The Connected Heat Pump: A New Cornerstone of Your Business

Moderator: Zachary Fink/ ZBF Geothermal

Panelist:
• Amanda Schneck/ WaterFurnace
• Geoff Hoffer/ Aztech Geothermal
• Rob Sullivan/ Ground Energy Support
• Brian Zimmerly/ Dandelion Energy
Geoff Hoffer
Aztech Geothermal
Symphony - Dashboard
Symphony - Annual Energy Monitoring

**MY ENERGY USE**

- **Power**
- **Dollars**

- **Comparison**
- **Day**
- **Week**
- **Year**

*Note: Average and total includes previous 12 months (excluding current month).*
Symphony – Historical Data

Air Side - 03-13-2019
Single-click without selecting to reset zoom
Symphony - Troubleshooting
Rob Sullivan
Ground Energy Support
Remote Monitoring of GSHP Systems

Ground Energy Support

ROBERT SULLIVAN
Installation Adjustments

Low temperatures in first heating season: Standing Column Well

Freeze Protection: Off
No Bleed

Freeze Protection: On
Bleed implemented

32 °F
Confirmation of Savings

GeoAnalyst® Geothermal System Report

Hydron Module Geothermal Systems

<table>
<thead>
<tr>
<th>System Performance</th>
<th>365 days starting January 21, 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td></td>
</tr>
<tr>
<td>Degree Days</td>
<td>5,036</td>
</tr>
<tr>
<td>Geoexchange</td>
<td>52,137,573</td>
</tr>
<tr>
<td>Total kWh</td>
<td>12,696</td>
</tr>
<tr>
<td>System Operating Cost</td>
<td>12,696</td>
</tr>
<tr>
<td>Heat Pump Operation</td>
<td></td>
</tr>
<tr>
<td>Current Conditions</td>
<td></td>
</tr>
<tr>
<td>EWT</td>
<td>48.76°F</td>
</tr>
<tr>
<td>LWT</td>
<td>44.26°F</td>
</tr>
<tr>
<td>On/ Off</td>
<td>Off</td>
</tr>
<tr>
<td>MbtuH</td>
<td>2202 hours</td>
</tr>
</tbody>
</table>

Actual kWh = 12,490

Expected kWh = 12,200
Major Problem with Controls

- Entering Water Temperature
  - EWT Max [°F]
  - EWT Min [°F]
- Geo Heat Extraction vs Geo Heat Rejection
- Average Daily Outside Air Temp [°F]
- Time Graph with specific times and durations:
  - 1:26AM: 26 Min
  - 1:57AM: 27 Min
  - 2:29AM: 29 Min
  - 3:03AM: 29 Min
  - 3:37AM:
Equipment Malfunction (valve)
Brian Zimmerly
Dandelion Energy