Weller Heat Pump Monitoring Plan

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| **Sensor locations** | | | |
| **Ground Temperature** | **Electrical Monitoring** | **BTU flow meters** | **BTU air flow meter** |
| 21 temp points | Pump 1 from ground | From solar to tank | From heat pump to plenum |
| 3 strings of 7 spaced at 3 foot intervals | Pump 2 from solar | From ground to heat pump |  |
| Center, edge and beside pit | Heat Pump | From heat pump to tank |  |

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| **Ground Temperature** | **Sensor Types** | | **Comments** |
|  | Digital Plan | Analog Plan | The digital sensors require a hub to connect to the Internet and a contract with EE internet to create online tables, If we use thermistors and Labjack we can use their online cloud  Either option requires much learning on our part |
| 21 temp points | Maxim DS18s20 | Thermistors |
| 3 strings of 7 spaced at 3 foot intervals | 1-wire | 7 pair for each string |
| Center, edge and beside pit | Redundancy? | Redundancy? |

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| **Electrical Monitoring** | **Sensor Types** | | **Comments** |
|  | Digital Plan | Analog Plan | The digital sensors require a hub to connect to the Internet and a contract with EE internet to create online tables, If we use thermistors and Labjack we can use their online cloud  Either option requires much learning on our part |
| Amp/energy meter | EPI sensor ZEM 29 | Amp meter to datalogger |
|  | Wireless |  |
|  | $135 apiece |  |

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| **BTU flow meters** | **Sensor Types** | **Comments** |
|  | Look at Onicons in North Lab $1800  Omega flow meter with 2 temp sensors  Istec BTU meter $715 http://www.istec-corp.com/btumeters.html  Caleffi has a BTU meter for the solar loop, too much flow in the hp loop for it though http://www.caleffi.us/ | We can get a fully separate Onicon system to communicate with the laptop for the digital or use the flow meter and temp sensors in a datalogger |
| 3-In line flow meter |
| 2 temp sensor per meter |
| From solar to tank  10 gpm |
| From tank to heat pump  18gpm |  |  |
| From ground to tank  ? 18gpm  No pump picked out yet |  |  |

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| **BTU air flow** | **Sensor Types** | **Comments** |
|  | Ebtron duct probes?  http://www.ebtron.com | We will need to encourage the design of the ducts to work with our duct probes, I don’t know much about these yet, I am hoping to talk to Roy about his |
|  |

At this point it looks to me like we have 4 different datalogging plans for this small project. Although the BTU meter can probably also go directly to a computer interface. It boils down to cost, the digital EPI sensors for the pumps seem pretty expensive to me, but if we don’t need a datalogger maybe it is reasonable.

It will be useful to have the controls information for this. We may just want to tap into that for most of the information if we can. It sounds like the solar loop is simple to do this with.

We will need a CPU and lots of hubs to connect all these things.

We also need to set up an online location to dump data into. Kristen T. says to use EE internet, which we already use for the Wiki. Cole had big ideas of making things from scratch; I don’t see where we have anyone except Cole with this ability.