Sabic Site - Data Integrator Notes

The facility uses a Steam Turbine Generator. The steam will flow to the distillation column and be diverted to the turbine. The turbine will regulate the flow of steam to the column, and in doing so; will spin a generator to create electricity. The electricity generated will be utilized on the plant site.

Data Point Details

The fifteen minute data for the previous day is uploaded every night to the CDHenergy server. The data is then downloaded and processed accordingly.

All data on the website is presented in Eastern Standard Time.

DG/CHP Generator Output (total kWh)
The Generator Output comes is calculated from the generator output demand. This 15 minute data is summed into hour data.

DG/CHP Generator Output Demand (peak kW)
The Generator Output Demand comes from the data channel number 4 from the raw data file. The peak value for the hour is used.

DG/CHP Generator Gas Input (cubic feet)
No data.

Total Facility Purchased Energy (total kWh)
No data.

Total Facility Purchased Demand (peak kW)
No data.

Other Facility Gas Use (cubic feet)
No data.

Unused Heat Recovery (total MBtu/h)
No data.

Useful Heat Recovery (total MBtu/h)
The amount of useful heat recovery can be found by measuring the pressure of the steam exiting the turbine to calculate the enthalpy for each interval. This is multiplied against the steam flow rate (column 3 of the raw data file), to determine the rate of useful heat recovery. This fifteen minute data is averaged into hourly data.

Status/Runtime of DG/CHP Generator (hrs)
During any interval where the generator power is greater than 25 kWh the generator status is set to .25. This 15 minute data is summed into hour data.

Ambient Temperature (avg °F)
The Ambient temperature comes from the Weather Underground using the ALB airport as a
reference location. The 15-minute data is averaged into hourly data.

Electrical Efficiency (%)
Not calculated

Total CHP Efficiency (%)
Not calculated.

Data Quality Checks

The Data Quality Checks consist of three levels of verification:
- the data exist (flag=1),
- the data pass range checks (flag=2)
- the data pass relational checks (flag=3).

The methodology for applying the data quality begins by creating a contiguous database. We
initially assume all data are good (flag=3) and 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 values
which conflict with other data in 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

Sabic

		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 interval data before it is converted to hourly data. If any of the interval data points fails the relational check, the data for the entire hour is marked as failed.

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 2. Range Checks

Data Point	Hourly Data Method	Upper Range Check	Lower Range Check
DG/CHP Generator Output	Sum	400kWh	0 kWh
DG/CHP Generator Output Demand	Maximum	1275 kW	0 kW
DG/CHP Generator Gas Use	Sum	-	-
Total Facility Purchased Energy	Sum	-	-
Total Facility Purchased Demand	Maximum	-	-
Other Facility Gas Use	Sum	-	-
Unused Heat Recovery	Average	-	-
Useful Heat Recovery	Average	80000 MBtu	0 MBtu
Ambient Temperature	Average	130°F	-30°F

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

Site Notes:

10/26/10:

Sabic

The data has been posted on the website.