1,515	1,498	2,032	517
5-Mar-2019	1,445	1,427	2,075	630
6-Mar-2019	1,510	1,458	1,866	356
7-Mar-2019	1,575	1,617	2,111	536

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
8-Mar-2019	1,635	1,593	2,040	405
9-Mar-2019	1,465	1,451	1,840	375
10-Mar-2019	1,405	1,360	1,872	467
11-Mar-2019	1,470	1,498	1,902	432
12-Mar-2019	1,295	1,289	1,949	654
13-Mar-2019	1,295	1,301	2,030	735
14-Mar-2019	1,400	1,406	1,890	490
15-Mar-2019	1,370	1,380	1,987	617
16-Mar-2019	1,280	1,242	2,029	749
17-Mar-2019	1,275	1,291	2,004	729
18-Mar-2019	1,390	1,389	1,841	451
19-Mar-2019	1,470	1,443	1,922	452
20-Mar-2019	1,450	1,457	1,902	452
21-Mar-2019	1,435	1,408	2,005	570
22-Mar-2019	1,325	1,290	1,910	585
23-Mar-2019	1,165	1,110	1,884	719
24-Mar-2019	1,180	1,199	1,884	704
25-Mar-2019	1,360	1,367	1,876	516
26-Mar-2019	1,425	1,414	1,976	551
27-Mar-2019	1,490	1,389	1,837	347
28-Mar-2019	1,535	1,522	1,817	282
29-Mar-2019	1,360	1,354	1,861	501
30-Mar-2019	1,230	1,187	1,794	564
31-Mar-2019	1,065	1,062	1,815	750
Minimum	1,065	1,062	1,794	282
Average	1,401	1,381	1,939	538
Maximum	1,635	1,617	2,140	750
1-Apr-2019	1,075	1,068	1,769	694
2-Apr-2019	1,250	1,250	1,842	592
3-Apr-2019	1,295	1,217	1,803	508
4-Apr-2019	1,265	1,211	1,834	569
5-Apr-2019	1,365	1,344	1,849	484
6-Apr-2019	1,265	1,233	1,705	440
7-Apr-2019	1,260	1,195	1,705	445
8-Apr-2019	1,415	1,399	1,820	405
9-Apr-2019	1,445	1,415	1,770	325
10-Apr-2019	1,290	1,241	1,796	506
11-Apr-2019	1,235	1,194	1,809	574

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
12-Apr-2019	1,240	1,198	1,810	570
13-Apr-2019	1,145	1,133	1,683	538
14-Apr-2019	1,080	1,091	1,652	572
15-Apr-2019	1,190	1,157	1,676	486
16-Apr-2019	1,200	1,143	1,684	484
17-Apr-2019	1,280	1,257	1,701	421
18-Apr-2019	1,295	1,294	1,704	409
19-Apr-2019	1,170	1,242	1,763	593
20-Apr-2019	1,095	1,109	1,762	667
21-Apr-2019	1,100	1,108	1,754	654
22-Apr-2019	1,010	957	1,752	742
23-Apr-2019	1,100	1,070	1,723	623
24-Apr-2019	1,260	1,339	1,737	477
25-Apr-2019	1,300	1,288	1,758	458
26-Apr-2019	1,245	1,196	1,767	522
27-Apr-2019	1,110	1,158	1,744	634
28-Apr-2019	1,165	1,137	1,635	470
29-Apr-2019	1,135	1,156	1,689	554
30-Apr-2019	1,300	1,256	1,705	405
Minimum	1,010	957	1,635	325
Average	1,219	1,202	1,747	527
Maximum	1,445	1,415	1,849	742
1-May-2019	1,275	1,221	1,700	425
2-May-2019	1,195	1,168	1,680	485
3-May-2019	1,190	1,188	1,615	425
4-May-2019	1,085	1,069	1,760	675
5-May-2019	995	969	1,750	755
6-May-2019	1,060	1,056	1,680	620
7-May-2019	1,095	1,084	1,695	600
8-May-2019	1,095	1,068	1,680	585
9-May-2019	1,160	1,153	1,700	540
10-May-2019	1,160	1,178	1,700	540
11-May-2019	1,045	1,097	1,680	635
12-May-2019	1,145	1,121	1,685	540
13-May-2019	1,100	1,128	1,700	600
14-May-2019	1,050	1,086	1,690	640
15-May-2019	1,115	1,157	1,715	600
16-May-2019	1,110	1,065	1,705	595

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
17-May-2019	1,050	1,075	1,530	480
18-May-2019	980	987	1,595	615
19-May-2019	1,115	1,098	1,625	510
20-May-2019	1,065	1,016	1,640	575
21-May-2019	1,055	1,077	1,585	530
22-May-2019	1,155	1,181	1,580	425
23-May-2019	1,190	1,195	1,590	400
24-May-2019	1,125	1,099	1,565	440
25-May-2019	940	856	1,675	735
26-May-2019	880	887	1,687	807
27-May-2019	1,040	1,067	1,490	450
28-May-2019	1,050	1,028	1,557	507
29-May-2019	1,015	1,055	1,475	460
30-May-2019	925	932	1,579	654
31-May-2019	1,005	999	1,577	572
Minimum	880	856	1,475	400
Average	1,080	1,076	1,641	562
Maximum	1,275	1,221	1,760	807
1-Jun-2019	965	999	1,465	500
2-Jun-2019	870	868	1,460	590
3-Jun-2019	990	992	1,480	490
4-Jun-2019	870	879	1,480	610
5-Jun-2019	835	750	1,475	640
6-Jun-2019	845	915	1,475	630
7-Jun-2019	835	833	1,495	660
8-Jun-2019	825	816	1,340	515
9-Jun-2019	920	917	1,320	400
10-Jun-2019	1,005	980	1,310	305
11-Jun-2019	935	917	1,445	510
12-Jun-2019	920	876	1,429	509
13-Jun-2019	910	883	1,430	520
14-Jun-2019	905	874	1,484	579
15-Jun-2019	915	899	1,465	550
16-Jun-2019	900	900	1,295	395
17-Jun-2019	885	878	1,260	375
18-Jun-2019	880	821	1,255	375
19-Jun-2019	820	813	1,260	440
20-Jun-2019	795	791	1,275	480

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
21-Jun-2019	855	823	1,285	430
22-Jun-2019	860	841	1,285	425
23-Jun-2019	895	849	1,335	440
24-Jun-2019	905	852	1,285	380
25-Jun-2019	835	833	1,285	450
26-Jun-2019	810	777	1,275	465
27-Jun-2019	810	783	1,260	450
28-Jun-2019	820	781	1,275	455
29-Jun-2019	770	759	1,285	515
30-Jun-2019	755	754	1,265	510
Minimum	755	750	1,255	305
Average	871	855	1,358	486
Maximum	1,005	999	1,495	660
1-Jul-2019	820	852	1,295	475
2-Jul-2019	815	849	1,290	475
3-Jul-2019	820	802	1,245	425
4-Jul-2019	855	815	1,265	410
5-Jul-2019	825	823	1,260	435
6-Jul-2019	755	780	1,260	505
7-Jul-2019	750	766	1,275	525
8-Jul-2019	780	804	1,240	460
9-Jul-2019	775	757	1,270	495
10-Jul-2019	795	809	1,235	440
11-Jul-2019	845	836	1,280	435
12-Jul-2019	845	810	1,260	415
13-Jul-2019	765	711	1,265	500
14-Jul-2019	775	720	1,270	495
15-Jul-2019	795	774	1,270	475
16-Jul-2019	755	789	1,220	465
17-Jul-2019	755	762	1,225	470
18-Jul-2019	760	774	1,310	550
19-Jul-2019	760	751	1,300	540
20-Jul-2019	740	726	1,275	535
21-Jul-2019	740	731	1,290	550
22-Jul-2019	775	771	1,270	495
23-Jul-2019	790	785	1,280	490
24-Jul-2019	780	763	1,280	500
25-Jul-2019	795	831	1,240	445

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
26-Jul-2019	790	780	1,280	490
27-Jul-2019	750	744	1,270	520
28-Jul-2019	745	727	1,250	505
29-Jul-2019	800	748	1,275	475
30-Jul-2019	785	776	1,220	435
31-Jul-2019	775	750	1,195	420
Minimum	740	711	1,195	410
Average	784	778	1,263	479
Maximum	855	852	1,310	550
1-Aug-2019	770	785	1,130	360
2-Aug-2019	780	793	1,180	400
3-Aug-2019	745	732	1,180	435
4-Aug-2019	750	708	1,175	425
5-Aug-2019	800	760	1,115	315
6-Aug-2019	765	748	1,130	365
7-Aug-2019	770	724	1,175	405
8-Aug-2019	780	754	1,185	405
9-Aug-2019	785	768	1,205	420
10-Aug-2019	740	747	1,180	440
11-Aug-2019	745	722	1,200	455
12-Aug-2019	780	740	1,195	415
13-Aug-2019	775	719	1,205	430
14-Aug-2019	760	716	1,185	425
15-Aug-2019	755	709	1,225	470
16-Aug-2019	760	740	1,215	455
17-Aug-2019	740	722	1,225	485
18-Aug-2019	740	690	1,290	550
19-Aug-2019	785	753	1,200	415
20-Aug-2019	775	766	1,215	440
21-Aug-2019	765	728	1,230	465
22-Aug-2019	775	747	1,200	425
23-Aug-2019	770	757	1,220	450
24-Aug-2019	765	723	1,240	475
25-Aug-2019	745	720	1,135	390
26-Aug-2019	775	748	1,130	355
27-Aug-2019	790	754	1,155	365
28-Aug-2019	770	751	1,135	365
29-Aug-2019	775	750	1,159	384

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
30-Aug-2019	775	763	1,150	375
31-Aug-2019	745	721	1,140	395
Minimum	740	690	1,115	315
Average	766	741	1,184	418
Maximum	800	793	1,290	550
1-Sep-2019	745	682	1,180	435
2-Sep-2019	755	736	1,180	425
3-Sep-2019	780	778	1,165	385
4-Sep-2019	765	747	1,150	385
5-Sep-2019	765	764	1,269	504
6-Sep-2019	745	744	1,210	465
7-Sep-2019	755	745	1,425	670
8-Sep-2019	830	764	1,460	630
9-Sep-2019	805	789	1,385	580
10-Sep-2019	810	775	1,340	530
11-Sep-2019	795	788	1,304	509
12-Sep-2019	840	796	1,414	574
13-Sep-2019	860	839	1,429	569
14-Sep-2019	820	750	1,409	589
15-Sep-2019	785	791	1,400	615
16-Sep-2019	815	765	1,380	565
17-Sep-2019	875	851	1,400	525
18-Sep-2019	910	914	1,435	525
19-Sep-2019	940	932	1,424	484
20-Sep-2019	840	810	1,484	644
21-Sep-2019	850	826	1,545	695
22-Sep-2019	835	828	1,540	705
23-Sep-2019	830	819	1,420	590
24-Sep-2019	855	828	1,520	665
25-Sep-2019	885	938	1,550	665
26-Sep-2019	855	889	1,510	655
27-Sep-2019	840	820	1,585	745
28-Sep-2019	800	804	1,555	755
29-Sep-2019	830	842	1,559	729
30-Sep-2019	940	936	1,549	609
Minimum	745	682	1,150	385
Average	825	810	1,406	581
Maximum	940	938	1,585	755

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
1-Oct-2019	965	927	1,529	564
2-Oct-2019	980	974	1,509	529
3-Oct-2019	1,010	996	1,529	519
4-Oct-2019	1,035	1,001	1,534	499
5-Oct-2019	980	981	1,629	649
6-Oct-2019	930	909	1,628	698
7-Oct-2019	935	939	1,648	713
8-Oct-2019	865	844	1,629	764
9-Oct-2019	900	859	1,603	703
10-Oct-2019	965	941	1,623	658
11-Oct-2019	980	957	1,589	609
12-Oct-2019	855	822	1,674	819
13-Oct-2019	825	850	1,660	835
14-Oct-2019	920	925	1,645	725
15-Oct-2019	960	962	1,574	614
16-Oct-2019	920	882	1,485	565
17-Oct-2019	1,010	972	1,579	569
18-Oct-2019	915	878	1,515	600
19-Oct-2019	855	785	1,504	649
20-Oct-2019	900	875	1,679	779
21-Oct-2019	975	929	1,659	684
22-Oct-2019	985	942	1,630	645
23-Oct-2019	1,000	944	1,679	679
24-Oct-2019	980	949	1,519	539
25-Oct-2019	950	912	1,752	802
26-Oct-2019	955	931	1,749	794
27-Oct-2019	1,025	991	1,774	749
28-Oct-2019	1,075	1,030	1,774	699
29-Oct-2019	1,085	1,072	1,684	599
30-Oct-2019	1,070	1,042	1,630	560
31-Oct-2019	1,030	997	1,725	695
Minimum	825	785	1,485	499
Average	962	936	1,624	661
Maximum	1,085	1,072	1,774	835
1-Nov-2019	935	853	1,785	850
2-Nov-2019	935	903	1,860	925
3-Nov-2019	925	1,007	1,685	760
4-Nov-2019	980	946	1,692	712

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
5-Nov-2019	1,065	1,008	1,672	607
6-Nov-2019	995	1,024	1,595	600
7-Nov-2019	1,115	1,101	1,792	677
8-Nov-2019	1,015	1,053	1,595	580
9-Nov-2019	1,180	1,156	1,787	607
10-Nov-2019	1,105	1,101	1,617	512
11-Nov-2019	1,105	1,098	1,647	542
12-Nov-2019	1,175	1,152	1,622	447
13-Nov-2019	1,040	941	1,660	620
14-Nov-2019	1,220	1,232	1,647	427
15-Nov-2019	1,285	1,270	1,652	367
16-Nov-2019	1,300	1,287	1,627	327
17-Nov-2019	1,250	1,241	1,627	377
18-Nov-2019	1,290	1,272	1,602	312
19-Nov-2019	1,225	1,196	1,722	497
20-Nov-2019	1,185	1,190	1,682	497
21-Nov-2019	1,230	1,288	1,797	567
22-Nov-2019	1,215	1,234	1,862	647
23-Nov-2019	1,165	1,154	1,715	550
24-Nov-2019	1,150	1,206	1,807	657
25-Nov-2019	1,245	1,267	1,787	542
26-Nov-2019	1,230	1,230	1,817	587
27-Nov-2019	1,225	1,204	1,767	542
28-Nov-2019	1,185	1,192	1,772	587
29-Nov-2019	1,280	1,248	1,812	532
30-Nov-2019	1,185	1,092	1,957	772
Minimum	925	853	1,595	312
Average	1,148	1,138	1,722	574
Maximum	1,300	1,288	1,957	925
1-Dec-2019	1,255	1,320	2,005	750
2-Dec-2019	1,400	1,375	1,980	580
3-Dec-2019	1,365	1,313	1,995	630
4-Dec-2019	1,205	1,171	2,040	835
5-Dec-2019	1,235	1,229	1,885	650
6-Dec-2019	1,275	1,229	1,970	695
7-Dec-2019	1,335	1,320	1,990	655
8-Dec-2019	1,390	1,400	1,985	595
9-Dec-2019	1,410	1,351	2,000	590

Date	Forecast Total Peak	Actual Total Peak	Available Island Supply	Forecast Reserve
10-Dec-2019	1,210	1,128	2,010	800
11-Dec-2019	1,260	1,195	1,985	725
12-Dec-2019	1,405	1,437	1,965	560
13-Dec-2019	1,565	1,564	2,000	435
14-Dec-2019	1,425	1,386	1,860	435
15-Dec-2019	1,230	1,171	1,872	642
16-Dec-2019	1,470	1,486	1,925	455
17-Dec-2019	1,570	1,492	2,025	455
18-Dec-2019	1,505	1,451	1,970	465
19-Dec-2019	1,510	1,398	1,975	465
20-Dec-2019	1,440	1,419	2,010	570
21-Dec-2019	1,390	1,365	2,060	670
22-Dec-2019	1,500	1,477	2,020	520
23-Dec-2019	1,495	1,500	1,995	500
24-Dec-2019	1,420	1,352	2,015	595
25-Dec-2019	1,305	1,322	2,040	735
26-Dec-2019	1,360	1,359	2,040	680
27-Dec-2019	1,380	1,344	2,050	670
28-Dec-2019	1,315	1,321	2,010	695
29-Dec-2019	1,305	1,303	2,025	720
30-Dec-2019	1,425	1,352	2,020	595
31-Dec-2019	1,355	1,316	2,015	660
Minimum	1,205	1,128	1,860	435
Average	1,378	1,350	1,992	614
Maximum	1,570	1,564	2,060	835

Table 2: Analysis of Total Forecast Error[15]

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
1-Jan-2019	1,504	1,555	51	51	3.4%	3.4%	3.3%
2-Jan-2019	1,573	1,555	-18	18	-1.1%	1.1%	-1.2%
3-Jan-2019	1,650	1,595	-55	55	-3.3%	3.3%	-3.4%
4-Jan-2019	1,620	1,605	-15	15	-0.9%	0.9%	-0.9%
5-Jan-2019	1,371	1,380	9	9	0.7%	0.7%	0.7%
6-Jan-2019	**1,314**	**1,395**	**81**	**81**	**6.2%**	**6.2%**	**5.8%**
7-Jan-2019	1,437	1,470	33	33	2.3%	2.3%	2.2%
8-Jan-2019	1,581	1,585	4	4	0.3%	0.3%	0.3%
9-Jan-2019	1,506	1,485	-21	21	-1.4%	1.4%	-1.4%
10-Jan-2019	1,358	1,420	62	62	4.6%	4.6%	4.4%
11-Jan-2019	1,263	1,320	57	57	4.5%	4.5%	4.3%
12-Jan-2019	1,369	1,360	-9	9	-0.7%	0.7%	-0.7%
13-Jan-2019	1,460	1,435	-25	25	-1.7%	1.7%	-1.7%
14-Jan-2019	1,463	1,480	17	17	1.2%	1.2%	1.1%
15-Jan-2019	1,411	1,470	59	59	4.2%	4.2%	4.0%
16-Jan-2019	1,485	1,510	25	25	1.7%	1.7%	1.7%
17-Jan-2019	1,469	1,515	46	46	3.1%	3.1%	3.0%
18-Jan-2019	1,617	1,625	8	8	0.5%	0.5%	0.5%
19-Jan-2019	1,427	1,500	73	73	5.1%	5.1%	4.9%
20-Jan-2019	1,517	1,575	58	58	3.8%	3.8%	3.7%
21-Jan-2019	1,324	1,360	36	36	2.7%	2.7%	2.6%
22-Jan-2019	**1,322**	**1,455**	**133**	**133**	**10.1%**	**10.1%**	**9.1%**
23-Jan-2019	1,383	1,450	67	67	4.8%	4.8%	4.6%
24-Jan-2019	1,397	1,435	38	38	2.7%	2.7%	2.6%
25-Jan-2019	**1,184**	**1,310**	**126**	**126**	**10.6%**	**10.6%**	**9.6%**
26-Jan-2019	1,289	1,255	-34	34	-2.6%	2.6%	-2.7%
27-Jan-2019	1,372	1,355	-17	17	-1.2%	1.2%	-1.3%
28-Jan-2019	1,374	1,400	26	26	1.9%	1.9%	1.9%
29-Jan-2019	1,430	1,510	80	80	5.6%	5.6%	5.3%
30-Jan-2019	1,479	1,480	1	1	0.1%	0.1%	0.1%
31-Jan-2019	1,346	1,405	59	59	4.4%	4.4%	4.2%
Minimum	1,184	1,255	-55	1	-3.3%	0.1%	-3.4%
Average	1,429	1,460	31	43	2.3%	3.1%	2.1%
Maximum	1,650	1,625	133	133	10.6%	10.6%	9.6%

[15] Lines that have been bolded indicate further examination of the hourly forecast was provided in this report.

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
1-Feb-2019	1,623	1,560	-63	63	-3.9%	3.9%	-4.0%
2-Feb-2019	1,557	1,545	-12	12	-0.8%	0.8%	-0.8%
3-Feb-2019	1,556	1,555	-1	1	-0.1%	0.1%	-0.1%
4-Feb-2019	1,660	1,660	0	0	0.0%	0.0%	0.0%
5-Feb-2019	1,411	1,405	-6	6	-0.4%	0.4%	-0.4%
6-Feb-2019	1,439	1,410	-29	29	-2.0%	2.0%	-2.1%
7-Feb-2019	1,446	1,470	24	24	1.7%	1.7%	1.6%
8-Feb-2019	1,429	1,430	1	1	0.1%	0.1%	0.1%
9-Feb-2019	1,501	1,515	14	14	0.9%	0.9%	0.9%
10-Feb-2019	1,641	1,650	9	9	0.5%	0.5%	0.5%
11-Feb-2019	1,686	1,700	14	14	0.8%	0.8%	0.8%
12-Feb-2019	1,585	1,600	15	15	0.9%	0.9%	0.9%
13-Feb-2019	1,592	1,620	28	28	1.8%	1.8%	1.7%
14-Feb-2019	1,444	1,455	11	11	0.8%	0.8%	0.8%
15-Feb-2019	1,405	1,440	35	35	2.5%	2.5%	2.4%
16-Feb-2019	1,418	1,380	-38	38	-2.7%	2.7%	-2.8%
17-Feb-2019	**1,272**	**1,435**	**163**	**163**	**12.8%**	**12.8%**	**11.4%**
18-Feb-2019	**1,491**	**1,565**	**74**	**74**	**5.0%**	**5.0%**	**4.7%**
19-Feb-2019	1,518	1,585	67	67	4.4%	4.4%	4.2%
20-Feb-2019	1,782	1,730	-52	52	-2.9%	2.9%	-3.0%
21-Feb-2019	1,760	1,775	15	15	0.9%	0.9%	0.8%
22-Feb-2019	1,658	1,670	12	12	0.7%	0.7%	0.7%
23-Feb-2019	1,647	1,680	33	33	2.0%	2.0%	2.0%
24-Feb-2019	1,581	1,645	64	64	4.0%	4.0%	3.9%
25-Feb-2019	1,697	1,695	-2	2	-0.1%	0.1%	-0.1%
26-Feb-2019	1,412	1,455	43	43	3.0%	3.0%	3.0%
27-Feb-2019	1,583	1,570	-13	13	-0.8%	0.8%	-0.8%
28-Feb-2019	1,534	1,575	41	41	2.7%	2.7%	2.6%
Minimum	1,272	1,380	-63	0	-3.9%	0.0%	-4.0%
Average	1,547	1,563	16	31	1.1%	2.1%	1.0%
Maximum	1,782	1,775	163	163	12.8%	12.8%	11.4%
1-Mar-2019	1,578	1,620	42	42	2.7%	2.7%	2.6%
2-Mar-2019	**1,372**	**1,465**	**93**	**93**	**6.8%**	**6.8%**	**6.3%**
3-Mar-2019	**1,448**	**1,545**	**97**	**97**	**6.7%**	**6.7%**	**6.3%**
4-Mar-2019	1,498	1,515	17	17	1.1%	1.1%	1.1%
5-Mar-2019	1,427	1,445	18	18	1.3%	1.3%	1.2%
6-Mar-2019	1,458	1,510	52	52	3.6%	3.6%	3.4%
7-Mar-2019	1,617	1,575	-42	42	-2.6%	2.6%	-2.7%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
8-Mar-2019	1,593	1,635	42	42	2.6%	2.6%	2.6%
9-Mar-2019	1,451	1,465	14	14	1.0%	1.0%	1.0%
10-Mar-2019	1,360	1,405	45	45	3.3%	3.3%	3.2%
11-Mar-2019	1,498	1,470	-28	28	-1.9%	1.9%	-1.9%
12-Mar-2019	1,289	1,295	6	6	0.5%	0.5%	0.5%
13-Mar-2019	1,301	1,295	-6	6	-0.5%	0.5%	-0.5%
14-Mar-2019	1,406	1,400	-6	6	-0.4%	0.4%	-0.4%
15-Mar-2019	1,380	1,370	-10	10	-0.7%	0.7%	-0.7%
16-Mar-2019	1,242	1,280	38	38	3.1%	3.1%	3.0%
17-Mar-2019	1,291	1,275	-16	16	-1.2%	1.2%	-1.3%
18-Mar-2019	1,389	1,390	1	1	0.1%	0.1%	0.1%
19-Mar-2019	1,443	1,470	27	27	1.9%	1.9%	1.8%
20-Mar-2019	1,457	1,450	-7	7	-0.5%	0.5%	-0.5%
21-Mar-2019	1,408	1,435	27	27	1.9%	1.9%	1.9%
22-Mar-2019	1,290	1,325	35	35	2.7%	2.7%	2.6%
23-Mar-2019	1,110	1,165	55	55	5.0%	5.0%	4.7%
24-Mar-2019	1,199	1,180	-19	19	-1.6%	1.6%	-1.6%
25-Mar-2019	1,367	1,360	-7	7	-0.5%	0.5%	-0.5%
26-Mar-2019	1,414	1,425	11	11	0.8%	0.8%	0.8%
27-Mar-2019	**1,389**	**1,490**	**101**	**101**	**7.3%**	**7.3%**	**6.8%**
28-Mar-2019	1,522	1,535	13	13	0.9%	0.9%	0.8%
29-Mar-2019	1,354	1,360	6	6	0.4%	0.4%	0.4%
30-Mar-2019	1,187	1,230	43	43	3.6%	3.6%	3.5%
31-Mar-2019	1,062	1,065	3	3	0.3%	0.3%	0.3%
Minimum	1,062	1,065	-42	1	-2.6%	0.1%	-2.7%
Average	1,381	1,401	21	30	1.5%	2.2%	1.4%
Maximum	1,617	1,635	101	101	7.3%	7.3%	6.8%
1-Apr-2019	1,068	1,075	7	7	0.7%	0.7%	0.7%
2-Apr-2019	1,250	1,250	0	0	0.0%	0.0%	0.0%
3-Apr-2019	**1,217**	**1,295**	**78**	**78**	**6.4%**	**6.4%**	**6.0%**
4-Apr-2019	1,211	1,265	54	54	4.5%	4.5%	4.3%
5-Apr-2019	1,344	1,365	21	21	1.6%	1.6%	1.5%
6-Apr-2019	1,233	1,265	32	32	2.6%	2.6%	2.5%
7-Apr-2019	1,195	1,260	65	65	5.4%	5.4%	5.2%
8-Apr-2019	1,399	1,415	16	16	1.1%	1.1%	1.1%
9-Apr-2019	1,415	1,445	30	30	2.1%	2.1%	2.1%
10-Apr-2019	1,241	1,290	49	49	3.9%	3.9%	3.8%
11-Apr-2019	1,194	1,235	41	41	3.4%	3.4%	3.3%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
12-Apr-2019	1,198	1,240	42	42	3.5%	3.5%	3.4%
13-Apr-2019	1,133	1,145	12	12	1.1%	1.1%	1.0%
14-Apr-2019	1,091	1,080	-11	11	-1.0%	1.0%	-1.0%
15-Apr-2019	1,157	1,190	33	33	2.9%	2.9%	2.8%
16-Apr-2019	1,143	1,200	57	57	5.0%	5.0%	4.8%
17-Apr-2019	1,257	1,280	23	23	1.8%	1.8%	1.8%
18-Apr-2019	1,294	1,295	1	1	0.1%	0.1%	0.1%
19-Apr-2019	**1,242**	**1,170**	**-72**	**72**	**-5.8%**	**5.8%**	**-6.2%**
20-Apr-2019	1,109	1,095	-14	14	-1.3%	1.3%	-1.3%
21-Apr-2019	1,108	1,100	-8	8	-0.7%	0.7%	-0.7%
22-Apr-2019	957	1,010	53	53	5.5%	5.5%	5.2%
23-Apr-2019	1,070	1,100	30	30	2.8%	2.8%	2.7%
24-Apr-2019	**1,339**	**1,260**	**-79**	**79**	**-5.9%**	**5.9%**	**-6.3%**
25-Apr-2019	1,288	1,300	12	12	0.9%	0.9%	0.9%
26-Apr-2019	1,196	1,245	49	49	4.1%	4.1%	3.9%
27-Apr-2019	1,158	1,110	-48	48	-4.1%	4.1%	-4.3%
28-Apr-2019	1,137	1,165	28	28	2.5%	2.5%	2.4%
29-Apr-2019	1,156	1,135	-21	21	-1.8%	1.8%	-1.9%
30-Apr-2019	1,256	1,300	44	44	3.5%	3.5%	3.4%
Minimum	957	1,010	-79	0	-5.9%	0.0%	-6.3%
Average	1,202	1,219	17	34	1.5%	2.9%	1.4%
Maximum	1,415	1,445	78	79	6.4%	6.4%	6.0%
1-May-2019	1,221	1,275	54	54	4.4%	4.4%	4.2%
2-May-2019	1,168	1,195	27	27	2.3%	2.3%	2.3%
3-May-2019	1,188	1,190	2	2	0.2%	0.2%	0.2%
4-May-2019	1,069	1,085	16	16	1.5%	1.5%	1.5%
5-May-2019	969	995	26	26	2.7%	2.7%	2.6%
6-May-2019	1,056	1,060	4	4	0.4%	0.4%	0.4%
7-May-2019	1,084	1,095	11	11	1.0%	1.0%	1.0%
8-May-2019	1,068	1,095	27	27	2.5%	2.5%	2.5%
9-May-2019	1,153	1,160	7	7	0.6%	0.6%	0.6%
10-May-2019	1,178	1,160	-18	18	-1.5%	1.5%	-1.6%
11-May-2019	1,097	1,045	-52	52	-4.7%	4.7%	-5.0%
12-May-2019	1,121	1,145	24	24	2.1%	2.1%	2.1%
13-May-2019	1,128	1,100	-28	28	-2.5%	2.5%	-2.5%
14-May-2019	1,086	1,050	-36	36	-3.3%	3.3%	-3.4%
15-May-2019	1,157	1,115	-42	42	-3.6%	3.6%	-3.8%
16-May-2019	1,065	1,110	45	45	4.2%	4.2%	4.1%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
17-May-2019	1,075	1,050	-25	25	-2.3%	2.3%	-2.4%
18-May-2019	987	980	-7	7	-0.7%	0.7%	-0.7%
19-May-2019	1,098	1,115	17	17	1.5%	1.5%	1.5%
20-May-2019	1,016	1,065	49	49	4.8%	4.8%	4.6%
21-May-2019	1,077	1,055	-22	22	-2.0%	2.0%	-2.1%
22-May-2019	1,181	1,155	-26	26	-2.2%	2.2%	-2.3%
23-May-2019	1,195	1,190	-5	5	-0.4%	0.4%	-0.4%
24-May-2019	1,099	1,125	26	26	2.4%	2.4%	2.3%
25-May-2019	**856**	**940**	**84**	**84**	**9.8%**	**9.8%**	**8.9%**
26-May-2019	887	880	-7	7	-0.8%	0.8%	-0.8%
27-May-2019	1,067	1,040	-27	27	-2.5%	2.5%	-2.6%
28-May-2019	1,028	1,050	22	22	2.1%	2.1%	2.1%
29-May-2019	1,055	1,015	-40	40	-3.8%	3.8%	-3.9%
30-May-2019	932	925	-7	7	-0.8%	0.8%	-0.8%
31-May-2019	999	1,005	6	6	0.6%	0.6%	0.6%
Minimum	856	880	-52	2	-4.7%	0.2%	-5.0%
Average	1,076	1,080	3	25	0.4%	2.4%	0.3%
Maximum	1,221	1,275	84	84	9.8%	9.8%	8.9%
1-Jun-2019	999	965	-34	34	-3.4%	3.4%	-3.5%
2-Jun-2019	868	870	2	2	0.2%	0.2%	0.2%
3-Jun-2019	992	990	-2	2	-0.2%	0.2%	-0.2%
4-Jun-2019	879	870	-9	9	-1.0%	1.0%	-1.0%
5-Jun-2019	**750**	**835**	**85**	**85**	**11.3%**	**11.3%**	**10.2%**
6-Jun-2019	**915**	**845**	**-70**	**70**	**-7.7%**	**7.7%**	**-8.3%**
7-Jun-2019	833	835	2	2	0.2%	0.2%	0.2%
8-Jun-2019	816	825	9	9	1.1%	1.1%	1.1%
9-Jun-2019	917	920	3	3	0.3%	0.3%	0.3%
10-Jun-2019	980	1,005	25	25	2.6%	2.6%	2.5%
11-Jun-2019	917	935	18	18	2.0%	2.0%	1.9%
12-Jun-2019	876	920	44	44	5.0%	5.0%	4.8%
13-Jun-2019	883	910	27	27	3.1%	3.1%	3.0%
14-Jun-2019	874	905	31	31	3.5%	3.5%	3.4%
15-Jun-2019	899	915	16	16	1.8%	1.8%	1.7%
16-Jun-2019	900	900	0	0	0.0%	0.0%	0.0%
17-Jun-2019	878	885	7	7	0.8%	0.8%	0.8%
18-Jun-2019	**821**	**880**	**59**	**59**	**7.2%**	**7.2%**	**6.7%**
19-Jun-2019	813	820	7	7	0.9%	0.9%	0.9%
20-Jun-2019	791	795	4	4	0.5%	0.5%	0.5%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
21-Jun-2019	823	855	32	32	3.9%	3.9%	3.7%
22-Jun-2019	841	860	19	19	2.3%	2.3%	2.2%
23-Jun-2019	849	895	46	46	5.4%	5.4%	5.1%
24-Jun-2019	852	905	53	53	6.2%	6.2%	5.9%
25-Jun-2019	833	835	2	2	0.2%	0.2%	0.2%
26-Jun-2019	777	810	33	33	4.2%	4.2%	4.1%
27-Jun-2019	783	810	27	27	3.4%	3.4%	3.3%
28-Jun-2019	781	820	39	39	5.0%	5.0%	4.8%
29-Jun-2019	759	770	11	11	1.4%	1.4%	1.4%
30-Jun-2019	754	755	1	1	0.1%	0.1%	0.1%
Minimum	750	755	-70	0	-7.7%	0.0%	-8.3%
Average	855	871	16	24	2.0%	2.8%	1.9%
Maximum	999	1,005	85	85	11.3%	11.3%	10.2%
1-Jul-2019	852	820	-32	32	-3.8%	3.8%	-3.9%
2-Jul-2019	849	815	-34	34	-4.0%	4.0%	-4.2%
3-Jul-2019	802	820	18	18	2.2%	2.2%	2.2%
4-Jul-2019	815	855	40	40	4.9%	4.9%	4.7%
5-Jul-2019	823	825	2	2	0.2%	0.2%	0.2%
6-Jul-2019	780	755	-25	25	-3.2%	3.2%	-3.3%
7-Jul-2019	766	750	-16	16	-2.1%	2.1%	-2.1%
8-Jul-2019	804	780	-24	24	-3.0%	3.0%	-3.1%
9-Jul-2019	757	775	18	18	2.4%	2.4%	2.3%
10-Jul-2019	809	795	-14	14	-1.7%	1.7%	-1.8%
11-Jul-2019	836	845	9	9	1.1%	1.1%	1.1%
12-Jul-2019	810	845	35	35	4.3%	4.3%	4.1%
13-Jul-2019	**711**	**765**	**54**	**54**	**7.6%**	**7.6%**	**7.1%**
14-Jul-2019	**720**	**775**	**55**	**55**	**7.6%**	**7.6%**	**7.1%**
15-Jul-2019	774	795	21	21	2.7%	2.7%	2.6%
16-Jul-2019	789	755	-34	34	-4.3%	4.3%	-4.5%
17-Jul-2019	762	755	-7	7	-0.9%	0.9%	-0.9%
18-Jul-2019	774	760	-14	14	-1.8%	1.8%	-1.8%
19-Jul-2019	751	760	9	9	1.2%	1.2%	1.2%
20-Jul-2019	726	740	14	14	1.9%	1.9%	1.9%
21-Jul-2019	731	740	9	9	1.2%	1.2%	1.2%
22-Jul-2019	771	775	4	4	0.5%	0.5%	0.5%
23-Jul-2019	785	790	5	5	0.6%	0.6%	0.6%
24-Jul-2019	763	780	17	17	2.2%	2.2%	2.2%
25-Jul-2019	831	795	-36	36	-4.3%	4.3%	-4.5%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
26-Jul-2019	780	790	10	10	1.3%	1.3%	1.3%
27-Jul-2019	744	750	6	6	0.8%	0.8%	0.8%
28-Jul-2019	727	745	18	18	2.5%	2.5%	2.4%
29-Jul-2019	**748**	**800**	**52**	**52**	**7.0%**	**7.0%**	**6.5%**
30-Jul-2019	776	785	9	9	1.2%	1.2%	1.1%
31-Jul-2019	750	775	25	25	3.3%	3.3%	3.2%
Minimum	711	740	-36	2	-4.3%	0.2%	-4.5%
Average	778	784	6	21	0.9%	2.8%	0.8%
Maximum	852	855	55	55	7.6%	7.6%	7.1%
1-Aug-2019	785	770	-15	15	-1.9%	1.9%	-1.9%
2-Aug-2019	793	780	-13	13	-1.6%	1.6%	-1.7%
3-Aug-2019	732	745	13	13	1.8%	1.8%	1.7%
4-Aug-2019	708	750	42	42	5.9%	5.9%	5.6%
5-Aug-2019	760	800	40	40	5.3%	5.3%	5.0%
6-Aug-2019	748	765	17	17	2.3%	2.3%	2.2%
7-Aug-2019	724	770	46	46	6.4%	6.4%	6.0%
8-Aug-2019	754	780	26	26	3.4%	3.4%	3.3%
9-Aug-2019	768	785	17	17	2.2%	2.2%	2.2%
10-Aug-2019	747	740	-7	7	-0.9%	0.9%	-0.9%
11-Aug-2019	722	745	23	23	3.2%	3.2%	3.1%
12-Aug-2019	740	780	40	40	5.4%	5.4%	5.1%
13-Aug-2019	**719**	**775**	**56**	**56**	**7.8%**	**7.8%**	**7.2%**
14-Aug-2019	716	760	44	44	6.1%	6.1%	5.8%
15-Aug-2019	**709**	**755**	**46**	**46**	**6.5%**	**6.5%**	**6.1%**
16-Aug-2019	740	760	20	20	2.7%	2.7%	2.6%
17-Aug-2019	722	740	18	18	2.5%	2.5%	2.4%
18-Aug-2019	**690**	**740**	**50**	**50**	**7.2%**	**7.2%**	**6.8%**
19-Aug-2019	753	785	32	32	4.2%	4.2%	4.1%
20-Aug-2019	766	775	9	9	1.2%	1.2%	1.2%
21-Aug-2019	728	765	37	37	5.1%	5.1%	4.8%
22-Aug-2019	747	775	28	28	3.7%	3.7%	3.6%
23-Aug-2019	757	770	13	13	1.7%	1.7%	1.7%
24-Aug-2019	723	765	42	42	5.8%	5.8%	5.5%
25-Aug-2019	720	745	25	25	3.5%	3.5%	3.4%
26-Aug-2019	748	775	27	27	3.6%	3.6%	3.5%
27-Aug-2019	754	790	36	36	4.8%	4.8%	4.6%
28-Aug-2019	751	770	19	19	2.5%	2.5%	2.5%
29-Aug-2019	750	775	25	25	3.3%	3.3%	3.2%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
30-Aug-2019	763	775	12	12	1.6%	1.6%	1.5%
31-Aug-2019	721	745	24	24	3.3%	3.3%	3.2%
Minimum	690	740	-15	7	-1.9%	0.9%	-1.9%
Average	741	766	26	28	3.5%	3.8%	3.3%
Maximum	793	800	56	56	7.8%	7.8%	7.2%
1-Sep-2019	**682**	**745**	**63**	**63**	**9.2%**	**9.2%**	**8.5%**
2-Sep-2019	736	755	19	19	2.6%	2.6%	2.5%
3-Sep-2019	778	780	2	2	0.3%	0.3%	0.3%
4-Sep-2019	747	765	18	18	2.4%	2.4%	2.4%
5-Sep-2019	764	765	1	1	0.1%	0.1%	0.1%
6-Sep-2019	744	745	1	1	0.1%	0.1%	0.1%
7-Sep-2019	745	755	10	10	1.3%	1.3%	1.3%
8-Sep-2019	764	830	66	66	8.6%	8.6%	8.0%
9-Sep-2019	789	805	16	16	2.0%	2.0%	2.0%
10-Sep-2019	775	810	35	35	4.5%	4.5%	4.3%
11-Sep-2019	788	795	7	7	0.9%	0.9%	0.9%
12-Sep-2019	796	840	44	44	5.5%	5.5%	5.2%
13-Sep-2019	839	860	21	21	2.5%	2.5%	2.4%
14-Sep-2019	**750**	**820**	**70**	**70**	**9.3%**	**9.3%**	**8.5%**
15-Sep-2019	791	785	-6	6	-0.8%	0.8%	-0.8%
16-Sep-2019	765	815	50	50	6.5%	6.5%	6.1%
17-Sep-2019	851	875	24	24	2.8%	2.8%	2.7%
18-Sep-2019	914	910	-4	4	-0.4%	0.4%	-0.4%
19-Sep-2019	932	940	8	8	0.9%	0.9%	0.9%
20-Sep-2019	810	840	30	30	3.7%	3.7%	3.6%
21-Sep-2019	826	850	24	24	2.9%	2.9%	2.8%
22-Sep-2019	828	835	7	7	0.8%	0.8%	0.8%
23-Sep-2019	819	830	11	11	1.3%	1.3%	1.3%
24-Sep-2019	828	855	27	27	3.3%	3.3%	3.2%
25-Sep-2019	**938**	**885**	**-53**	**53**	**-5.7%**	**5.7%**	**-6.0%**
26-Sep-2019	889	855	-34	34	-3.8%	3.8%	-4.0%
27-Sep-2019	820	840	20	20	2.4%	2.4%	2.4%
28-Sep-2019	804	800	-4	4	-0.5%	0.5%	-0.5%
29-Sep-2019	842	830	-12	12	-1.4%	1.4%	-1.4%
30-Sep-2019	936	940	4	4	0.4%	0.4%	0.4%
Minimum	682	745	-53	1	-5.7%	0.1%	-6.0%
Average	810	825	16	23	2.1%	2.9%	1.9%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
Maximum	938	940	70	70	9.3%	9.3%	8.5%
1-Oct-2019	927	965	38	38	4.1%	4.1%	3.9%
2-Oct-2019	974	980	6	6	0.6%	0.6%	0.6%
3-Oct-2019	996	1,010	14	14	1.4%	1.4%	1.4%
4-Oct-2019	1,001	1,035	34	34	3.4%	3.4%	3.3%
5-Oct-2019	981	980	-1	1	-0.1%	0.1%	-0.1%
6-Oct-2019	909	930	21	21	2.3%	2.3%	2.3%
7-Oct-2019	939	935	-4	4	-0.4%	0.4%	-0.4%
8-Oct-2019	844	865	21	21	2.5%	2.5%	2.4%
9-Oct-2019	859	900	41	41	4.8%	4.8%	4.6%
10-Oct-2019	941	965	24	24	2.6%	2.6%	2.5%
11-Oct-2019	957	980	23	23	2.4%	2.4%	2.3%
12-Oct-2019	822	855	33	33	4.0%	4.0%	3.9%
13-Oct-2019	850	825	-25	25	-2.9%	2.9%	-3.0%
14-Oct-2019	925	920	-5	5	-0.5%	0.5%	-0.5%
15-Oct-2019	962	960	-2	2	-0.2%	0.2%	-0.2%
16-Oct-2019	882	920	38	38	4.3%	4.3%	4.1%
17-Oct-2019	972	1,010	38	38	3.9%	3.9%	3.8%
18-Oct-2019	878	915	37	37	4.2%	4.2%	4.0%
19-Oct-2019	**785**	**855**	**70**	**70**	**8.9%**	**8.9%**	**8.2%**
20-Oct-2019	875	900	25	25	2.9%	2.9%	2.8%
21-Oct-2019	929	975	46	46	5.0%	5.0%	4.7%
22-Oct-2019	942	985	43	43	4.6%	4.6%	4.4%
23-Oct-2019	**944**	**1,000**	**56**	**56**	**5.9%**	**5.9%**	**5.6%**
24-Oct-2019	949	980	31	31	3.3%	3.3%	3.2%
25-Oct-2019	912	950	38	38	4.2%	4.2%	4.0%
26-Oct-2019	931	955	24	24	2.6%	2.6%	2.5%
27-Oct-2019	991	1,025	34	34	3.4%	3.4%	3.3%
28-Oct-2019	1,030	1,075	45	45	4.4%	4.4%	4.2%
29-Oct-2019	1,072	1,085	13	13	1.2%	1.2%	1.2%
30-Oct-2019	1,042	1,070	28	28	2.7%	2.7%	2.6%
31-Oct-2019	997	1,030	33	33	3.3%	3.3%	3.2%
Minimum	785	825	-25	1	-2.9%	0.1%	-3.0%
Average	936	962	26	29	2.9%	3.1%	2.7%
Maximum	1,072	1,085	70	70	8.9%	8.9%	8.2%
1-Nov-2019	**853**	**935**	**82**	**82**	**9.6%**	**9.6%**	**8.8%**
2-Nov-2019	903	935	32	32	3.5%	3.5%	3.4%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
3-Nov-2019	**1,007**	**925**	**-82**	**82**	**-8.1%**	**8.1%**	**-8.9%**
4-Nov-2019	946	980	34	34	3.6%	3.6%	3.5%
5-Nov-2019	1,008	1,065	57	57	5.7%	5.7%	5.4%
6-Nov-2019	1,024	995	-29	29	-2.8%	2.8%	-2.9%
7-Nov-2019	1,101	1,115	14	14	1.3%	1.3%	1.3%
8-Nov-2019	1,053	1,015	-38	38	-3.6%	3.6%	-3.7%
9-Nov-2019	1,156	1,180	24	24	2.1%	2.1%	2.0%
10-Nov-2019	1,101	1,105	4	4	0.4%	0.4%	0.4%
11-Nov-2019	1,098	1,105	7	7	0.6%	0.6%	0.6%
12-Nov-2019	1,152	1,175	23	23	2.0%	2.0%	2.0%
13-Nov-2019	**941**	**1,040**	**99**	**99**	**10.5%**	**10.5%**	**9.5%**
14-Nov-2019	1,232	1,220	-12	12	-1.0%	1.0%	-1.0%
15-Nov-2019	1,270	1,285	15	15	1.2%	1.2%	1.2%
16-Nov-2019	1,287	1,300	13	13	1.0%	1.0%	1.0%
17-Nov-2019	1,241	1,250	9	9	0.7%	0.7%	0.7%
18-Nov-2019	1,272	1,290	18	18	1.4%	1.4%	1.4%
19-Nov-2019	1,196	1,225	29	29	2.4%	2.4%	2.4%
20-Nov-2019	1,190	1,185	-5	5	-0.4%	0.4%	-0.4%
21-Nov-2019	1,288	1,230	-58	58	-4.5%	4.5%	-4.7%
22-Nov-2019	1,234	1,215	-19	19	-1.5%	1.5%	-1.6%
23-Nov-2019	1,154	1,165	11	11	1.0%	1.0%	0.9%
24-Nov-2019	1,206	1,150	-56	56	-4.6%	4.6%	-4.9%
25-Nov-2019	1,267	1,245	-22	22	-1.7%	1.7%	-1.8%
26-Nov-2019	1,230	1,230	0	0	0.0%	0.0%	0.0%
27-Nov-2019	1,204	1,225	21	21	1.7%	1.7%	1.7%
28-Nov-2019	1,192	1,185	-7	7	-0.6%	0.6%	-0.6%
29-Nov-2019	1,248	1,280	32	32	2.6%	2.6%	2.5%
30-Nov-2019	1,092	1,185	93	93	8.5%	8.5%	7.8%
Minimum	853	925	-82	0	-8.1%	0.0%	-8.9%
Average	1,138	1,148	10	32	1.0%	3.0%	0.9%
Maximum	1,288	1,300	99	99	10.5%	10.5%	9.5%
1-Dec-2019	1,320	1,255	-65	65	-4.9%	4.9%	-5.2%
2-Dec-2019	1,375	1,400	25	25	1.8%	1.8%	1.8%
3-Dec-2019	1,313	1,365	52	52	4.0%	4.0%	3.8%
4-Dec-2019	1,171	1,205	34	34	2.9%	2.9%	2.8%
5-Dec-2019	1,229	1,235	6	6	0.5%	0.5%	0.5%
6-Dec-2019	1,229	1,275	46	46	3.7%	3.7%	3.6%
7-Dec-2019	1,320	1,335	15	15	1.1%	1.1%	1.1%

Date	Actual Total Peak (MW)	Forecast Total Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
8-Dec-2019	1,400	1,390	-10	10	-0.7%	0.7%	-0.7%
9-Dec-2019	1,351	1,410	59	59	4.4%	4.4%	4.2%
10-Dec-2019	**1,128**	**1,210**	**82**	**82**	**7.3%**	**7.3%**	**6.8%**
11-Dec-2019	**1,195**	**1,260**	**65**	**65**	**5.4%**	**5.4%**	**5.2%**
12-Dec-2019	1,437	1,405	-32	32	-2.2%	2.2%	-2.3%
13-Dec-2019	1,564	1,565	1	1	0.1%	0.1%	0.1%
14-Dec-2019	1,386	1,425	39	39	2.8%	2.8%	2.7%
15-Dec-2019	1,171	1,230	59	59	5.0%	5.0%	4.8%
16-Dec-2019	1,486	1,470	-16	16	-1.1%	1.1%	-1.1%
17-Dec-2019	1,492	1,570	78	78	5.2%	5.2%	5.0%
18-Dec-2019	1,451	1,505	54	54	3.7%	3.7%	3.6%
19-Dec-2019	**1,398**	**1,510**	**112**	**112**	**8.0%**	**8.0%**	**7.4%**
20-Dec-2019	1,419	1,440	21	21	1.5%	1.5%	1.5%
21-Dec-2019	1,365	1,390	25	25	1.8%	1.8%	1.8%
22-Dec-2019	1,477	1,500	23	23	1.6%	1.6%	1.5%
23-Dec-2019	1,500	1,495	-5	5	-0.3%	0.3%	-0.3%
24-Dec-2019	1,352	1,420	68	68	5.0%	5.0%	4.8%
25-Dec-2019	1,322	1,305	-17	17	-1.3%	1.3%	-1.3%
26-Dec-2019	1,359	1,360	1	1	0.1%	0.1%	0.1%
27-Dec-2019	1,344	1,380	36	36	2.7%	2.7%	2.6%
28-Dec-2019	1,321	1,315	-6	6	-0.5%	0.5%	-0.5%
29-Dec-2019	1,303	1,305	2	2	0.2%	0.2%	0.2%
30-Dec-2019	1,352	1,425	73	73	5.4%	5.4%	5.1%
31-Dec-2019	1,316	1,355	39	39	3.0%	3.0%	2.9%
Minimum	1,128	1,205	-65	1	-4.9%	0.1%	-5.2%
Average	1,350	1,378	28	38	2.1%	2.8%	2.0%
Maximum	1,564	1,570	112	112	8.0%	8.0%	7.4%

Table 3: Analysis of Utility Forecast Error[16]

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
1-Jan-2019	1,336	1,366	30	30	2.2%	2.2%	2.2%
2-Jan-2019	1,394	1,367	-27	27	-1.9%	1.9%	-1.9%
3-Jan-2019	1,436	1,408	-29	29	-2.0%	2.0%	-2.0%
4-Jan-2019	1,437	1,420	-17	17	-1.2%	1.2%	-1.2%
5-Jan-2019	1,190	1,195	4	4	0.3%	0.3%	0.3%
6-Jan-2019	**1,150**	**1,206**	**56**	**56**	**4.8%**	**4.8%**	**4.6%**
7-Jan-2019	1,260	1,284	23	23	1.8%	1.8%	1.8%
8-Jan-2019	1,403	1,398	-6	6	-0.4%	0.4%	-0.4%
9-Jan-2019	1,332	1,297	-34	34	-2.6%	2.6%	-2.7%
10-Jan-2019	1,224	1,226	2	2	0.2%	0.2%	0.2%
11-Jan-2019	1,101	1,128	27	27	2.4%	2.4%	2.4%
12-Jan-2019	1,191	1,168	-23	23	-1.9%	1.9%	-1.9%
13-Jan-2019	1,282	1,244	-38	38	-3.0%	3.0%	-3.1%
14-Jan-2019	1,308	1,286	-22	22	-1.7%	1.7%	-1.7%
15-Jan-2019	1,267	1,276	10	10	0.8%	0.8%	0.7%
16-Jan-2019	1,312	1,317	5	5	0.4%	0.4%	0.4%
17-Jan-2019	1,308	1,323	15	15	1.2%	1.2%	1.2%
18-Jan-2019	1,444	1,434	-10	10	-0.7%	0.7%	-0.7%
19-Jan-2019	1,260	1,307	47	47	3.8%	3.8%	3.6%
20-Jan-2019	1,372	1,382	10	10	0.7%	0.7%	0.7%
21-Jan-2019	1,156	1,169	13	13	1.2%	1.2%	1.2%
22-Jan-2019	**1,143**	**1,264**	**121**	**121**	**10.6%**	**10.6%**	**9.5%**
23-Jan-2019	1,224	1,256	32	32	2.7%	2.7%	2.6%
24-Jan-2019	1,236	1,244	8	8	0.7%	0.7%	0.7%
25-Jan-2019	**1,013**	**1,117**	**104**	**104**	**10.2%**	**10.2%**	**9.3%**
26-Jan-2019	1,096	1,065	-31	31	-2.8%	2.8%	-2.9%
27-Jan-2019	1,212	1,165	-47	47	-3.9%	3.9%	-4.1%
28-Jan-2019	1,202	1,208	6	6	0.5%	0.5%	0.5%
29-Jan-2019	1,280	1,318	38	38	3.0%	3.0%	2.9%
30-Jan-2019	1,301	1,289	-13	13	-1.0%	1.0%	-1.0%
31-Jan-2019	1,173	1,215	42	42	3.6%	3.6%	3.5%
Minimum	1,013	1,065	-47	2	-3.9%	0.2%	-4.1%
Average	1,259	1,269	10	29	0.9%	2.4%	0.8%
Maximum	1,444	1,434	121	121	10.6%	10.6%	9.5%

[16] Lines that have been bolded indicate further examination of the hourly forecast was provided in this report.

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
1-Feb-2019	1,453	1,368	-85	85	-5.8%	5.8%	-6.2%
2-Feb-2019	1,385	1,352	-33	33	-2.4%	2.4%	-2.4%
3-Feb-2019	1,380	1,371	-9	9	-0.7%	0.7%	-0.7%
4-Feb-2019	1,480	1,477	-2	2	-0.2%	0.2%	-0.2%
5-Feb-2019	1,224	1,222	-3	3	-0.2%	0.2%	-0.2%
6-Feb-2019	1,248	1,226	-22	22	-1.8%	1.8%	-1.8%
7-Feb-2019	1,270	1,284	14	14	1.1%	1.1%	1.1%
8-Feb-2019	1,245	1,247	2	2	0.2%	0.2%	0.2%
9-Feb-2019	1,351	1,328	-23	23	-1.7%	1.7%	-1.8%
10-Feb-2019	1,475	1,465	-10	10	-0.7%	0.7%	-0.7%
11-Feb-2019	1,519	1,515	-4	4	-0.3%	0.3%	-0.3%
12-Feb-2019	1,421	1,416	-5	5	-0.3%	0.3%	-0.3%
13-Feb-2019	1,433	1,434	2	2	0.1%	0.1%	0.1%
14-Feb-2019	1,285	1,272	-14	14	-1.1%	1.1%	-1.1%
15-Feb-2019	1,253	1,255	1	1	0.1%	0.1%	0.1%
16-Feb-2019	1,236	1,196	-40	40	-3.2%	3.2%	-3.4%
17-Feb-2019	1,137	1,251	114	114	10.1%	10.1%	9.1%
18-Feb-2019	1,375	1,346	-29	29	-2.1%	2.1%	-2.1%
19-Feb-2019	1,374	1,401	28	28	2.0%	2.0%	2.0%
20-Feb-2019	1,624	1,544	-80	80	-5.0%	5.0%	-5.2%
21-Feb-2019	1,613	1,591	-22	22	-1.4%	1.4%	-1.4%
22-Feb-2019	1,476	1,487	11	11	0.7%	0.7%	0.7%
23-Feb-2019	1,470	1,497	27	27	1.8%	1.8%	1.8%
24-Feb-2019	1,412	1,458	46	46	3.2%	3.2%	3.1%
25-Feb-2019	1,524	1,509	-14	14	-0.9%	0.9%	-0.9%
26-Feb-2019	1,294	1,271	-23	23	-1.8%	1.8%	-1.8%
27-Feb-2019	1,406	1,385	-21	21	-1.5%	1.5%	-1.5%
28-Feb-2019	1,379	1,388	9	9	0.6%	0.6%	0.6%
Minimum	1,137	1,196	-85	1	-5.8%	0.1%	-6.2%
Average	1,384	1,377	-7	25	-0.4%	1.8%	-0.5%
Maximum	1,624	1,591	114	114	10.1%	10.1%	9.1%
1-Mar-2019	1,418	1,436	18	18	1.3%	1.3%	1.3%
2-Mar-2019	**1,234**	**1,280**	**47**	**47**	**3.8%**	**3.8%**	**3.6%**
3-Mar-2019	**1,275**	**1,359**	**84**	**84**	**6.6%**	**6.6%**	**6.2%**
4-Mar-2019	1,340	1,330	-9	9	-0.7%	0.7%	-0.7%
5-Mar-2019	1,247	1,259	13	13	1.0%	1.0%	1.0%
6-Mar-2019	1,280	1,323	43	43	3.3%	3.3%	3.2%
7-Mar-2019	1,434	1,391	-44	44	-3.1%	3.1%	-3.2%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
8-Mar-2019	1,436	1,449	13	13	0.9%	0.9%	0.9%
9-Mar-2019	1,284	1,282	-2	2	-0.1%	0.1%	-0.1%
10-Mar-2019	1,260	1,220	-40	40	-3.2%	3.2%	-3.3%
11-Mar-2019	1,326	1,284	-43	43	-3.2%	3.2%	-3.3%
12-Mar-2019	1,121	1,109	-12	12	-1.1%	1.1%	-1.1%
13-Mar-2019	1,138	1,111	-27	27	-2.4%	2.4%	-2.5%
14-Mar-2019	1,252	1,216	-36	36	-2.9%	2.9%	-3.0%
15-Mar-2019	1,208	1,187	-21	21	-1.7%	1.7%	-1.8%
16-Mar-2019	1,061	1,095	34	34	3.2%	3.2%	3.1%
17-Mar-2019	1,111	1,090	-21	21	-1.9%	1.9%	-1.9%
18-Mar-2019	1,207	1,205	-2	2	-0.2%	0.2%	-0.2%
19-Mar-2019	1,294	1,284	-11	11	-0.8%	0.8%	-0.8%
20-Mar-2019	1,294	1,267	-27	27	-2.1%	2.1%	-2.1%
21-Mar-2019	1,249	1,248	-1	1	0.0%	0.0%	0.0%
22-Mar-2019	1,144	1,142	-3	3	-0.2%	0.2%	-0.2%
23-Mar-2019	983	982	-1	1	-0.1%	0.1%	-0.1%
24-Mar-2019	1,018	996	-22	22	-2.1%	2.1%	-2.2%
25-Mar-2019	1,186	1,177	-9	9	-0.7%	0.7%	-0.8%
26-Mar-2019	1,240	1,241	1	1	0.1%	0.1%	0.1%
27-Mar-2019	**1,262**	**1,304**	**43**	**43**	**3.4%**	**3.4%**	**3.3%**
28-Mar-2019	1,330	1,350	20	20	1.5%	1.5%	1.5%
29-Mar-2019	1,184	1,175	-8	8	-0.7%	0.7%	-0.7%
30-Mar-2019	1,016	1,047	31	31	3.1%	3.1%	3.0%
31-Mar-2019	888	878	-10	10	-1.1%	1.1%	-1.1%
Minimum	888	878	-44	1	-3.2%	0.0%	-3.3%
Average	1,217	1,217	0	22	0.0%	1.8%	-0.1%
Maximum	1,436	1,449	84	84	6.6%	6.6%	6.2%
1-Apr-2019	893	890	-3	3	-0.4%	0.4%	-0.4%
2-Apr-2019	1,073	1,066	-8	8	-0.7%	0.7%	-0.7%
3-Apr-2019	**1,094**	**1,110**	**16**	**16**	**1.4%**	**1.4%**	**1.4%**
4-Apr-2019	1,068	1,081	13	13	1.2%	1.2%	1.2%
5-Apr-2019	1,193	1,178	-15	15	-1.2%	1.2%	-1.3%
6-Apr-2019	1,078	1,081	3	3	0.3%	0.3%	0.3%
7-Apr-2019	1,031	1,076	45	45	4.4%	4.4%	4.2%
8-Apr-2019	1,245	1,229	-16	16	-1.3%	1.3%	-1.3%
9-Apr-2019	1,246	1,262	16	16	1.3%	1.3%	1.3%
10-Apr-2019	1,101	1,104	3	3	0.3%	0.3%	0.3%
11-Apr-2019	1,048	1,048	0	0	0.0%	0.0%	0.0%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
12-Apr-2019	1,057	1,057	-1	1	0.0%	0.0%	0.0%
13-Apr-2019	968	959	-9	9	-0.9%	0.9%	-1.0%
14-Apr-2019	921	895	-26	26	-2.9%	2.9%	-2.9%
15-Apr-2019	989	1,007	18	18	1.8%	1.8%	1.8%
16-Apr-2019	1,038	1,015	-23	23	-2.2%	2.2%	-2.3%
17-Apr-2019	1,097	1,096	-1	1	-0.1%	0.1%	-0.1%
18-Apr-2019	1,135	1,110	-25	25	-2.2%	2.2%	-2.2%
19-Apr-2019	**1,071**	**987**	**-84**	**84**	**-7.8%**	**7.8%**	**-8.5%**
20-Apr-2019	931	911	-20	20	-2.2%	2.2%	-2.2%
21-Apr-2019	936	917	-18	18	-2.0%	2.0%	-2.0%
22-Apr-2019	773	825	52	52	6.7%	6.7%	6.2%
23-Apr-2019	882	914	32	32	3.6%	3.6%	3.5%
24-Apr-2019	**1,159**	**1,073**	**-86**	**86**	**-7.4%**	**7.4%**	**-8.0%**
25-Apr-2019	1,116	1,113	-3	3	-0.3%	0.3%	-0.3%
26-Apr-2019	1,029	1,059	30	30	2.9%	2.9%	2.8%
27-Apr-2019	979	925	-53	53	-5.4%	5.4%	-5.7%
28-Apr-2019	964	980	16	16	1.6%	1.6%	1.6%
29-Apr-2019	981	950	-31	31	-3.1%	3.1%	-3.2%
30-Apr-2019	1,134	1,113	-21	21	-1.9%	1.9%	-1.9%
Minimum	773	825	-86	0	-7.8%	0.0%	-8.5%
Average	1,041	1,034	-7	23	-0.6%	2.2%	-0.7%
Maximum	1,246	1,262	52	86	6.7%	7.8%	6.2%
1-May-2019	1,089	1,090	1	1	0.1%	0.1%	0.1%
2-May-2019	1,026	1,012	-15	15	-1.4%	1.4%	-1.4%
3-May-2019	1,023	1,003	-20	20	-2.0%	2.0%	-2.0%
4-May-2019	904	898	-6	6	-0.7%	0.7%	-0.7%
5-May-2019	824	810	-14	14	-1.7%	1.7%	-1.7%
6-May-2019	877	877	-1	1	-0.1%	0.1%	-0.1%
7-May-2019	916	908	-8	8	-0.9%	0.9%	-0.9%
8-May-2019	911	909	-1	1	-0.1%	0.1%	-0.1%
9-May-2019	992	975	-17	17	-1.7%	1.7%	-1.8%
10-May-2019	993	976	-17	17	-1.7%	1.7%	-1.8%
11-May-2019	918	862	-56	56	-6.1%	6.1%	-6.5%
12-May-2019	947	960	13	13	1.4%	1.4%	1.4%
13-May-2019	934	917	-17	17	-1.8%	1.8%	-1.8%
14-May-2019	906	866	-41	41	-4.5%	4.5%	-4.7%
15-May-2019	994	929	-64	64	-6.5%	6.5%	-6.9%
16-May-2019	897	926	28	28	3.1%	3.1%	3.1%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
17-May-2019	900	864	-36	36	-4.0%	4.0%	-4.2%
18-May-2019	818	794	-24	24	-2.9%	2.9%	-3.0%
19-May-2019	940	930	-10	10	-1.1%	1.1%	-1.1%
20-May-2019	859	880	22	22	2.5%	2.5%	2.4%
21-May-2019	897	872	-25	25	-2.8%	2.8%	-2.8%
22-May-2019	1,006	971	-35	35	-3.5%	3.5%	-3.6%
23-May-2019	1,009	1,005	-5	5	-0.5%	0.5%	-0.5%
24-May-2019	955	939	-16	16	-1.7%	1.7%	-1.7%
25-May-2019	**711**	**756**	**45**	**45**	**6.4%**	**6.4%**	**6.0%**
26-May-2019	706	694	-12	12	-1.7%	1.7%	-1.8%
27-May-2019	887	856	-31	31	-3.5%	3.5%	-3.7%
28-May-2019	866	864	-2	2	-0.2%	0.2%	-0.2%
29-May-2019	878	829	-49	49	-5.6%	5.6%	-5.9%
30-May-2019	753	739	-14	14	-1.9%	1.9%	-1.9%
31-May-2019	840	822	-19	19	-2.2%	2.2%	-2.3%
Minimum	706	694	-64	1	-6.5%	0.1%	-6.9%
Average	909	895	-14	21	-1.5%	2.4%	-1.6%
Maximum	1,089	1.090	45	64	6.4%	6.5%	6.0%
1-Jun-2019	825	778	-47	47	-5.7%	5.7%	-6.0%
2-Jun-2019	701	686	-15	15	-2.2%	2.2%	-2.2%
3-Jun-2019	819	805	-14	14	-1.8%	1.8%	-1.8%
4-Jun-2019	684	684	0	0	-0.1%	0.1%	-0.1%
5-Jun-2019	**662**	**648**	**-14**	**14**	**-2.1%**	**2.1%**	**-2.2%**
6-Jun-2019	**698**	**658**	**-40**	**40**	**-5.8%**	**5.8%**	**-6.1%**
7-Jun-2019	662	651	-11	11	-1.7%	1.7%	-1.7%
8-Jun-2019	628	638	10	10	1.6%	1.6%	1.5%
9-Jun-2019	747	733	-14	14	-1.9%	1.9%	-1.9%
10-Jun-2019	826	819	-8	8	-0.9%	0.9%	-0.9%
11-Jun-2019	749	750	1	1	0.2%	0.2%	0.2%
12-Jun-2019	728	737	9	9	1.2%	1.2%	1.2%
13-Jun-2019	726	725	-2	2	-0.3%	0.3%	-0.3%
14-Jun-2019	737	722	-15	15	-2.0%	2.0%	-2.0%
15-Jun-2019	731	729	-2	2	-0.3%	0.3%	-0.3%
16-Jun-2019	736	713	-23	23	-3.1%	3.1%	-3.2%
17-Jun-2019	738	699	-39	39	-5.3%	5.3%	-5.6%
18-Jun-2019	**705**	**695**	**-9**	**9**	**-1.3%**	**1.3%**	**-1.4%**
19-Jun-2019	653	636	-17	17	-2.6%	2.6%	-2.7%
20-Jun-2019	613	612	-1	1	-0.1%	0.1%	-0.1%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
21-Jun-2019	666	670	4	4	0.6%	0.6%	0.6%
22-Jun-2019	690	676	-14	14	-2.1%	2.1%	-2.1%
23-Jun-2019	705	708	3	3	0.4%	0.4%	0.4%
24-Jun-2019	676	718	42	42	6.2%	6.2%	5.8%
25-Jun-2019	646	648	3	3	0.4%	0.4%	0.4%
26-Jun-2019	632	626	-6	6	-0.9%	0.9%	-0.9%
27-Jun-2019	614	626	12	12	1.9%	1.9%	1.9%
28-Jun-2019	624	634	9	9	1.5%	1.5%	1.5%
29-Jun-2019	585	584	0	0	-0.1%	0.1%	-0.1%
30-Jun-2019	578	572	-6	6	-1.1%	1.1%	-1.1%
Minimum	578	572	-47	0	-5.8%	0.1%	-6.1%
Average	693	686	-7	13	-0.9%	1.8%	-1.0%
Maximum	826	819	42	47	6.2%	6.2%	5.8%
1-Jul-2019	688	636	-53	53	-7.7%	7.7%	-8.3%
2-Jul-2019	668	631	-37	37	-5.5%	5.5%	-5.8%
3-Jul-2019	649	636	-13	13	-2.0%	2.0%	-2.0%
4-Jul-2019	664	669	5	5	0.7%	0.7%	0.7%
5-Jul-2019	651	640	-11	11	-1.6%	1.6%	-1.7%
6-Jul-2019	599	577	-22	22	-3.7%	3.7%	-3.8%
7-Jul-2019	581	569	-12	12	-2.1%	2.1%	-2.1%
8-Jul-2019	598	601	3	3	0.5%	0.5%	0.5%
9-Jul-2019	593	593	0	0	0.0%	0.0%	0.0%
10-Jul-2019	647	616	-31	31	-4.9%	4.9%	-5.1%
11-Jul-2019	677	667	-10	10	-1.4%	1.4%	-1.5%
12-Jul-2019	669	663	-6	6	-0.9%	0.9%	-0.9%
13-Jul-2019	**581**	**586**	**4**	**4**	**0.7%**	**0.7%**	**0.7%**
14-Jul-2019	**604**	**597**	**-6**	**6**	**-1.0%**	**1.0%**	**-1.0%**
15-Jul-2019	618	637	19	19	3.0%	3.0%	2.9%
16-Jul-2019	611	597	-14	14	-2.3%	2.3%	-2.4%
17-Jul-2019	600	594	-6	6	-0.9%	0.9%	-0.9%
18-Jul-2019	605	598	-6	6	-1.1%	1.1%	-1.1%
19-Jul-2019	597	600	3	3	0.4%	0.4%	0.4%
20-Jul-2019	564	581	18	18	3.1%	3.1%	3.0%
21-Jul-2019	575	581	6	6	1.0%	1.0%	1.0%
22-Jul-2019	627	617	-10	10	-1.6%	1.6%	-1.7%
23-Jul-2019	612	601	-11	11	-1.7%	1.7%	-1.7%
24-Jul-2019	606	589	-17	17	-2.7%	2.7%	-2.8%
25-Jul-2019	614	606	-8	8	-1.3%	1.3%	-1.3%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
26-Jul-2019	596	599	3	3	0.4%	0.4%	0.4%
27-Jul-2019	563	561	-2	2	-0.3%	0.3%	-0.3%
28-Jul-2019	554	571	17	17	3.1%	3.1%	3.0%
29-Jul-2019	**593**	**611**	**18**	**18**	**3.1%**	**3.1%**	**3.0%**
30-Jul-2019	603	593	-10	10	-1.7%	1.7%	-1.7%
31-Jul-2019	588	588	-1	1	-0.1%	0.1%	-0.1%
Minimum	554	561	-53	0	-7.7%	0.0%	-8.3%
Average	613	607	-6	12	-0.9%	2.0%	-1.0%
Maximum	688	669	19	53	3.1%	7.7%	3.0%
1-Aug-2019	593	580	-13	13	-2.2%	2.2%	-2.3%
2-Aug-2019	591	590	-1	1	-0.1%	0.1%	-0.1%
3-Aug-2019	552	558	6	6	1.1%	1.1%	1.1%
4-Aug-2019	553	559	6	6	1.2%	1.2%	1.2%
5-Aug-2019	597	613	16	16	2.6%	2.6%	2.5%
6-Aug-2019	582	577	-5	5	-0.8%	0.8%	-0.8%
7-Aug-2019	573	579	6	6	1.1%	1.1%	1.1%
8-Aug-2019	574	589	15	15	2.6%	2.6%	2.6%
9-Aug-2019	592	595	3	3	0.5%	0.5%	0.5%
10-Aug-2019	568	552	-15	15	-2.7%	2.7%	-2.8%
11-Aug-2019	552	556	4	4	0.8%	0.8%	0.8%
12-Aug-2019	591	592	1	1	0.1%	0.1%	0.1%
13-Aug-2019	**588**	**585**	**-3**	**3**	**-0.5%**	**0.5%**	**-0.5%**
14-Aug-2019	577	570	-7	7	-1.2%	1.2%	-1.2%
15-Aug-2019	**564**	**569**	**5**	**5**	**0.8%**	**0.8%**	**0.8%**
16-Aug-2019	585	571	-14	14	-2.3%	2.3%	-2.4%
17-Aug-2019	555	552	-3	3	-0.6%	0.6%	-0.6%
18-Aug-2019	**542**	**549**	**7**	**7**	**1.3%**	**1.3%**	**1.2%**
19-Aug-2019	588	596	8	8	1.3%	1.3%	1.3%
20-Aug-2019	595	587	-8	8	-1.4%	1.4%	-1.4%
21-Aug-2019	577	578	1	1	0.2%	0.2%	0.2%
22-Aug-2019	595	586	-8	8	-1.4%	1.4%	-1.4%
23-Aug-2019	595	580	-15	15	-2.5%	2.5%	-2.6%
24-Aug-2019	560	575	15	15	2.6%	2.6%	2.5%
25-Aug-2019	547	555	8	8	1.4%	1.4%	1.4%
26-Aug-2019	581	589	8	8	1.3%	1.3%	1.3%
27-Aug-2019	601	601	0	0	-0.1%	0.1%	-0.1%
28-Aug-2019	592	581	-11	11	-1.9%	1.9%	-1.9%
29-Aug-2019	595	589	-5	5	-0.9%	0.9%	-0.9%

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30-Aug-2019	598	588	-10	10	-1.7%	1.7%	-1.7%
31-Aug-2019	545	556	11	11	2.0%	2.0%	2.0%
Minimum	542	549	-15	0	-2.7%	0.1%	-2.8%
Average	577	577	0	8	0.0%	1.3%	0.0%
Maximum	601	613	16	16	2.6%	2.7%	2.6%
1-Sep-2019	**524**	**558**	**33**	**33**	**6.3%**	**6.3%**	**6.0%**
2-Sep-2019	555	566	12	12	2.1%	2.1%	2.1%
3-Sep-2019	619	589	-30	30	-4.8%	4.8%	-5.0%
4-Sep-2019	583	578	-5	5	-0.9%	0.9%	-0.9%
5-Sep-2019	594	579	-16	16	-2.6%	2.6%	-2.7%
6-Sep-2019	567	558	-9	9	-1.5%	1.5%	-1.5%
7-Sep-2019	556	567	11	11	2.0%	2.0%	2.0%
8-Sep-2019	588	582	-6	6	-1.1%	1.1%	-1.1%
9-Sep-2019	621	617	-4	4	-0.6%	0.6%	-0.6%
10-Sep-2019	624	621	-2	2	-0.4%	0.4%	-0.4%
11-Sep-2019	615	604	-11	11	-1.7%	1.7%	-1.8%
12-Sep-2019	647	650	2	2	0.4%	0.4%	0.4%
13-Sep-2019	673	669	-4	4	-0.6%	0.6%	-0.6%
14-Sep-2019	**611**	**631**	**20**	**20**	**3.3%**	**3.3%**	**3.2%**
15-Sep-2019	602	594	-8	8	-1.3%	1.3%	-1.4%
16-Sep-2019	603	629	26	26	4.3%	4.3%	4.1%
17-Sep-2019	689	684	-5	5	-0.7%	0.7%	-0.7%
18-Sep-2019	748	752	4	4	0.5%	0.5%	0.5%
19-Sep-2019	757	753	-4	4	-0.5%	0.5%	-0.5%
20-Sep-2019	650	652	2	2	0.3%	0.3%	0.3%
21-Sep-2019	643	663	20	20	3.1%	3.1%	3.0%
22-Sep-2019	648	646	-2	2	-0.4%	0.4%	-0.4%
23-Sep-2019	617	643	26	26	4.2%	4.2%	4.0%
24-Sep-2019	657	666	9	9	1.4%	1.4%	1.4%
25-Sep-2019	**772**	**696**	**-76**	**76**	**-9.8%**	**9.8%**	**-10.9%**
26-Sep-2019	659	666	6	6	0.9%	0.9%	0.9%
27-Sep-2019	653	653	1	1	0.1%	0.1%	0.1%
28-Sep-2019	625	613	-12	12	-1.8%	1.8%	-1.9%
29-Sep-2019	672	641	-31	31	-4.7%	4.7%	-4.9%
30-Sep-2019	757	753	-4	4	-0.6%	0.6%	-0.6%
Minimum	524	558	-76	1	-9.8%	0.1%	-10.9%
Average	638	636	-2	13	-0.2%	2.1%	-0.3%
Maximum	772	753	33	76	6.3%	9.8%	6.0%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
1-Oct-2019	764	776	11	11	1.5%	1.5%	1.4%
2-Oct-2019	792	792	0	0	0.0%	0.0%	0.0%
3-Oct-2019	812	820	8	8	0.9%	0.9%	0.9%
4-Oct-2019	830	844	14	14	1.7%	1.7%	1.7%
5-Oct-2019	805	789	-16	16	-2.0%	2.0%	-2.0%
6-Oct-2019	758	744	-15	15	-1.9%	1.9%	-2.0%
7-Oct-2019	768	747	-21	21	-2.7%	2.7%	-2.8%
8-Oct-2019	669	678	9	9	1.4%	1.4%	1.4%
9-Oct-2019	702	710	8	8	1.1%	1.1%	1.1%
10-Oct-2019	791	778	-13	13	-1.7%	1.7%	-1.7%
11-Oct-2019	806	793	-13	13	-1.6%	1.6%	-1.6%
12-Oct-2019	687	666	-21	21	-3.0%	3.0%	-3.1%
13-Oct-2019	680	638	-42	42	-6.2%	6.2%	-6.6%
14-Oct-2019	774	731	-44	44	-5.6%	5.6%	-6.0%
15-Oct-2019	772	789	17	17	2.2%	2.2%	2.2%
16-Oct-2019	720	733	13	13	1.8%	1.8%	1.8%
17-Oct-2019	823	819	-4	4	-0.5%	0.5%	-0.5%
18-Oct-2019	714	726	11	11	1.6%	1.6%	1.6%
19-Oct-2019	**648**	**666**	**18**	**18**	**2.7%**	**2.7%**	**2.6%**
20-Oct-2019	747	713	-34	34	-4.6%	4.6%	-4.8%
21-Oct-2019	790	789	-1	1	-0.2%	0.2%	-0.2%
22-Oct-2019	810	798	-12	12	-1.5%	1.5%	-1.6%
23-Oct-2019	**811**	**810**	**-1**	**1**	**-0.1%**	**0.1%**	**-0.1%**
24-Oct-2019	792	792	0	0	0.0%	0.0%	0.0%
25-Oct-2019	770	762	-8	8	-1.1%	1.1%	-1.1%
26-Oct-2019	763	769	5	5	0.7%	0.7%	0.7%
27-Oct-2019	849	838	-11	11	-1.3%	1.3%	-1.3%
28-Oct-2019	891	886	-5	5	-0.6%	0.6%	-0.6%
29-Oct-2019	914	894	-20	20	-2.2%	2.2%	-2.2%
30-Oct-2019	895	883	-11	11	-1.2%	1.2%	-1.3%
31-Oct-2019	842	841	-1	1	-0.1%	0.1%	-0.1%
Minimum	648	638	-44	0	-6.2%	0.0%	-6.6%
Average	780	775	-6	13	-0.7%	1.7%	-0.8%
Maximum	914	894	18	44	2.7%	6.2%	2.6%
1-Nov-2019	**690**	**744**	**54**	**54**	**7.8%**	**7.8%**	**7.3%**
2-Nov-2019	761	746	-15	15	-2.0%	2.0%	-2.0%
3-Nov-2019	**912**	**782**	**-130**	**130**	**-14.2%**	**14.2%**	**-16.6%**

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
4-Nov-2019	832	839	7	7	0.8%	0.8%	0.8%
5-Nov-2019	892	925	33	33	3.7%	3.7%	3.6%
6-Nov-2019	893	854	-39	39	-4.4%	4.4%	-4.6%
7-Nov-2019	978	973	-5	5	-0.5%	0.5%	-0.5%
8-Nov-2019	922	870	-52	52	-5.6%	5.6%	-6.0%
9-Nov-2019	678	628	-50	50	-7.4%	7.4%	-8.0%
10-Nov-2019	966	960	-6	6	-0.6%	0.6%	-0.6%
11-Nov-2019	983	964	-20	20	-2.0%	2.0%	-2.1%
12-Nov-2019	1,034	1,031	-3	3	-0.3%	0.3%	-0.3%
13-Nov-2019	**824**	**895**	**71**	**71**	**8.6%**	**8.6%**	**8.0%**
14-Nov-2019	1,041	1,028	-14	14	-1.3%	1.3%	-1.3%
15-Nov-2019	1,078	1,094	15	15	1.4%	1.4%	1.4%
16-Nov-2019	1,120	1,106	-14	14	-1.3%	1.3%	-1.3%
17-Nov-2019	1,062	1,058	-4	4	-0.4%	0.4%	-0.4%
18-Nov-2019	1,103	1,098	-5	5	-0.5%	0.5%	-0.5%
19-Nov-2019	729	750	21	21	2.9%	2.9%	2.8%
20-Nov-2019	1,029	992	-37	37	-3.6%	3.6%	-3.8%
21-Nov-2019	1,114	1,035	-79	79	-7.1%	7.1%	-7.6%
22-Nov-2019	1,058	1,024	-34	34	-3.2%	3.2%	-3.3%
23-Nov-2019	993	970	-23	23	-2.3%	2.3%	-2.3%
24-Nov-2019	1,023	955	-68	68	-6.7%	6.7%	-7.1%
25-Nov-2019	1,086	1,055	-32	32	-2.9%	2.9%	-3.0%
26-Nov-2019	1,066	1,035	-31	31	-2.9%	2.9%	-3.0%
27-Nov-2019	1,041	1,031	-10	10	-0.9%	0.9%	-1.0%
28-Nov-2019	1,009	991	-17	17	-1.7%	1.7%	-1.8%
29-Nov-2019	1,075	1,087	12	12	1.1%	1.1%	1.1%
30-Nov-2019	972	990	18	18	1.9%	1.9%	1.8%
Minimum	678	628	-130	3	-14.2%	0.3%	-16.6%
Average	966	950	-15	31	-1.5%	3.3%	-1.7%
Maximum	1,120	1,106	71	130	8.6%	14.2%	8.0%
1-Dec-2019	1,143	1,060	-83	83	-7.2%	7.2%	-7.8%
2-Dec-2019	1,196	1,209	13	13	1.1%	1.1%	1.1%
3-Dec-2019	1,176	1,172	-4	4	-0.3%	0.3%	-0.3%
4-Dec-2019	1,008	1,012	3	3	0.3%	0.3%	0.3%
5-Dec-2019	1,085	1,042	-43	43	-3.9%	3.9%	-4.1%
6-Dec-2019	1,084	1,082	-1	1	-0.1%	0.1%	-0.1%
7-Dec-2019	1,150	1,141	-9	9	-0.8%	0.8%	-0.8%
8-Dec-2019	1,250	1,196	-54	54	-4.3%	4.3%	-4.5%

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
9-Dec-2019	678	628	-50	50	-7.4%	7.4%	-8.0%
10-Dec-2019	**998**	**1,018**	**20**	**20**	**2.0%**	**2.0%**	**1.9%**
11-Dec-2019	**1,052**	**1,068**	**16**	**16**	**1.6%**	**1.6%**	**1.5%**
12-Dec-2019	1,286	1,214	-72	72	-5.6%	5.6%	-5.9%
13-Dec-2019	1,397	1,371	-27	27	-1.9%	1.9%	-1.9%
14-Dec-2019	1,236	1,235	-1	1	-0.1%	0.1%	-0.1%
15-Dec-2019	1,005	1,036	31	31	3.1%	3.1%	3.0%
16-Dec-2019	1,324	1,276	-48	48	-3.6%	3.6%	-3.8%
17-Dec-2019	1,343	1,377	34	34	2.5%	2.5%	2.4%
18-Dec-2019	1,273	1,311	38	38	3.0%	3.0%	2.9%
19-Dec-2019	**729**	**750**	**21**	**21**	**2.9%**	**2.9%**	**2.8%**
20-Dec-2019	1,286	1,250	-36	36	-2.8%	2.8%	-2.9%
21-Dec-2019	1,206	1,198	-7	7	-0.6%	0.6%	-0.6%
22-Dec-2019	1,317	1,308	-9	9	-0.7%	0.7%	-0.7%
23-Dec-2019	1,364	1,394	29	29	2.2%	2.2%	2.1%
24-Dec-2019	1,257	1,320	63	63	5.0%	5.0%	4.8%
25-Dec-2019	1,229	1,207	-22	22	-1.8%	1.8%	-1.8%
26-Dec-2019	1,274	1,259	-15	15	-1.2%	1.2%	-1.2%
27-Dec-2019	1,265	1,279	14	14	1.1%	1.1%	1.1%
28-Dec-2019	1,238	1,217	-21	21	-1.7%	1.7%	-1.8%
29-Dec-2019	1,221	1,207	-14	14	-1.1%	1.1%	-1.1%
30-Dec-2019	1,271	1,327	56	56	4.4%	4.4%	4.2%
31-Dec-2019	1,234	1,255	21	21	1.7%	1.7%	1.7%
Minimum	678	628	-83	1	-7.4%	0.1%	-8.0%
Average	1,180	1,175	-5	28	-0.5%	2.4%	-0.6%
Maximum	1,397	1,394	63	83	5.0%	7.4%	4.8%

Table 4: Monthly Peak Utility Load Error Summary - Average Error

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
Jan 2019	1,259	1,269	10	29	0.9%	2.4%	0.8%
Feb 2019	1,384	1,377	-7	25	-0.4%	1.8%	-0.5%
Mar 2019	1,217	1,217	0	22	0.0%	1.8%	-0.1%
Apr 2019	1,041	1,034	-7	23	-0.6%	2.2%	-0.7%
May 2019	909	895	-14	21	-1.5%	2.4%	-1.6%
Jun 2019	693	686	-7	13	-0.9%	1.8%	-1.0%
Jul 2019	613	607	-6	12	-0.9%	2.0%	-1.0%
Aug 2019	577	577	0	8	0.0%	1.3%	0.0%
Sep 2019	638	636	-2	13	-0.2%	2.1%	-0.3%
Oct 2019	780	775	-6	13	-0.7%	1.7%	-0.8%
Nov 2019	966	950	-15	31	-1.5%	3.3%	-1.7%
Dec 2019	1,180	1,175	-5	28	-0.5%	2.4%	-0.6%
Total Average	**938**	**933**	**-5**	**20**	**-0.5%**	**2.1%**	**-0.6%**

Table 5: Monthly Peak Utility Load Error Summary - Maximum Error[17]

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
Jan 2019	1,444	1,434	121	121	10.6%	10.6%	9.5%
Feb 2019	1,624	1,591	114	114	10.1%	10.1%	9.1%
Mar 2019	1,436	1,449	84	84	6.6%	6.6%	6.2%
Apr 2019	1,246	1,262	52	86	6.7%	7.8%	6.2%
May 2019	1,089	1,090	45	64	6.4%	6.5%	6.0%
Jun 2019	826	819	42	47	6.2%	6.2%	5.8%
Jul 2019	688	669	19	53	3.1%	7.7%	3.0%
Aug 2019	601	613	16	16	2.6%	2.7%	2.6%
Sep 2019	772	753	33	76	6.3%	9.8%	6.0%
Oct 2019	914	894	18	44	2.7%	6.2%	2.6%
Nov 2019	1,120	1,106	71	130	8.6%	14.2%	8.0%
Dec 2019	1,397	1,394	63	83	5.0%	7.4%	4.8%
Annual	**1,624**	**1,591**	**121**	**130**	**10.6%**	**14.2%**	**9.5%**

[17] The maximum forecast, the maximum peak, and the maximum error do not necessarily occur on the same day.

Table 6: Error in Ten Highest Utility Loads

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Percent Error	Absolute Percent Error	Actual/ Forecast
20-Feb-2019	1,624	1,544	-80	80	-5.0%	5.0%	-5.2%
21-Feb-2019	1,613	1,591	-22	22	-1.4%	1.4%	-1.4%
25-Feb-2019	1,524	1,509	-14	14	-0.9%	0.9%	-0.9%
11-Feb-2019	1,519	1,515	-4	4	-0.3%	0.3%	-0.3%
4-Feb-2019	1,480	1,477	-2	2	-0.2%	0.2%	-0.2%
22-Feb-2019	1,476	1,487	11	11	0.7%	0.7%	0.7%
10-Feb-2019	1,475	1,465	-10	10	-0.7%	0.7%	-0.7%
23-Feb-2019	1,470	1,497	27	27	1.8%	1.8%	1.8%
1-Feb-2019	1,453	1,368	-85	85	-5.8%	5.8%	-6.2%
18-Jan-2019	1,444	1,434	-10	10	-0.7%	0.7%	-0.7%
Average	**1,508**	**1,489**	**-19**	**27**	**-1.2%**	**1.7%**	**-1.3%**

Table 7: Summary of Forecast Issues

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Absolute Percent Error	Explanation
6-Jan-2019	1,150	1,206	56	56	4.8%	Error in industrial load forecast, error in wind speed forecast, and non-uniform customer behavior.
22-Jan-2019	1,143	1,264	121	121	10.6%	Error in industrial load forecast and error in weather forecast.
25-Jan-2019	1,013	1,117	104	104	10.2%	Error in industrial load forecast and error in temperature forecast.
17-Feb-2019	1,137	1,137	-114	114	10.1%	Error in industrial load forecast, error in temperature and wind speed forecast, and non-uniform customer behaviour.
18-Feb-2019	1,375	1,346	-29	29	2.1%	Error in industrial load forecast.
2-Mar-2019	1,234	1,280	47	47	3.8%	Error in industrial load forecast and non-uniform customer behavior.
3-Mar-2019	1,275	1,359	84	84	6.6%	Error in industrial load forecast, error in wind speed and cloud cover forecast, and non-uniform customer behavior.
27-Mar-2019	1,262	1,304	43	43	3.4%	Error in industrial load forecast and error in wind speed forecast.
3-Apr-2019	1,094	1,110	16	16	1.4%	Error in industrial load forecast.
19-Apr-2019	1,071	987	-84	84	7.8%	Error in temperature and cloud cover forecast.

Date	Actual Utility Peak (MW)	Forecast Utility Peak (MW)	Error (MW)	Absolute Error (MW)	Absolute Percent Error	Explanation
24-Apr-2019	1,159	1,073	-86	86	7.4%	Error in temperature forecast and non-uniform customer behavior.
25-May-2019	711	756	45	45	6.4%	Error in industrial load forecast; error in temperature and wind speed forecast.
5-Jun-2019	662	648	-14	14	2.1%	Error in industrial load forecast.
6-Jun-2019	698	658	-40	40	5.8%	Error attributed to an overstatement of load due to export activity over the Maritime Link.
18-Jun-2019	705	695	-9	9	1.3%	Error in industrial load forecast.
13-Jul-2019	581	586	4	4	0.7%	Error in industrial load forecast.
14-Jul-2019	604	597	-6	6	1.0%	Error in industrial load forecast.
29-Jul-2019	593	611	18	18	3.1%	Error in industrial load forecast.
13-Aug-2019	588	585	-3	3	0.5%	Error in industrial load forecast.
15-Aug-2019	564	569	5	5	0.8%	Error in industrial load forecast.
18-Aug-2019	542	549	7	7	1.3%	Error in industrial load forecast.
1-Sep-2019	524	558	33	33	6.3%	Error in industrial load forecast; non-uniform customer behaviour.
14-Sep-2019	611	631	20	20	3.3%	Error in industrial load forecast.
25-Sep-2019	772	696	-76	76	9.8%	Error in temperature and cloud cover forecast.
19-Oct-2019	648	666	18	18	2.7%	Error in industrial load forecast.
23-Oct-2019	811	810	-1	1	0.1%	Error in industrial load forecast; non-uniform customer behaviour.
1-Nov-2019	690	744	54	54	7.8%	Error in industrial load forecast; error in weather forecast.
3-Nov-2019	912	782	-130	130	14.2%	Error in temperature forecast; non-uniform customer behaviour.
13-Nov-2019	824	895	71	71	8.6%	Error in the industrial load forecast; error in wind speed forecast.
10-Dec-2019	998	1018	20	20	2.0%	Error in industrial load forecast.
11-Dec-2019	1052	1068	16	16	1.6%	Error in industrial load forecast.
19-Dec-2019	729	750	21	21	2.9%	Error in industrial load forecast; error in temperature and wind speed forecast.