

Cabrini Terrace Site - Data Integrator Notes

Cabrini Terrace consists of 217 individual apartments of varying floor plan. There are also common spaces on the first floor including the lobby, mail room, laundry room, and other community rooms. Cabrini Terrace has an attached, single story (above ground) garage structure with an open roof. The CHP system consists of two generators from Intelligen Power systems, one 55 kW and one 80 kW. The recovered heat will serve the domestic hot water supply for the residents as well as space heating for the garage, offsetting the load on the boilers.

Data Point Details

DSM Engineering Associates are providing the data collection and transmission for this project. Every morning they will submit a csv file containing the data for the previous day.

The timestamp in the raw data files is in Eastern Standard Time. All data on the website is presented in Eastern Standard Time.

DG/CHP Generator Output (total kWh)

The Generator Output (a net value*) is calculated from the columns labeled WG-CHP1 (KW), WG-CHP2 (KW), and PARASITICS (KW) in the data files. This 15-minute interval power data is converted to kWh and summed into hourly data.

DG/CHP Generator Output Demand (peak kW)

The Generator Output Demand (a net value*) is calculated from the columns labeled WG-CHP1 (KW), WG-CHP2 (KW), and PARASITICS (KW) in the data files. This 15-minute interval power data is summed and the maximum value is taken for each hour.

DG/CHP Generator Gas Input (cubic feet)

The data for Generator Gas Input comes from the column labeled FG-G-TOT (THERMS). This data is converted into standard cubic feet (e.g. divided by 100) for each 15-minute interval and summed into hourly data.

Total Facility Purchased Energy (total kWh)

The data for Total Facility Purchased Energy comes from the column labeled W-BLDG (KWH). This 15 minute data is summed into hourly data.

Total Facility Purchased Demand (peak kW)

The data for Total Facility Purchased Energy comes from the column labeled W-BLDG (KWH). This 15 minute data is converted to kW and the maximum value is taken for each hour.

Other Facility Gas Use (cubic feet)

No data

Unused Heat Recovery (total MBtu/h)

Unused Heat Recovery comes from the column labeled Q-HBR (BTU). This 15 minute data is converted to MBtu and summed to hourly data.

Useful Heat Recovery (total MBtu/h)

The Useful heat Recovery is obtained from the column of data labeled Q-BLDG (BTU). This 15 minute data converted to MBtu and is summed to hourly data.

Status/Runtime of DG/CHP Generator (hrs)

Generator status is determined based on the power output for each generator. If the generator output powers are above a certain threshold, 15 and 20 kW respective to the 55 and 80 kw generators, the status is assigned a value of +1 for each generator. This status is then averaged for each hour.

Ambient Temperature (avg °F)

Ambient data is collected from Weather Underground using the JFK airport as the nearby weather station.

Electrical Efficiency (%)

The Electrical Efficiency is calculated by dividing Generator Output (WG) in BTU's by Generator Gas Input (FGE) in BTU's. The lower heating value of natural gas used is 930 btu/cf. The expected efficiency should range from 20%-30%.

Total CHP Efficiency (%)

The Total CHP Efficiency is calculated by dividing the Generator Output and Useful Heat Recovery by the Generator Gas Input. The lower heating value of natural gas used is 930 btu/cf and the expected efficiency should range 40-90%

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 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.

Table 2. Relational Checks

Evaluated Point	Criteria	Result

Range Checks

These checks are applied to the 1-minute data before it is converted to hourly data. If any of the 1-minute data points fails the range check, the data for the entire hour is marked as failed.

Table 3. Range Checks

Data Point	Hourly Data Method	Upper Range Check	Lower Range Check
DG/CHP Generator Output	Sum	70 kWh	0 kWh
DG/CHP Generator Output Demand	Maximum	240 kW	0 kW
DG/CHP Generator Gas Use	Sum	700 cf	0 cf
Total Facility Purchased Energy	Sum	300 kWh	0 kWh
Total Facility Purchased Demand	Maximum	1000 kW	0 kW
Other Facility Gas Use	Sum	700 cf	0 cf
Unused Heat Recovery	Sum	700 Mbtu	0 MBtu
Useful Heat Recovery	Sum	700 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”

Cabrini Terrace

Site Notes:

12/12/2012:

The data has been posted on the website. Utility power and parasitic power are currently not being submitted but are expected soon.

1/9/2012:

Applied parasitic power to the generator outputs