Energy Twin report

Analyzed meter: Office Eagle Main meter kW

Generated at 2021.05.11 16:29:14

Statistical properties

Metric	Curent model	Target
R² - Coefficient of Determination	0.85	> 0.75
CV(RMSE) - Coefficient of Variation of RMSE	19.5%	< 25 %
NBD - Net Determination Bias	0.000%	abs < 0.005 %

Time-dependent load

The energy consumption of buildings is usually determined by two major factors: time of the week and weather. The Energy twin model enables investigation of the influence of the above-mentioned factors separately.

Below is the chart of typical daily profiles for different weekdays without the influence of the weather.
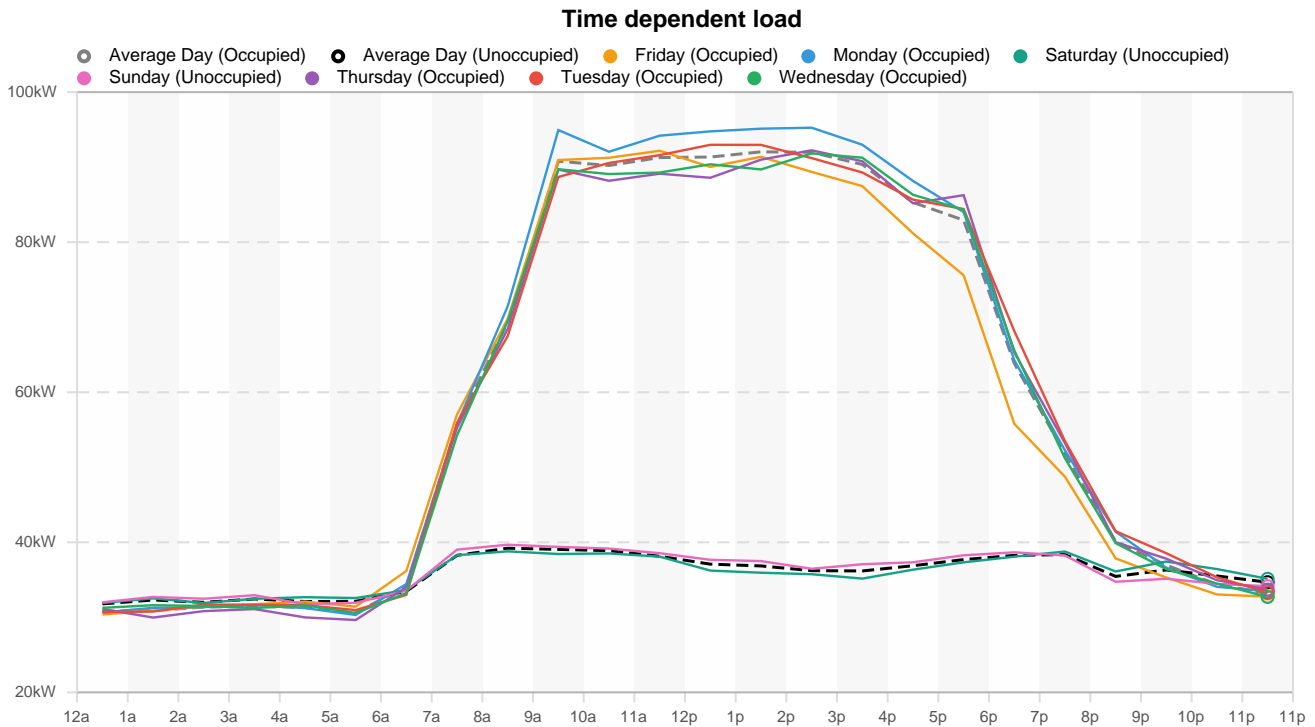

The tables below show the relative difference among individual weekdays days and the average day. The occupied days are shown in the upper table, the unoccupied days are shown in the lower table. Can you also see the lower energy consumption on Fridays?

Occupied Days		Unoccupied Days	
Monday	102%	Sunday	100%
Tuesday	101%	Saturday	99.91%
Wednesday	99.64%	Average Day	100%
Thursday	99.59%		
Friday	98.0%		
Average Day	100%		

Weather-dependent load

The analysis of the ambient temperature effect on energy consumption is shown in the chart below The y-axis corresponds to the relative increase in energy consumption as a function of ambient temperature (x-axis). Usually, one can observe a dead-band range around 10 °C where no extra energy is used. With increasing temperatures the energy demand also increases due to cooling. In the case of electrical heating, the energy consumption increase can be observed for lower temperatures as well. The weather-dependent load characteristic is modeled separately for occupied days and for unoccupied days.

Weather dependent load
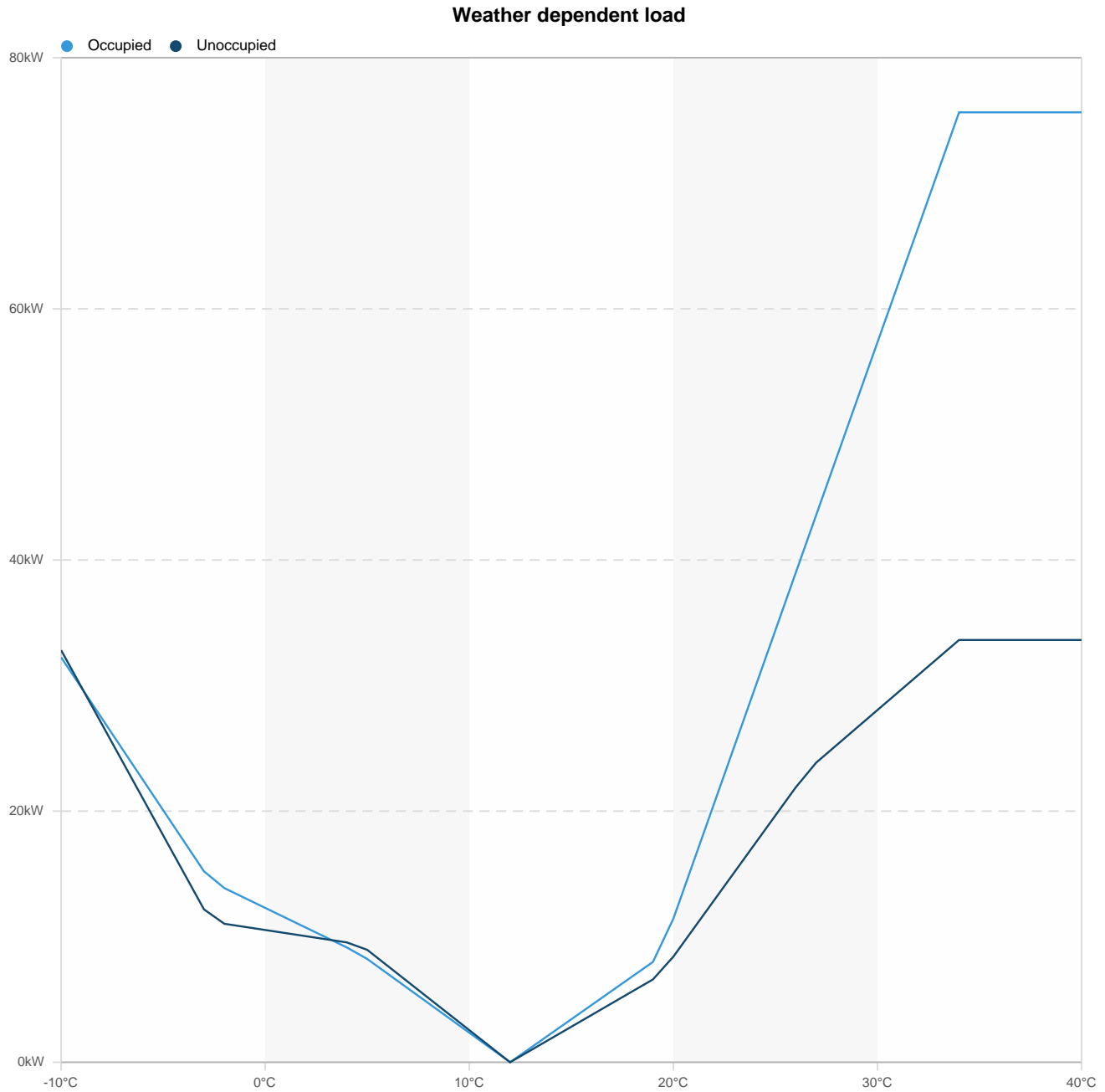
Benchmarks

The summary benchmarks calculated with the use of the mathematical model of the energy consumption profile are listed in the table below.
For a detailed benchmarks description see the KPI simulator view in the Energy Twin app.

	Value
Setback Ratio • Working day maximum	92.04kW
Setback Ratio • Weekend average	35.81kW
Setback Ratio • Current setback ratio	38.9%
Setback Flattening • Weekend morning	32.13kW
Setback Flattening • Weekend average	35.81kW
Setback Flattening • Weekend maximum	39.21kW
Saturday Sunday Equalization • Saturday average	35.77kW
Saturday Sunday Equalization • Sunday average	35.96kW
Heating/Cooling Load Reduction • Heating load - occupie…	32.25kW
Heating/Cooling Load Reduction • Heating load - unoccup…	32.82kW
Heating/Cooling Load Reduction • Cooling load - occupie…	75.65kW
Heating/Cooling Load Reduction • Cooling load - unoccup…	33.63kW
Heating/Cooling Setback • Heating setback	102%
Heating/Cooling Setback • Cooling setback	44.45%

Comparison of measurement and model prediction overview

Scope: **Office Eagle Main meter kW**

From: **01.01.2020**

To: **31.12.2020**

The table below shows overview of differences between prediction and measurement (negative value indicates energy savings). For detailed information see the monthly reports on the next pages.

Differences between measurement and prediction.

Month	All data relative	All data absolute	Occupied relative	Occupied absolute	Unoccupied relative	Unoccupied absolute
Jan-2020	1.4%	643kWh	4.7%	1,031kWh	-1.5%	-387kWh
Feb-2020	-10.7%	-4,013kWh	-9.7%	-1,631kWh	-11.5%	-2,382kWh
Mar-2020	-10%	-4,057kWh	-14.4%	-2,518kWh	-6.7%	-1,539kWh
Apr-2020	-27.2%	-8,558kWh	-36.3%	-4,754kWh	-20.7%	-3,804kWh
May-2020	-25.6%	-8,189kWh	-22.4%	-3,082kWh	-28.1%	-5,107kWh
Jun-2020	-23.2%	-8,146kWh	-15.1%	-2,764kWh	-31.9%	-5,382kWh
Jul-2020	-10.7%	-4,594kWh	-1.5%	-351kWh	-20.9%	-4,243kWh
Aug-2020	-9.5%	-4,381kWh	3.3%	791kWh	-23.2%	-5,171kWh
Sep-2020	-13.7%	-5,233kWh	-4.4%	-854kWh	-23.5%	-4,379kWh
Oct-2020	-12.4%	-4,511kWh	-8.5%	-1,438kWh	-15.9%	-3,073kWh
Nov-2020	2.5%	1,073kWh	1.6%	300kWh	3.2%	774kWh
Dec-2020	1.3%	586kWh	-1%	-192kWh	2.9%	778kWh

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

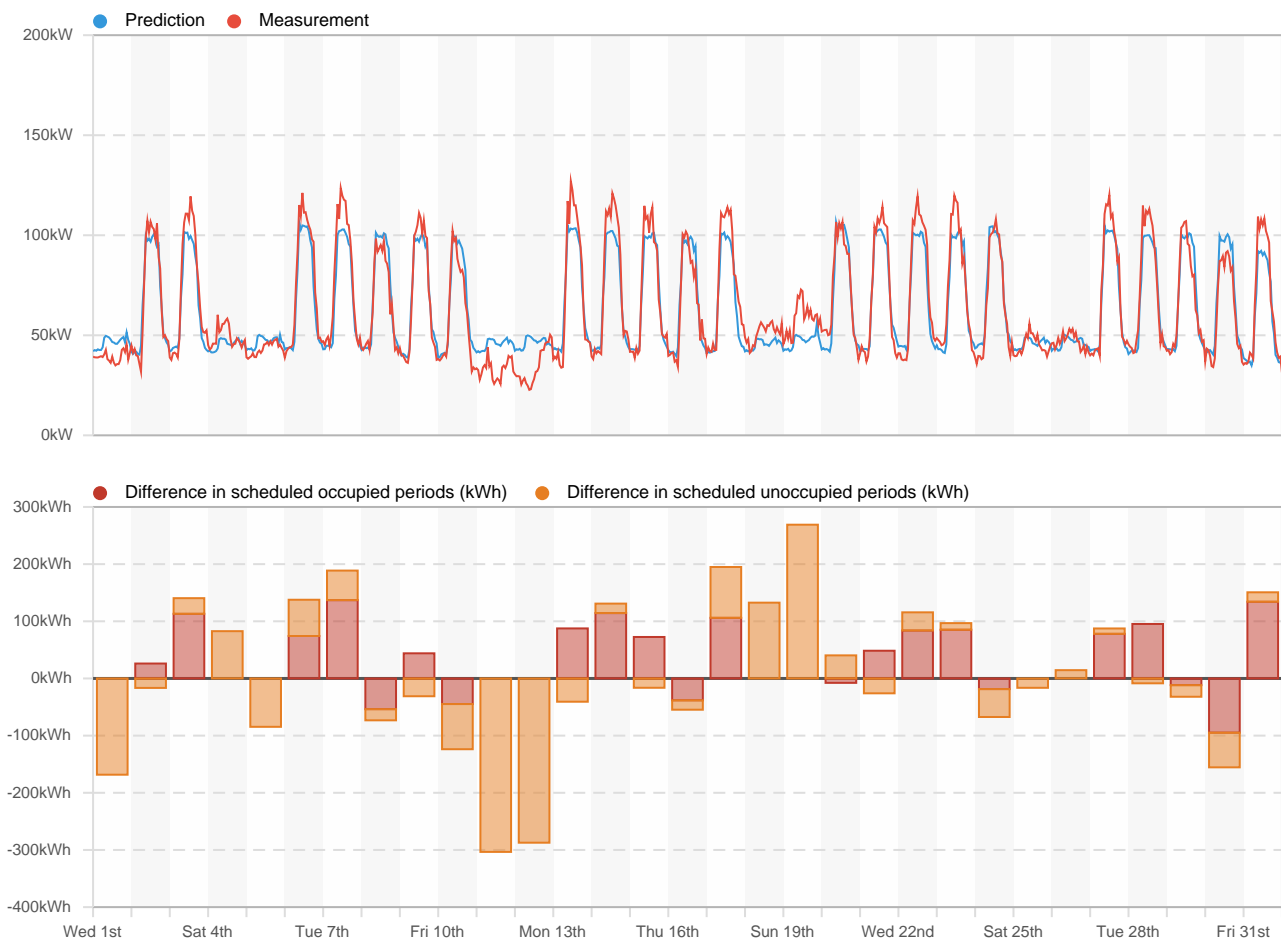**From:** **01.01.2020**

To: **31.01.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	1.4%	643kWh	47,047kWh	46,403kWh
Scheduled Occupied Periods	4.7%	1,031kWh	21,701kWh	20,670kWh
Scheduled Unoccupied Periods	-1.5%	-387kWh	25,346kWh	25,733kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

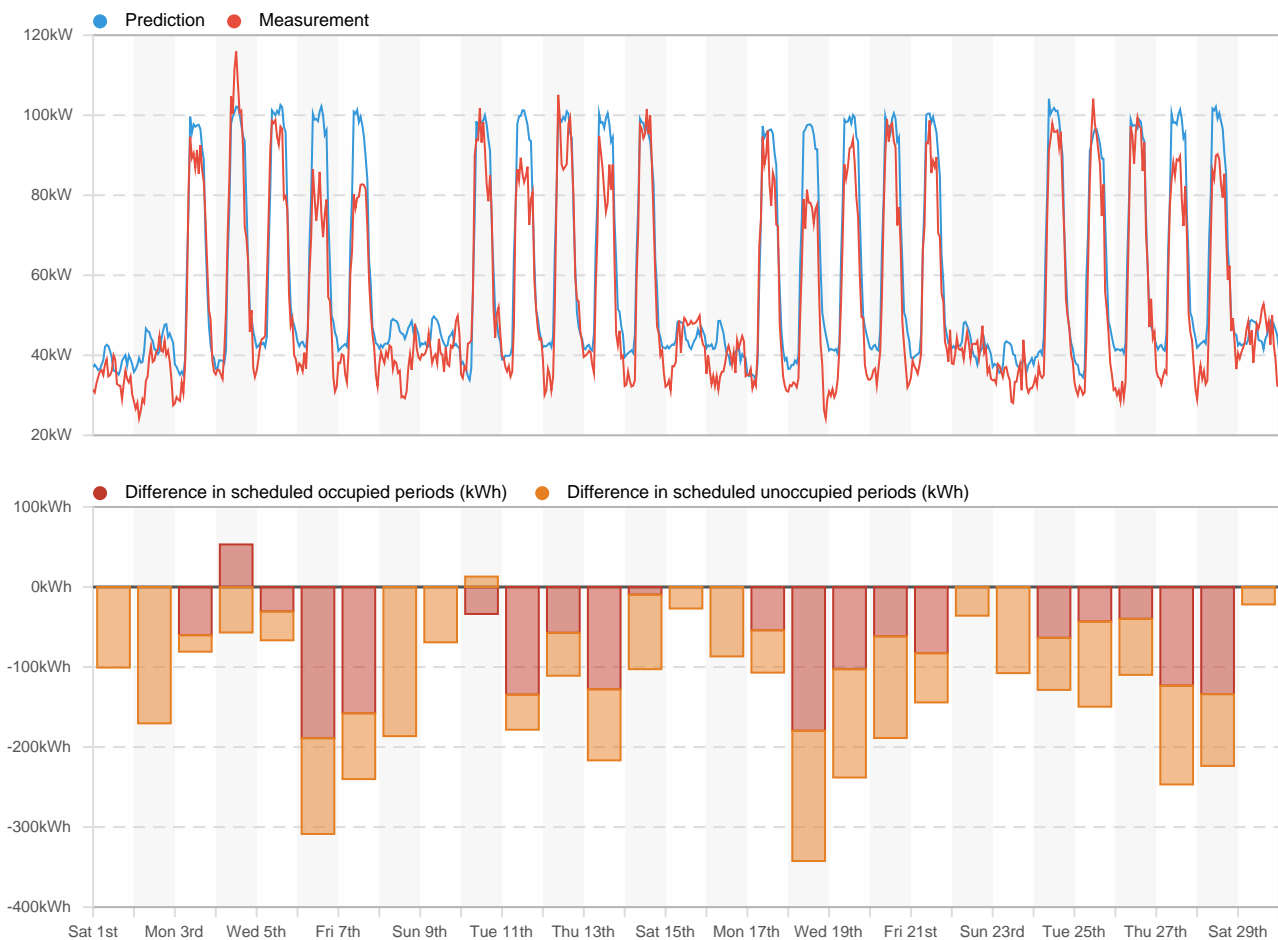**From:** **01.02.2020**

To: **29.02.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-10.7%	-4,013kWh	37,586kWh	41,599kWh
Scheduled Occupied Periods	-9.7%	-1,631kWh	16,872kWh	18,503kWh
Scheduled Unoccupied Periods	-11.5%	-2,382kWh	20,714kWh	23,096kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

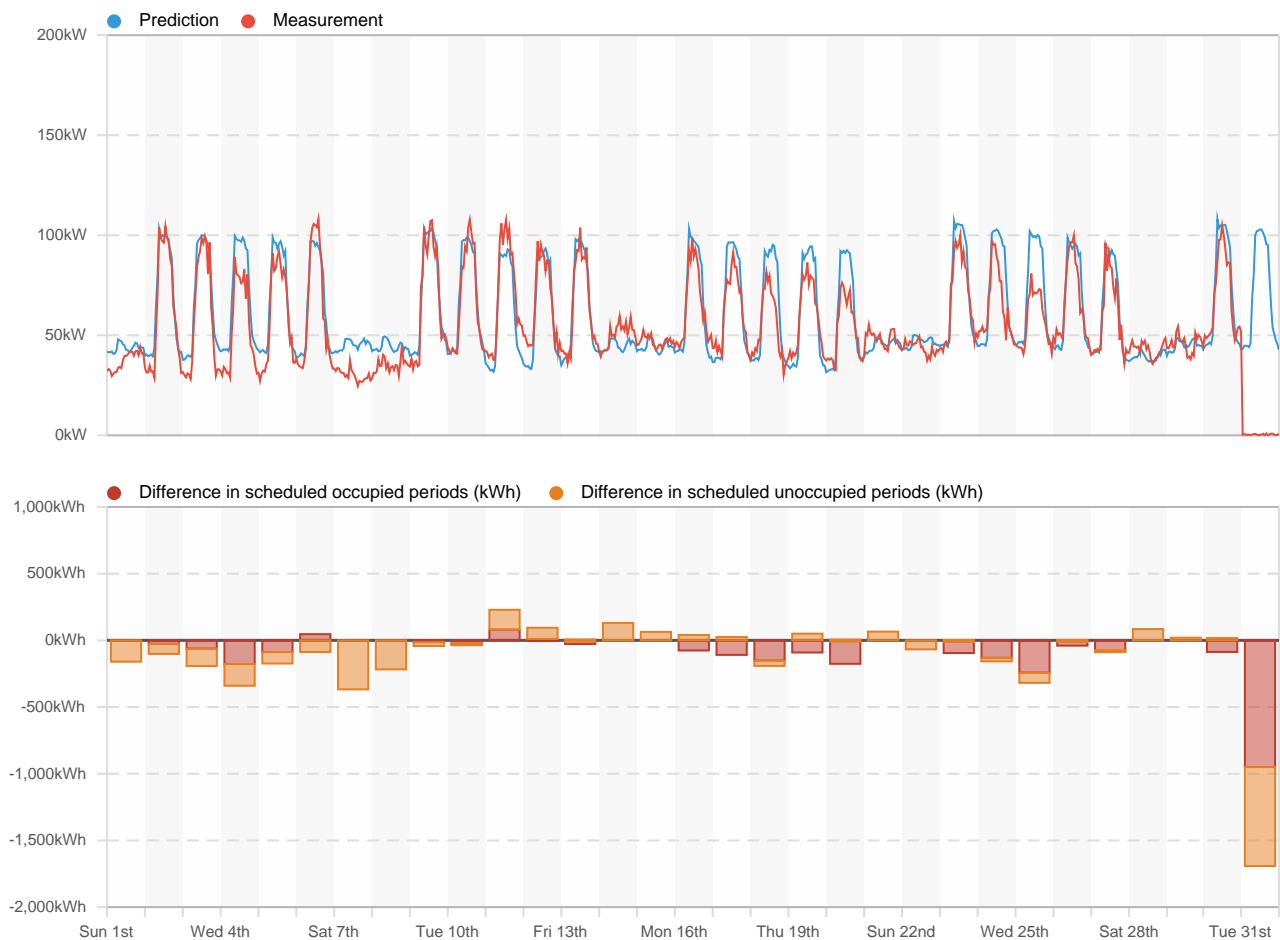**From:** **01.03.2020**

To: **31.03.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-10%	-4,057kWh	40,524kWh	44,581kWh
Scheduled Occupied Periods	-14.4%	-2,518kWh	17,530kWh	20,048kWh
Scheduled Unoccupied Periods	-6.7%	-1,539kWh	22,994kWh	24,533kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

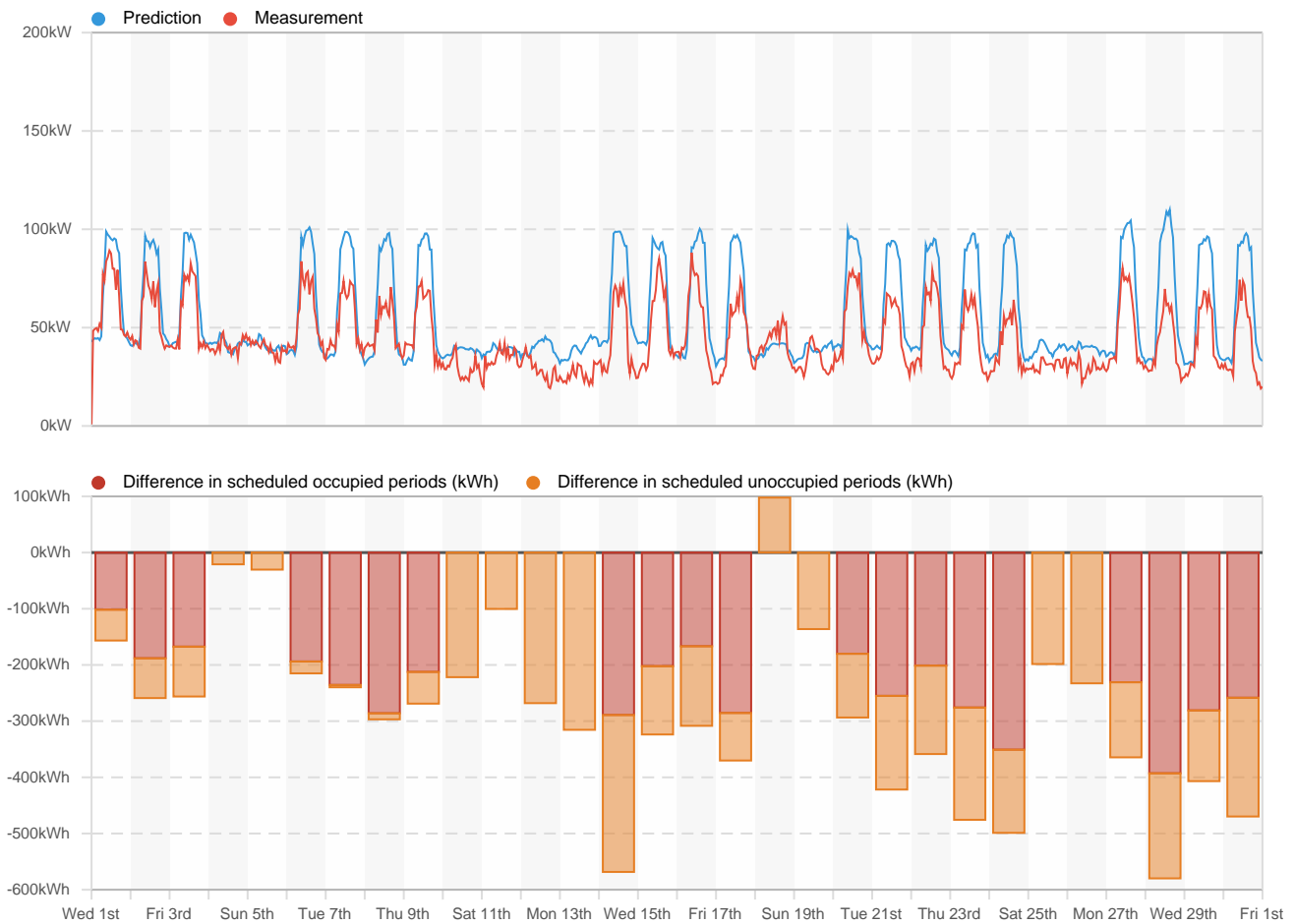**From:** **01.04.2020**

To: **30.04.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-27.2%	-8,558kWh	31,502kWh	40,059kWh
Scheduled Occupied Periods	-36.3%	-4,754kWh	13,105kWh	17,859kWh
Scheduled Unoccupied Periods	-20.7%	-3,804kWh	18,397kWh	22,200kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.05.2020**
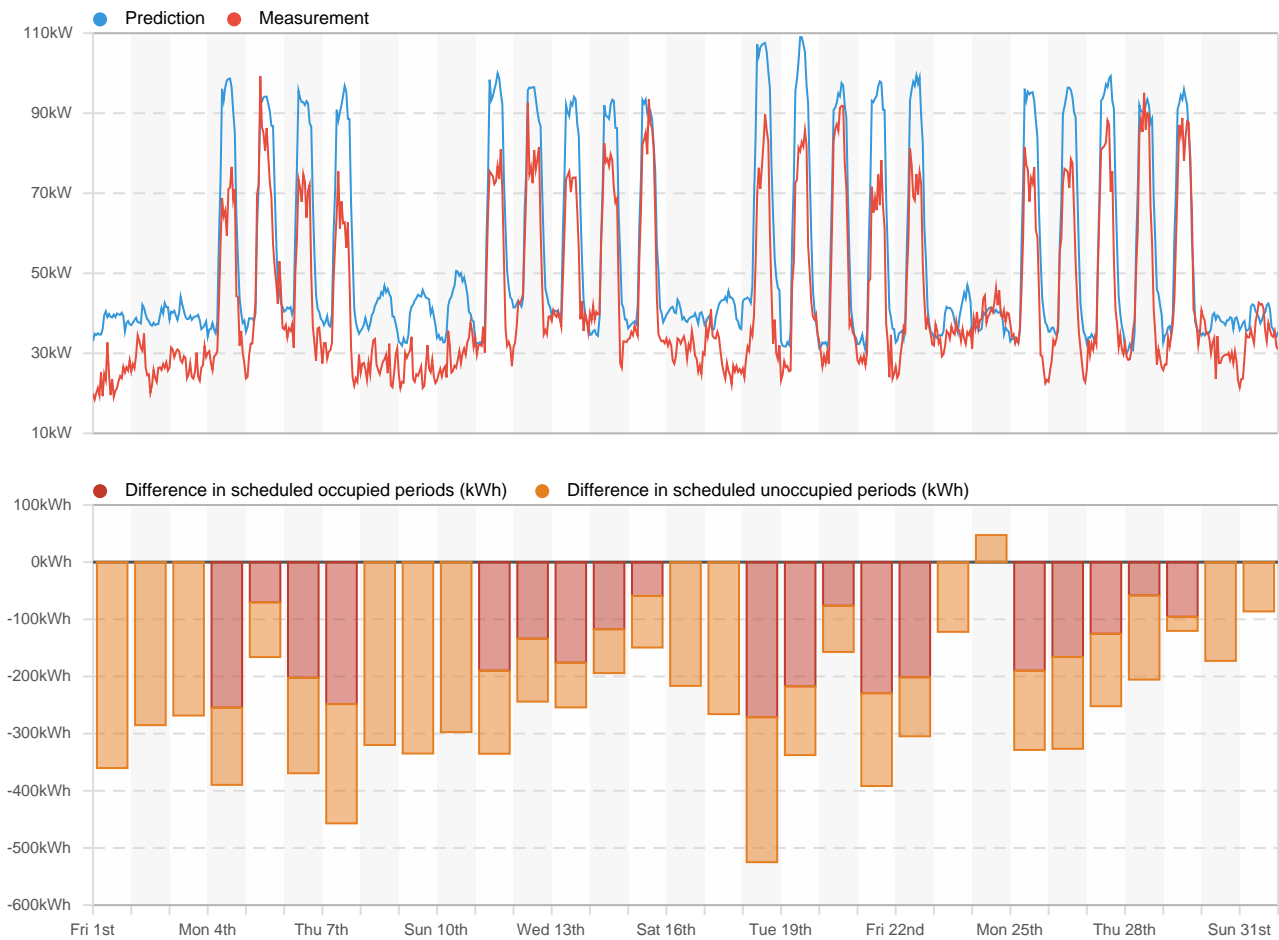
To: **31.05.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-25.6%	-8,189kWh	31,946kWh	40,135kWh
Scheduled Occupied Periods	-22.4%	-3,082kWh	13,790kWh	16,872kWh
Scheduled Unoccupied Periods	-28.1%	-5,107kWh	18,155kWh	23,262kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.06.2020**
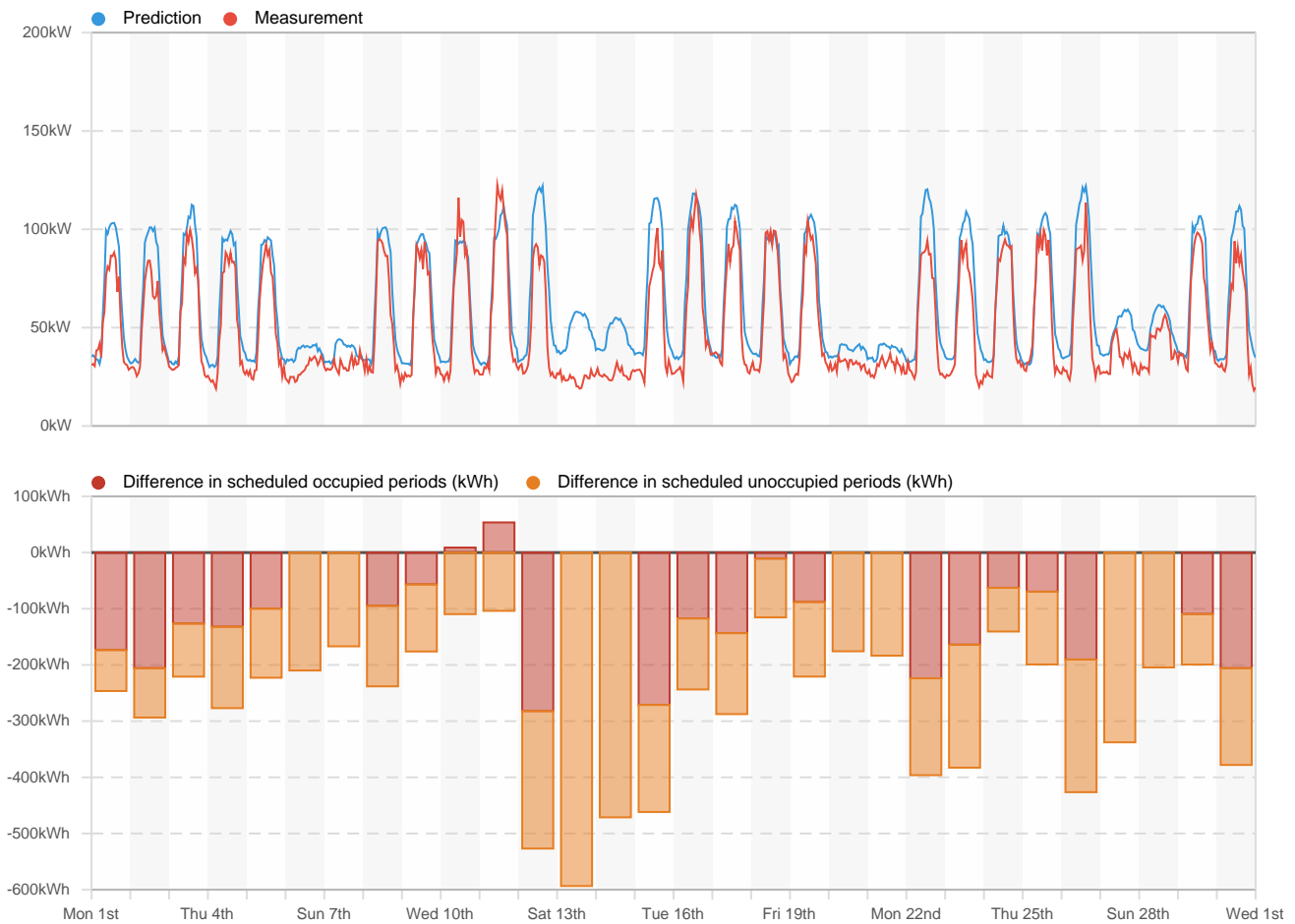
To: **30.06.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-23.2%	-8,146kWh	35,155kWh	43,301kWh
Scheduled Occupied Periods	-15.1%	-2,764kWh	18,296kWh	21,060kWh
Scheduled Unoccupied Periods	-31.9%	-5,382kWh	16,859kWh	22,242kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.07.2020**
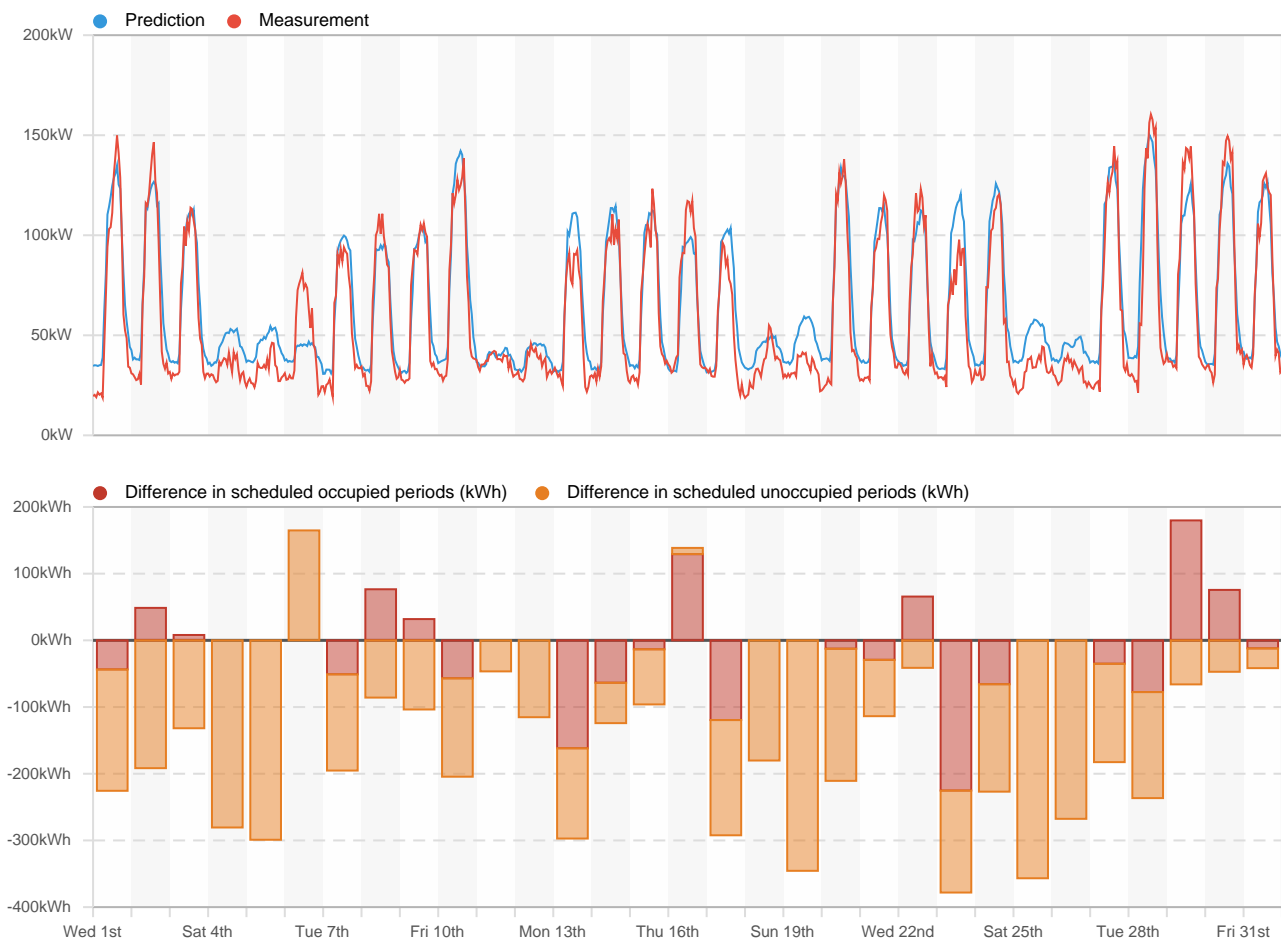
To: **31.07.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-10.7%	-4,594kWh	42,985kWh	47,579kWh
Scheduled Occupied Periods	-1.5%	-351kWh	22,671kWh	23,023kWh
Scheduled Unoccupied Periods	-20.9%	-4,243kWh	20,314kWh	24,556kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.08.2020**
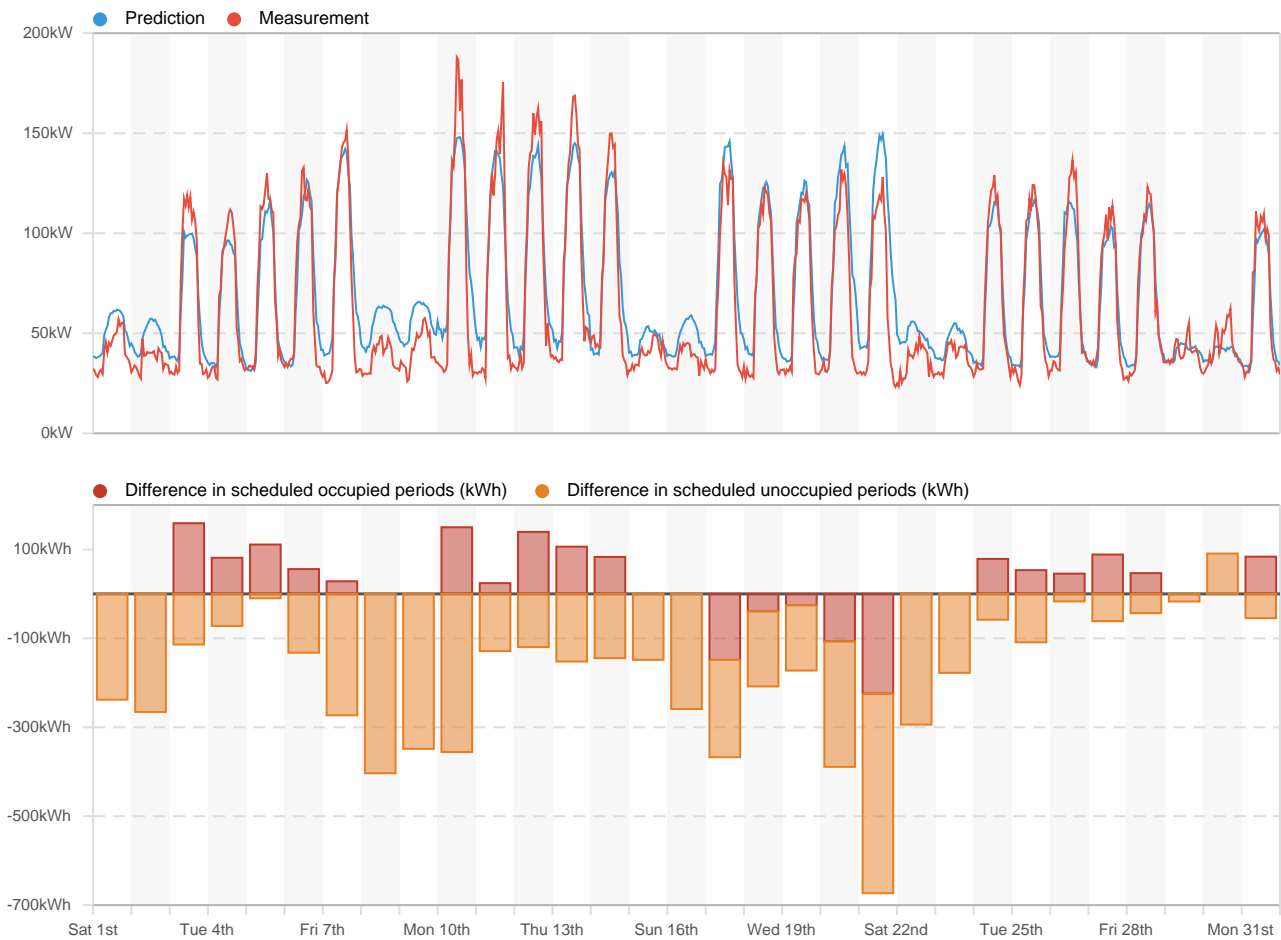
To: **31.08.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-9.5%	-4,381kWh	46,217kWh	50,598kWh
Scheduled Occupied Periods	3.3%	791kWh	23,938kWh	23,147kWh
Scheduled Unoccupied Periods	-23.2%	-5,171kWh	22,279kWh	27,450kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.09.2020**
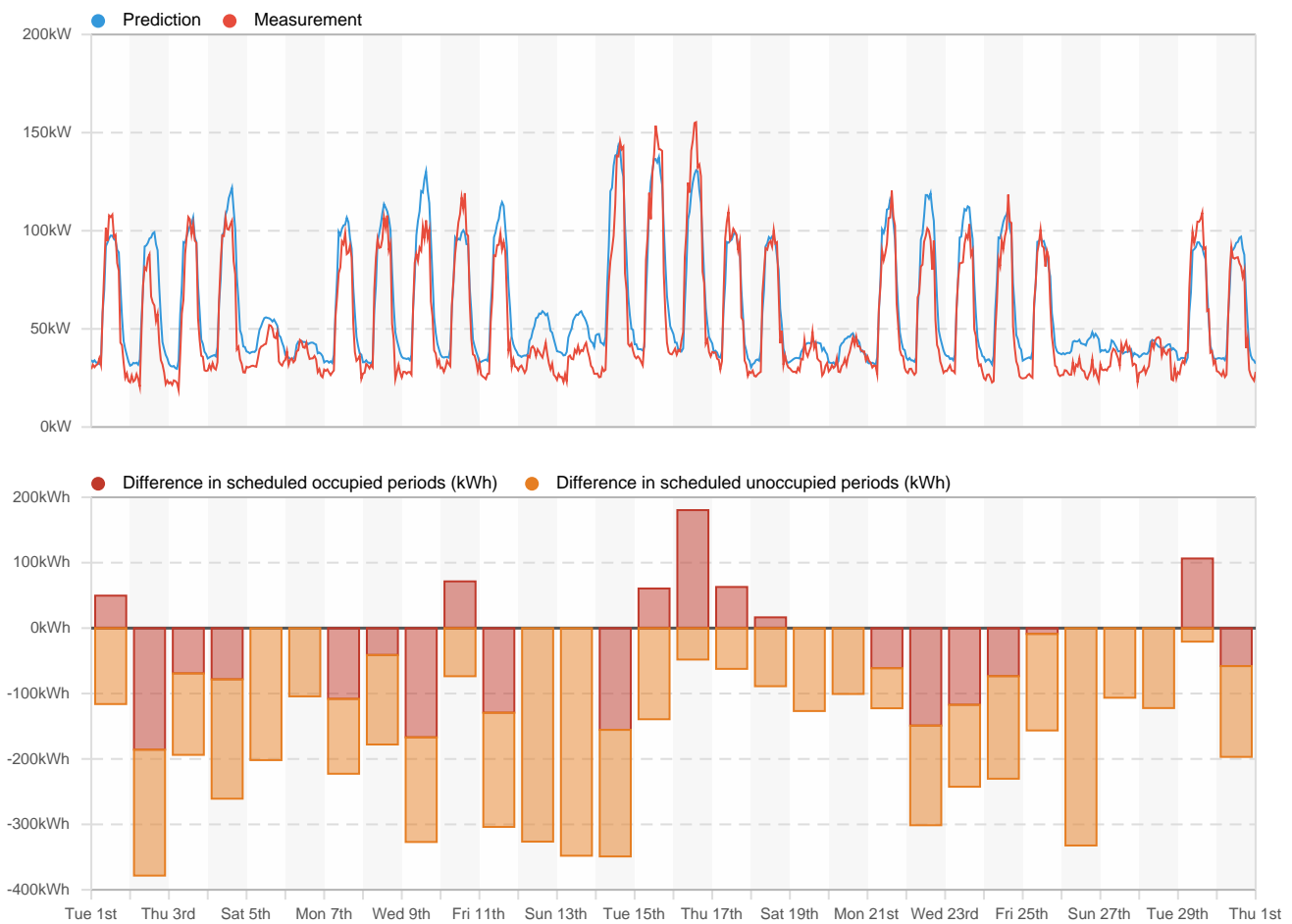
To: **30.09.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-13.7%	-5,233kWh	38,232kWh	43,465kWh
Scheduled Occupied Periods	-4.4%	-854kWh	19,617kWh	20,471kWh
Scheduled Unoccupied Periods	-23.5%	-4,379kWh	18,615kWh	22,994kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.10.2020**
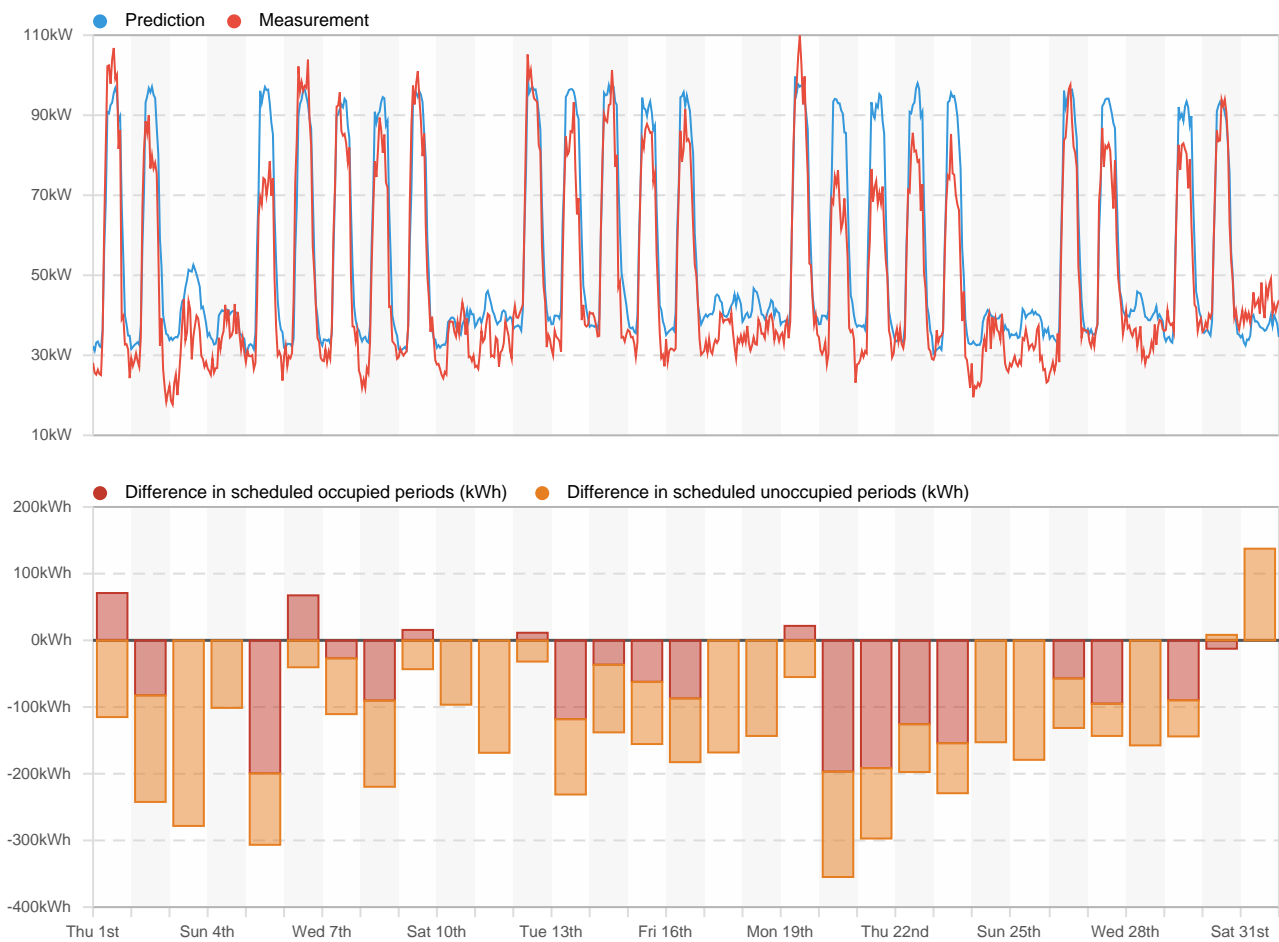
To: **31.10.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	-12.4%	-4,511kWh	36,258kWh	40,769kWh
Scheduled Occupied Periods	-8.5%	-1,438kWh	16,947kWh	18,385kWh
Scheduled Unoccupied Periods	-15.9%	-3,073kWh	19,311kWh	22,384kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.11.2020**
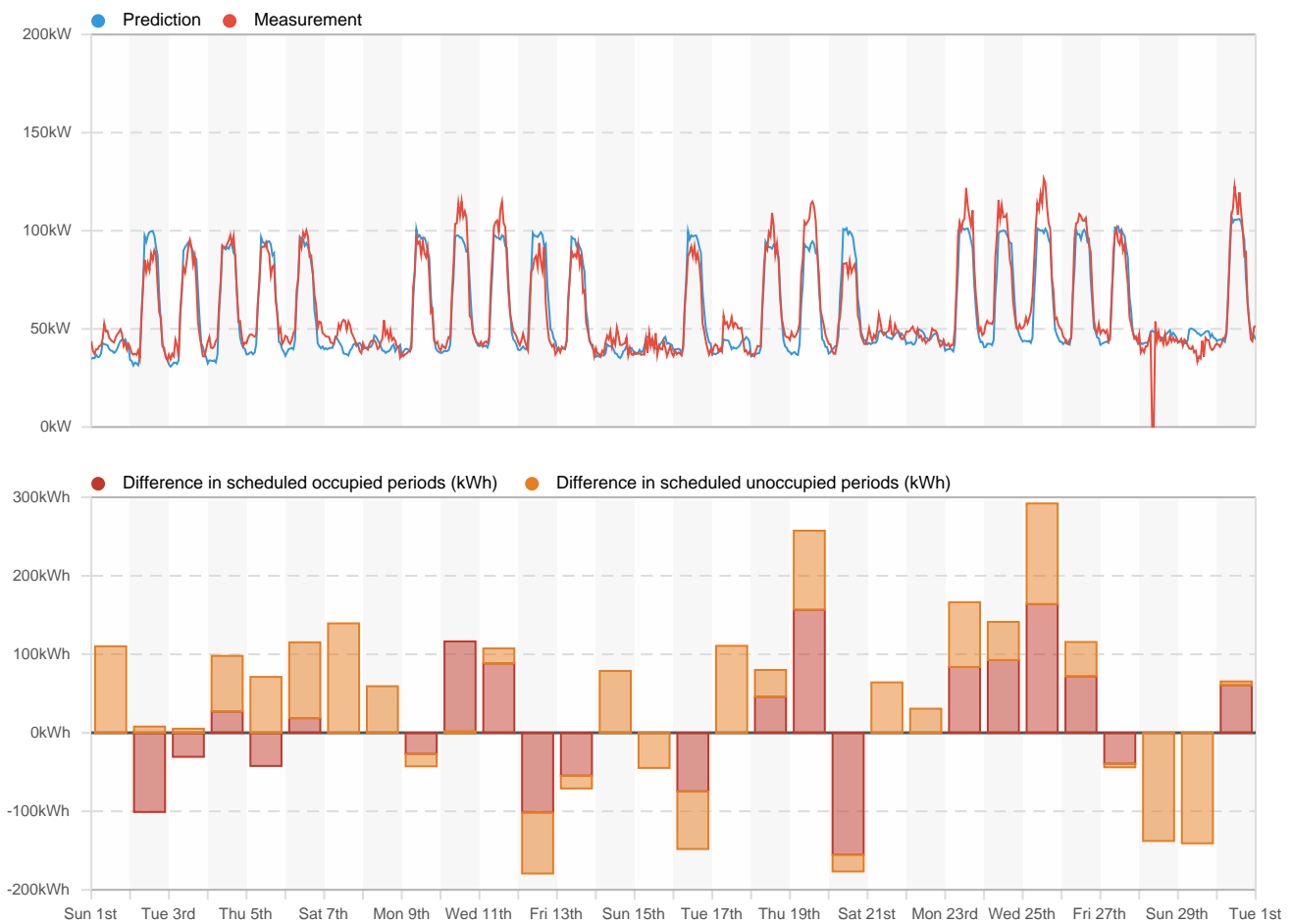
To: **30.11.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	2.5%	1,073kWh	42,926kWh	41,852kWh
Scheduled Occupied Periods	1.6%	300kWh	18,488kWh	18,189kWh
Scheduled Unoccupied Periods	3.2%	774kWh	24,437kWh	23,663kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.

Comparison of measurement and model prediction

Scope: **Office Eagle Main meter kW**

From: **01.12.2020**

To: **31.12.2020**

The model prediction is compared with measurement in order to detect and quantify deviations from the expected energy consumption profile. Time periods, when a building is occupied and unoccupied, are distinguished in the comparison. Negative difference values represent energy savings (i.e. measured consumption is lower than expected by the model).

Table with summary data for the entire analyzed time period.

Scope	Relative difference	Absolute difference	Measurement	Prediction
All data	1.3%	586kWh	46,239kWh	45,653kWh
Scheduled Occupied Periods	-1%	-192kWh	19,568kWh	19,760kWh
Scheduled Unoccupied Periods	2.9%	778kWh	26,671kWh	25,893kWh

Predicted and measured profiles are shown in the upper chart.

Daily sums of difference between measured and predicted values are shown in the lower chart. Sums are calculated for occupied and unoccupied periods separately.