# The Strand – Database Notes

**Table 1 Database Notes**

| | | |
|---|---|---|
| **Data Collection** | Data Logger:<br>Data Collection Interval:<br>Collection Method: | Obvius AcquiSuite A8812 & Expansion Board A8332<br>1 – Minute<br>Nightly Obvius Building Manager Online upload to CDH servers. |
| **Site Information** | Cogeneration Units:<br>Nameplate Capacity:<br>Heat Recovery Medium:<br>Heat Recovery Uses:<br>Excess Heat: | Tecogen InVerde 100<br>100 kW<br>Hot Water<br>DHW, pool, and space heating<br>Rejected to atmosphere using dump radiator |
| **DG/CHP Generator Electrical Output** | Engineering Units:<br>Energy Measurement (net/gross):<br>Measurement Type: | kWh<br>Gross power measurement from InVerde engine controller<br>Accumulated kWh |
| **DG/CHP Generator Electrical Output Demand** | Engineering Units:<br>Measurement Type: | kW<br>Calculated : accumulated kWh / int * # intervals |
| **DG/CHP Generator Fuel Input** | Engineering Units:<br>Measurement type: | CF<br>Pulse output from Romet RM2000 utility gas meter |
| **Other Fuel Input** | Engineering Units:<br>Heat Measurement Type: | -<br>- |
| **Utility Energy Import** | Engineering Units:<br>Measurement Type: | kWh<br>Calculated using kW value from InVerde modbus reading |
| **Utility Energy Import Demand** | Engineering Units:<br>Measurement Type: | kW<br>Modbus signal from InVerde. |

# The Strand – Database Notes

| | | |
|---|---|---|
| **DG/CHP Useful Heat Recovery** | Engineering Units: <br> Measurement Type: | MBtu/hr <br> Calculated using 1-minute flow and temperature measurements |
| **DG/CHP Rejected Heat Recovery** | Engineering Units: <br> Heat Measurement Type: | MBtu/hr <br> Calculated using 1-minute flow and temperature data. |
| **Generator Status** | Engineering Units: <br> Measurement Type: | Hours <br> 0 to 1, system on / system off.  Generator output must be above 25 kW to be considered on. |
| **Ambient Temperature** | Engineering Units: <br> Measurement Type: | Deg. F <br> Weather Underground airport code NYC. |

**Table 2 Event Timeline**

| Date | Event |
|---|---|
| August 18, 2015 | Data collection begins |
| January 11, 2021 | Gas data stops. |
| October 21, 2022 | Gas data stipulated, from 1/11/21 to present, using measured power and gas prior to gas meter failure. See Appendix – Gas Calc for details. |

# The Strand – Database Notes

## *Range Checks*

**Table 3. Range Checks**

| Data Point | Units | Hourly Data Calculation Method | Database Lower Range | Database Upper Range | Notes |
|---|---|---|---|---|---|
| DG/CHP Generator Output (WG_d) | kWh/int | Sum | 0 | 2 | |
| DG/CHP Generator Output Demand (WG_KW_d) | kW | Max | 0 | 100 | *WG_KW_d = WG_d * # Intervals* |
| DG/CHP Generator Gas Use (FG_d) | Cfh/int | Sum | 0 | 20 | |
| Total Facility Purchased Energy (WT_d) | kWh/int | - | 0 | 10 | |
| Total Facility Purchased Demand (WT_KW_d) | kW | - | 0 | 600 | |
| Other Facility Gas Use (FT_d) | cf/int | - | - | - | |
| Useful Heat Recovery (QHR_d) | MBtu/int | - | 0 | 800 | |
| Unused Heat Recovery (QD_d) | MBtu/int | - | 0 | 800 | |
| Status/Runtime of DG/CHP Generator (SG_d) | hr | - | 0 | 1 | 0-1, System On/System Off |
| Ambient Temperature (TAO) | °F | Avg | -20 | 130 | WUG Airport Code: NYC |

Notes:

1. This table contains values from *strand.csv*

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## *Relational Checks*

**Table 4.  Relational Checks**

| Evaluated Point | Criteria | Result |
|---|---|---|
|  |  |  |
|  |  |  |
|  |  |  |

Notes:

1.  This table contains values from *relational_checks.pro*

# THE STRAND – APPENDIX A

Gas data is calculated from power generation by using gas curve developed from the measured power and gas data, prior to the gas meter failure on 1/11/21, for the Tecogen InVerde Ultra INV-100 unit.



The Strand - Daily Reformed
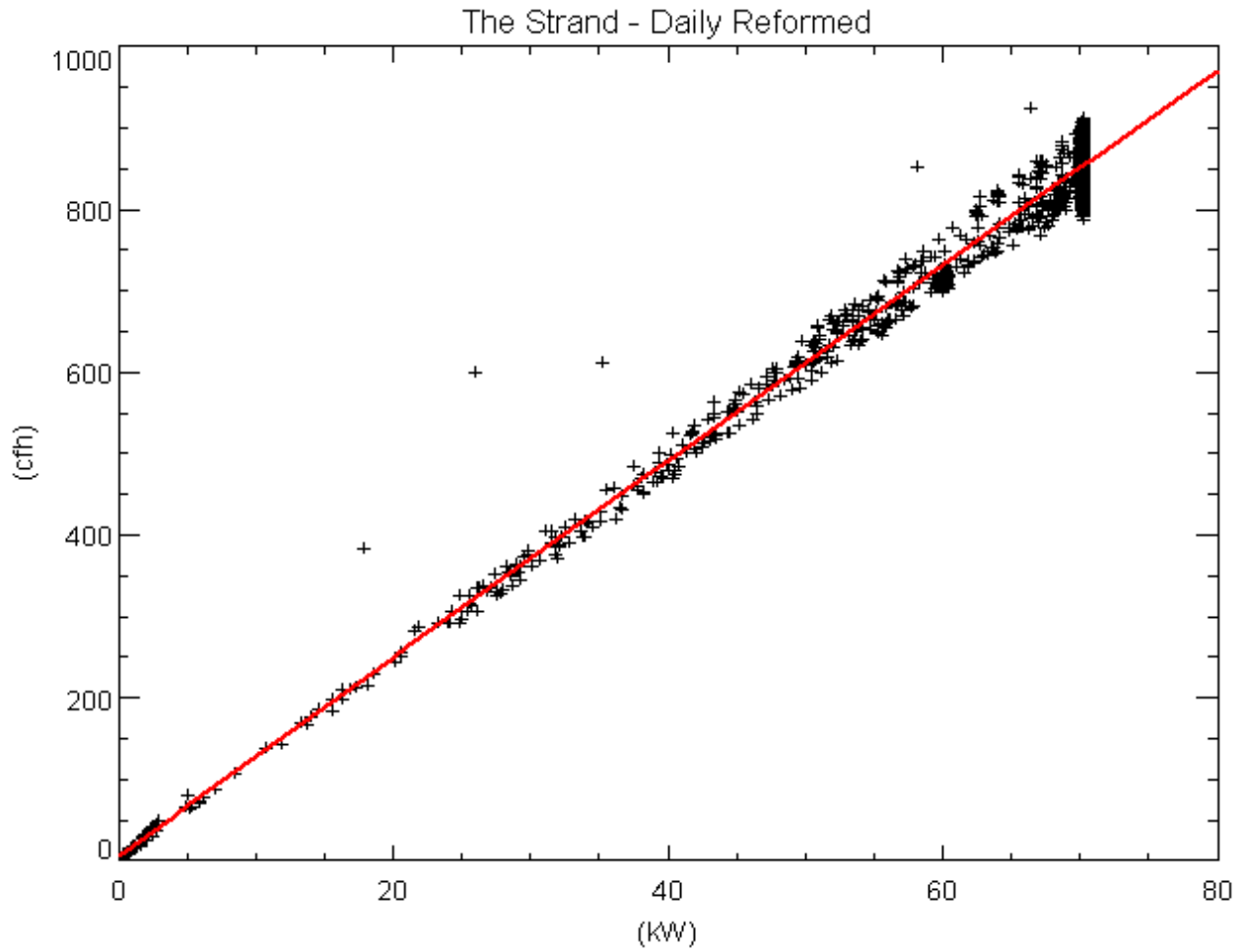
Power generation (WG_KW), gas consumption (FG):

$FG = -0.00223(WG\_KW)^2 + 12.22245(WG\_KW) + 6.3690958$