

Patterson Farms - New Generator - Data Integrator Notes

Patterson New consists of the new engine-generator that helps meet the electrical needs for the farm located in Auburn, NY.

The single 225 kW Guascor engine serves the farm. It is located in the pole barn, near the digester. The heat recovery loop provides heating for the digester thru a hot water loop. The radiator is located out back of the pole barn the engines are located in. Dump radiator rejects excess heat to ambient when the return water temperature entering the engine HX is too high.

Data Point Details

The data collected will be made available at <http://chp.nyserda.org/home/index.cfm>. Data is logged at 15-minute intervals and is averaged or totaled for that period.

The timestamp in the raw data files is in Eastern Standard Time. All graphical figures on the website are presented in Eastern Standard Time. This means that during the Daylight Savings Time period from the first Sunday in April until the last Sunday in October the monitored data plots, CSV output and standardized PDF reports are in Eastern Standard Time and do not obey Daylight Savings time rules. Presenting data in Standard Time throughout the year is common practice for graphical time series plotting because it eliminates skipping an hour in April and duplicating an hour in October.

DG/CHP Generator Output (total kWh)

The data for Generator Output comes from the data point WG2. The data is accumulated so the difference between consecutive records is calculated for the energy use during the interval. This 15-minute interval energy data is then summed into hourly data.

DG/CHP Generator Output Demand (peak kW)

The Generator Output Demand comes from 15-minute data point as above, WG2. Instead of accumulating the kWh data, the highest kWh/ 15-min value is multiplied by 4 in order to calculate the highest hourly demand from the 15-minute data.

DG/CHP Generator Gas Input (cubic feet)

The data for Generator Gas Input comes from 15-minute data. The column of origin for this data point is labeled FGE2. The data is accumulated so the difference between consecutive records is calculated for the gas flow during the interval. This 15-minute interval energy data is then summed into hourly data.

Total Facility Purchased Energy (total kWh)

There is no data available for this point.

Total Facility Purchased Demand (peak kW)

There is no data available for this point.

Other Facility Gas Use (cubic feet)

There is no data available for this point.

Total Facility Energy (total kWh) and Total Facility Demand (peak kW)

There is no data available for this point.

Unused Heat Recovery (total MBtu/h)

There is no data available for this point.

Useful Heat Recovery (total MBtu/h)

There is no data available for this point.

Status/Runtime of DG/CHP Generator (hrs)

The generators are defined as being fully on for a 15-minute interval if the generator output is greater than 15 kW for the period (the fully-loaded capacity is 180 kW). The status is given a value of 0.25 if the generator output is above 15 kW. The 15-minute data is then summed into hourly data for the online database.

Ambient Temperature (avg °F)

The data for Ambient Temperature comes from hourly data from recorded data at <http://www.wunderground.com/>, for Skaneateles, New York (PWS).

Total CHP Efficiency (%)

The Total CHP Efficiency is calculated from the online hourly database by dividing the DG/CHP Generator Output, converted from kWh to MBtus, by the DG/CHP Generator Gas Input. The gas input is converted to MBtus using the Lower Heating Value (LHV) of the fuel which is 0.550 MBtu/cubic foot (Natural Gas).

Data Quality Checks

The Data Quality Checks consist of three levels of verification: does the data exist, does the data pass reasonable range checking and does the data pass relational checks. The methodology for applying the data quality begins by creating a contiguous database. This is necessary to maintain compatibility between the many sites on the server. Next, the data received for this site is fit into the database, in this case we are using 15-minute data. For any period where there is data, the data quality level is set to 3 for “Passes Relational Checks”. We then work backwards to identify data that does not meet Relational and/or Range Checking.

The next step is to apply the relational checks. Relational checks attempt to identify data which is uncorroborated by the rest of the data set. For instance, data received indicating a DG/CHP Generator output when the gas use is zero is suspect. For data failing a relational check, the data quality level is set to 2 for “Data Passes Range Checks”.

The last step is evaluating the range checks. The range checks consist of reasonable high and low values based on facility and DG/CHP Generator information. Data that falls outside the defined range for the database value has its data quality level set to 1 for “Data Exists.”

It is necessary to work backwards when applying data quality checks to insure that data gets set to the lowest applicable data quality level. It is possible for data to pass the relational check and fail the range check and such data will be set to a data quality level of 1 for “Data Exists.”

Table 1. Data Quality Definitions

Data Quality Levels	Description	Definition
3	Passes Relational Checking	This data passes Range Checks and Relational Checks. This is the highest quality data in the data set.
2	Passes Range Checks	This data passes the Range Checks but is uncorroborated by Relational Checks with other values.
1	Data Exists	This data does not pass Range Checks. This data is found to be suspect based on the facility and/or CHP equipment sizing.
0	Data Does Not Exist	This data is a placeholder for maintaining a contiguous database only.

Details on the Range and Relational Checks are found below.

Relational Checks

These checks are applied to the 15-minute data before it is converted to hourly data. If any of the 15-minute data points fails the relational check, the data for the entire hour is marked as failed.

Table 2. Relational Checks for Arrow Linen

Evaluated Point	Criteria	Result
FG	WG > 5 and FG <3	DQ Level for FG set to 2

Notes: FG – DG/CHP Generator Gas Use
 WG – DG/CHP Generator Output

Range Checks

These checks are applied to the 15-minute data before it is converted to hourly data. If any of the 15-minute data points fails the range check, the data for the entire hour is marked as failed.

Table 3. Range Checks for Patterson New

Data Point	Hourly Data Method	Upper Range Check	Lower Range Check
DG/CHP Generator Output	Sum	250 kWh	0 kWh
DG/CHP Generator Output Demand	Maximum	250 kW	0 kW
DG/CHP Generator Gas Use	Sum	5500 cubic feet/hour	0 cubic feet
Total Facility Purchased Energy	N/A	N/A	N/A
Total Facility Purchased Demand	N/A	N/A	N/A
Other Facility Gas Use	N/A	N/A	N/A
Unused Heat Recovery	N/A	N/A	N/A
Useful Heat Recovery	N/A	N/A	N/A
Status/Runtime of DG/CHP Generator	Sum	0.25 hrs	0 hrs
Ambient Temperature	Average	130°F	-30°F

Notes: Data failing the Range Check has the data quality level set to 1 for “Data Exists”

ASERTTI Protocol Adherence

This site adheres fully to the ASERTTI Long-Term Monitoring Protocol. All required performance parameters are provided. The data is averaged and summed into 15-minute intervals as per the protocol. In addition, most of the optional parameters are available at this site.

Monitoring Notes

9/19/09

The site has been posted.

Database Variables	Multiplier		Site Variables
WG1	0.012		
WG2	1	WG2	WG
FGE1	10	WG2/15-min (max)*4	WG_KW
FGE2	10	FGE2	FG
FGF	10	n/a	WT
FGF2	1	n/a	WT_KW
		n/a	FT
		n/a	QD
		n/a	QHR
		WG2>15kW .25 per interval	SG
		TAO=	TAO