



Zero Energy Homes

A 2014 Pilot for Existing Homes

Better Buildings by Design
February 4, 2015

Existing Homes - Is it All About the Money?





Energy Freakshow #1

Complete exterior renovation

3" foam board + siding replacement

Partial interior rehab

New windows: PVC Industries U .19

Occupied continuously

440 cfm50

Mini split + pellet stove

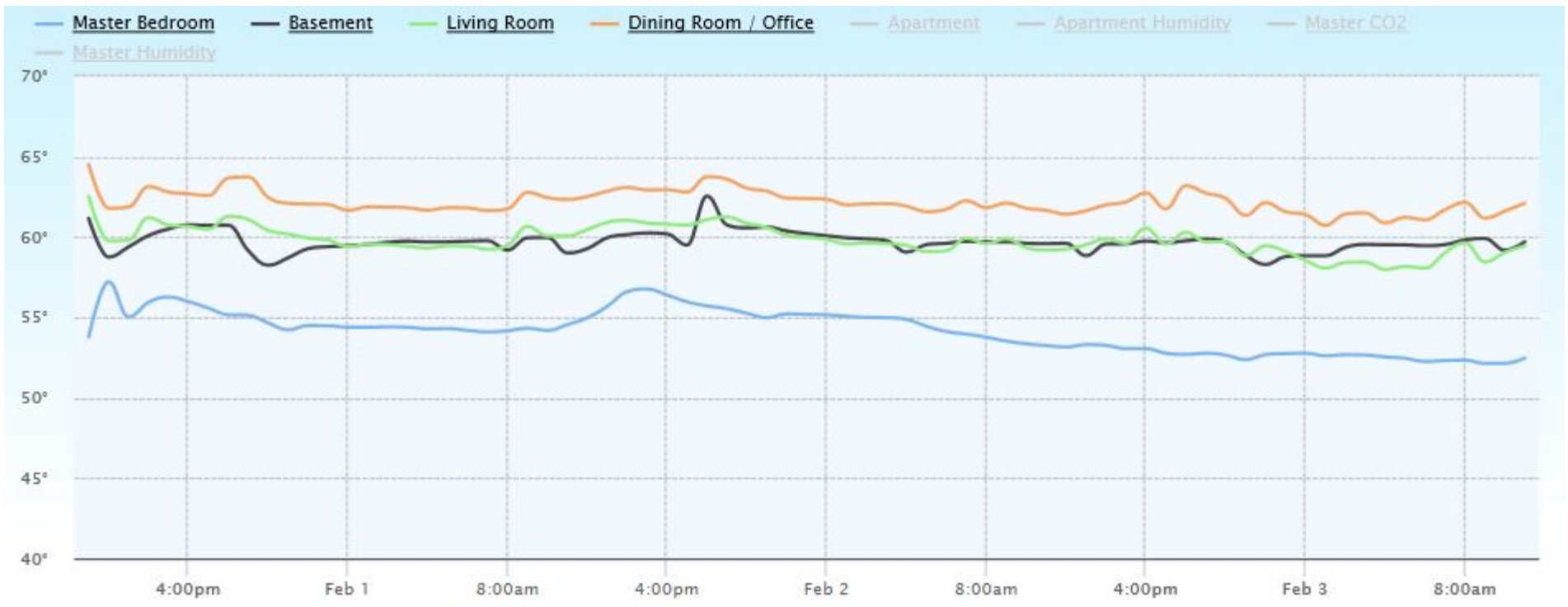
Heat pump water heater

Exhaust-only ventilation

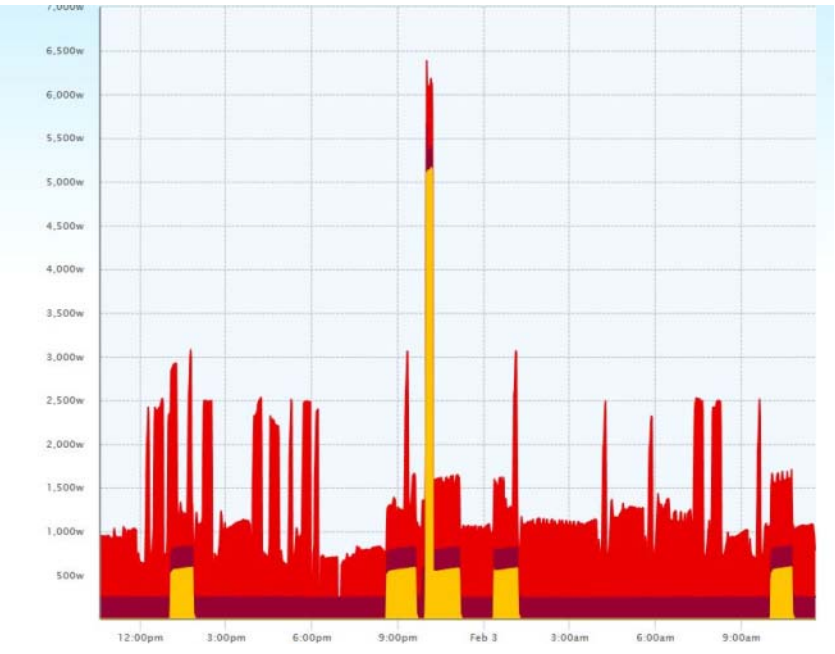
Future ~6kW PV







- Circuit**
(Click label to hide or show)
- Elec. Heat - Air Src. Hea
 - Apartment Elec. Heat - Ai
 - Furnace - Wood Pellet
 - Water Heater - Electric
 - Oven/Range - Electric
 - Dishwasher
 - Basement-Outlets/Lighting
 - Refrigerator
 - Breaker 5
 - Living room Outlets/Light
 - Future PV
 - Breaker 1
 - Range Hood
 - Breaker 7
 - Dryer - Electric
 - Breaker 10
 - Breaker 18
 - Breaker 20





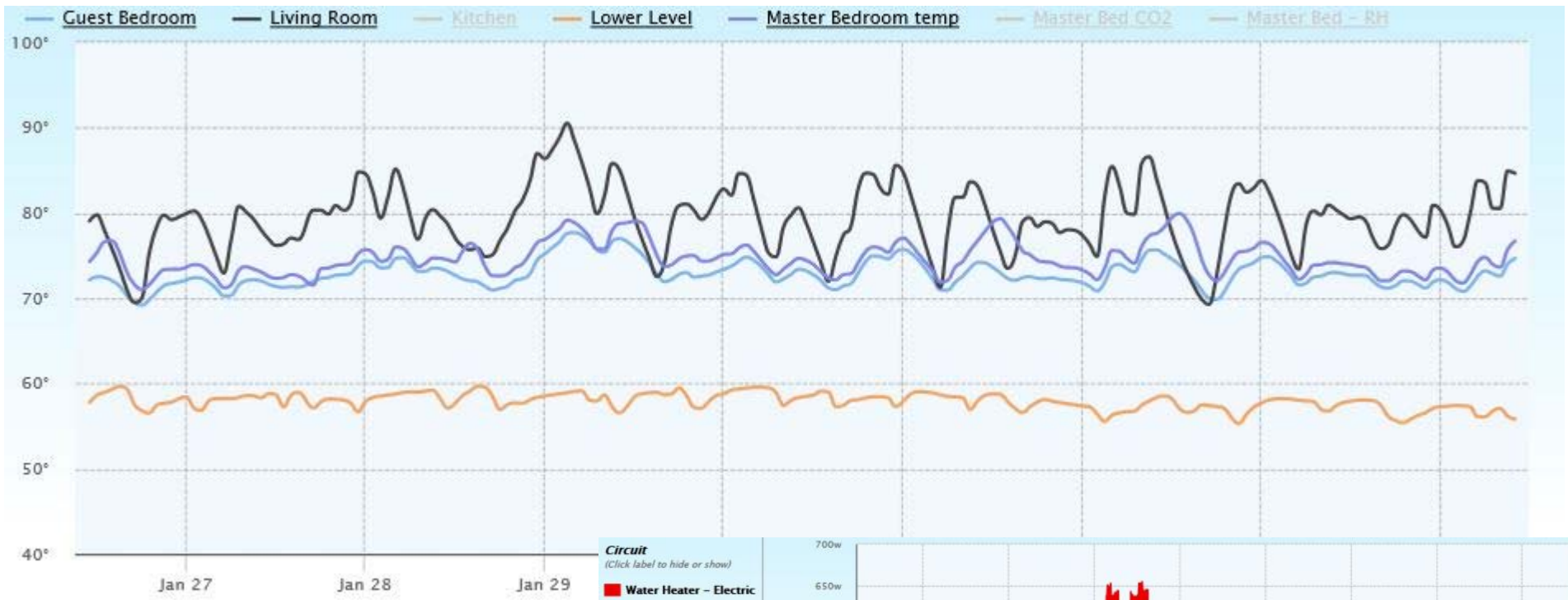
Retirement Home

- Attic air sealing + R-80 cellulose
- Replace some windows

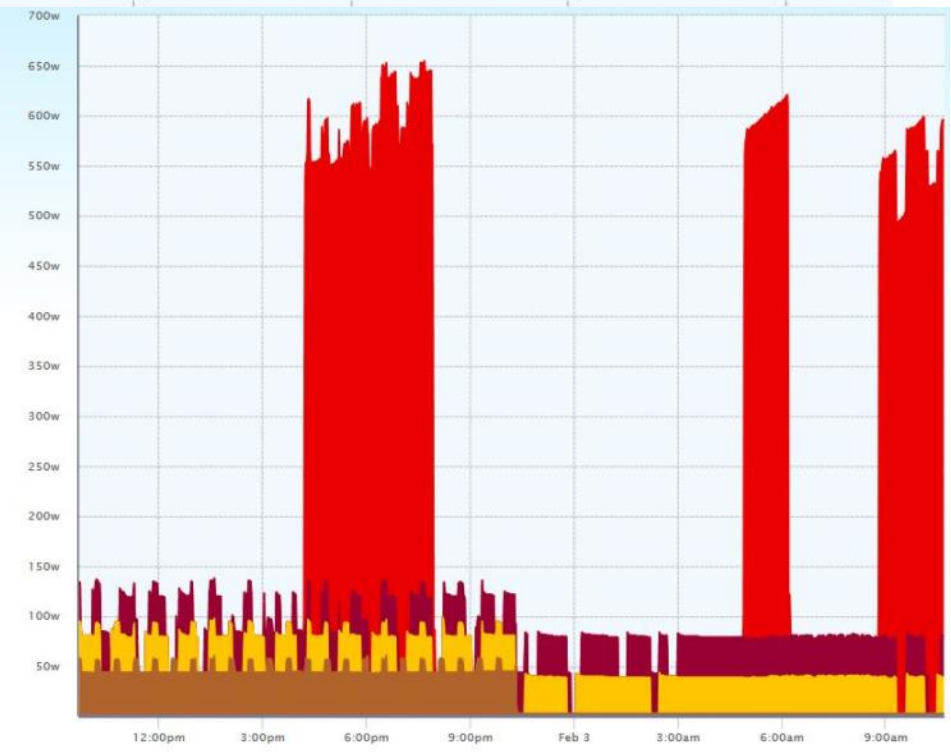
- Two mini-splits
- Woodstove
- Heat pump water heater
- Balanced, distributed ventilation
- 6.5 kW PV







- Circuit**
(Click label to hide or show)
- Water Heater - Electric
 - Oven/Range - Electric
 - Cellar Heat Pump
 - First Floor Heat Pump
 - HRV
 - Kitchen Outlets
 - Fresh Water Pump
 - Freezer Outlets
 - Spare
 - Dishwasher



Ranch #2

Full-blown Deep Energy Retrofit

Radon remediation

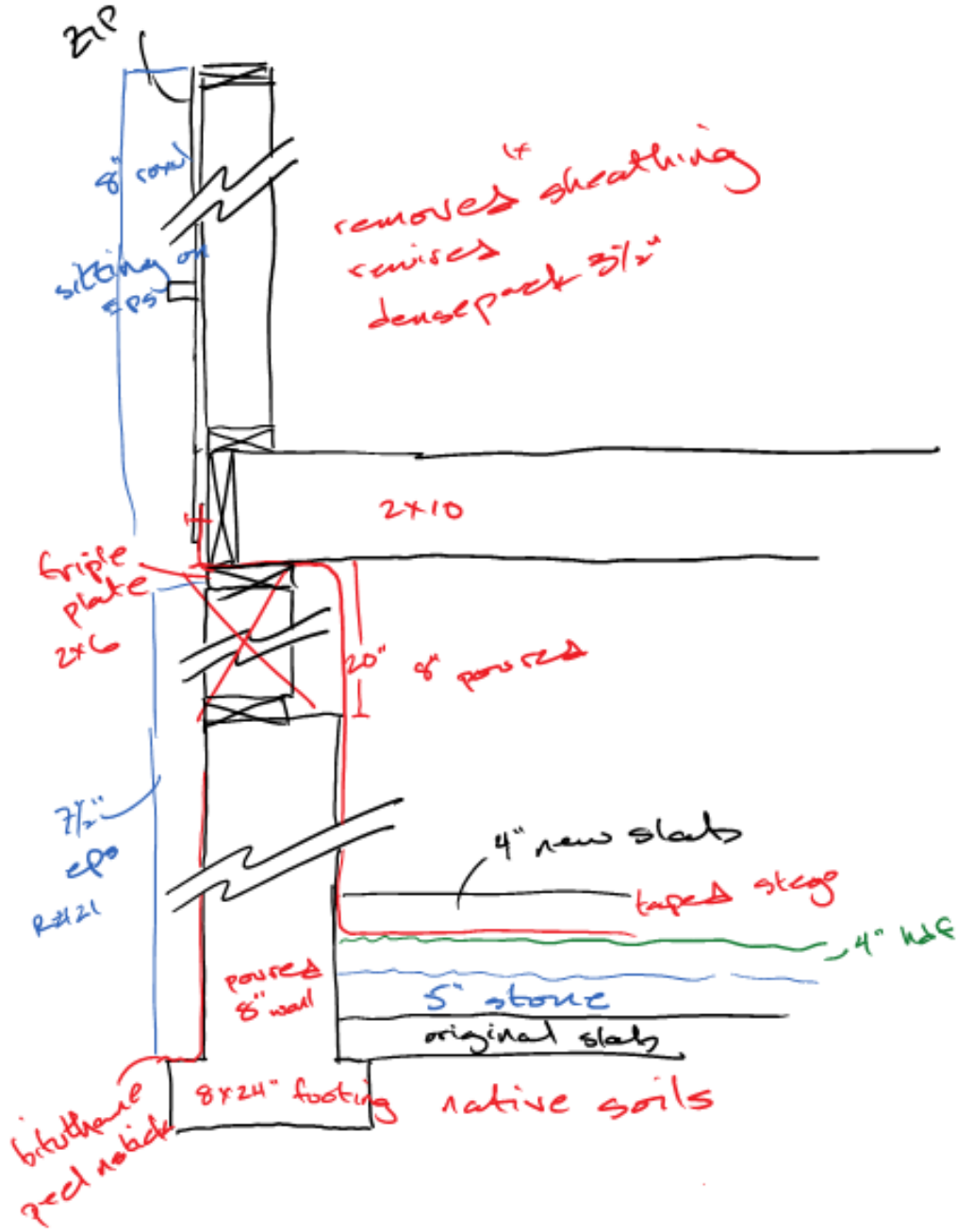
Less than 200 cfm50

Two mini-splits

Heat pump water heater

13 kW PV

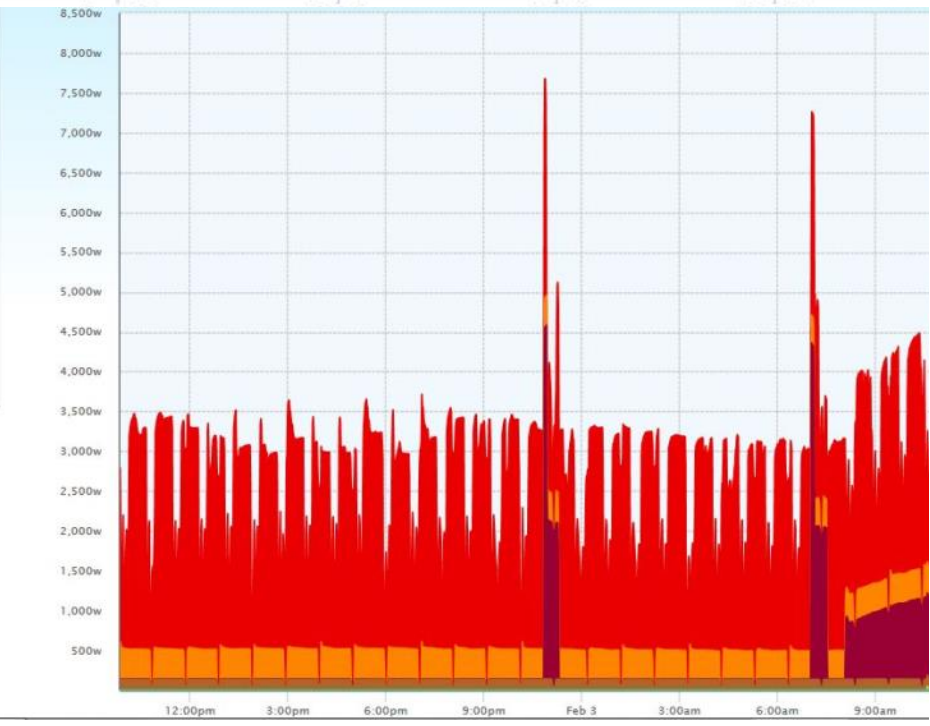
CERV balanced ventilation







- Circuit**
(Click label to hide or show)
- Elec. Heat – Air Src. Hea
 - CERV Heat Pump
 - Water Heater – Electric
 - Refrigerator (Primary)
 - CERV Fans
 - Radon Fan
 - Kitchen Counter #2
 - Fresh Water Pump
 - Kitchen Counter #1
 - Dryer – Electric
 - Washing Machine
 - Dishwasher







Suburban

Densepack 2X4 walls

Some replacement windows

DIY air sealing in attic

Gut rehab, R-30 basement

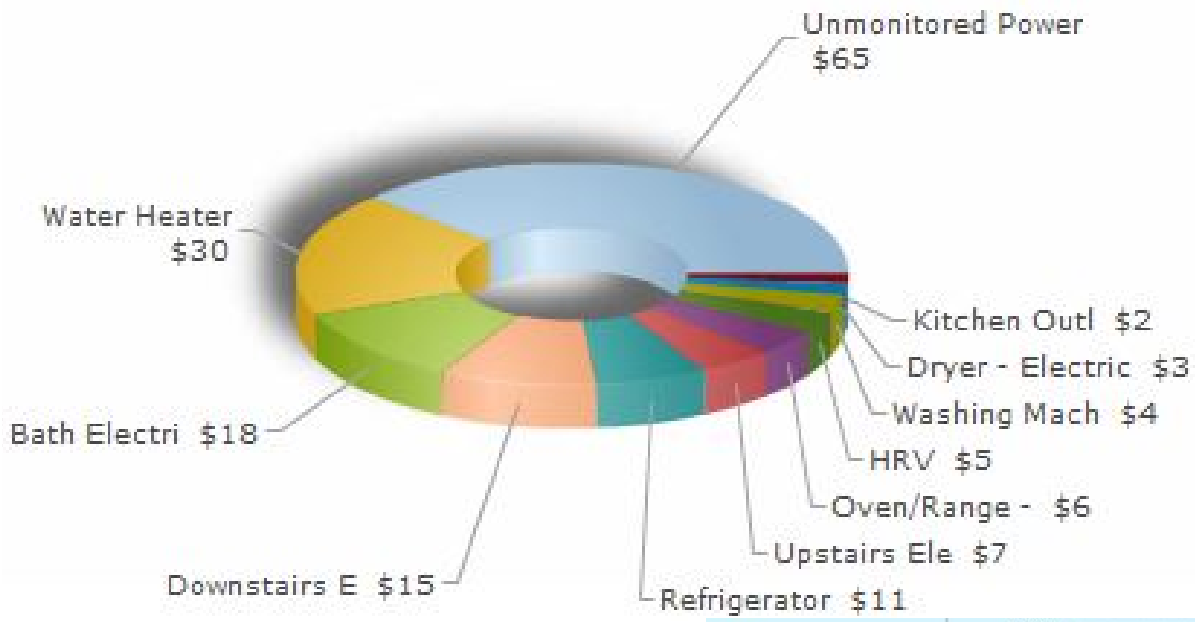
Two mini-splits

Solar+electric domestic hot water

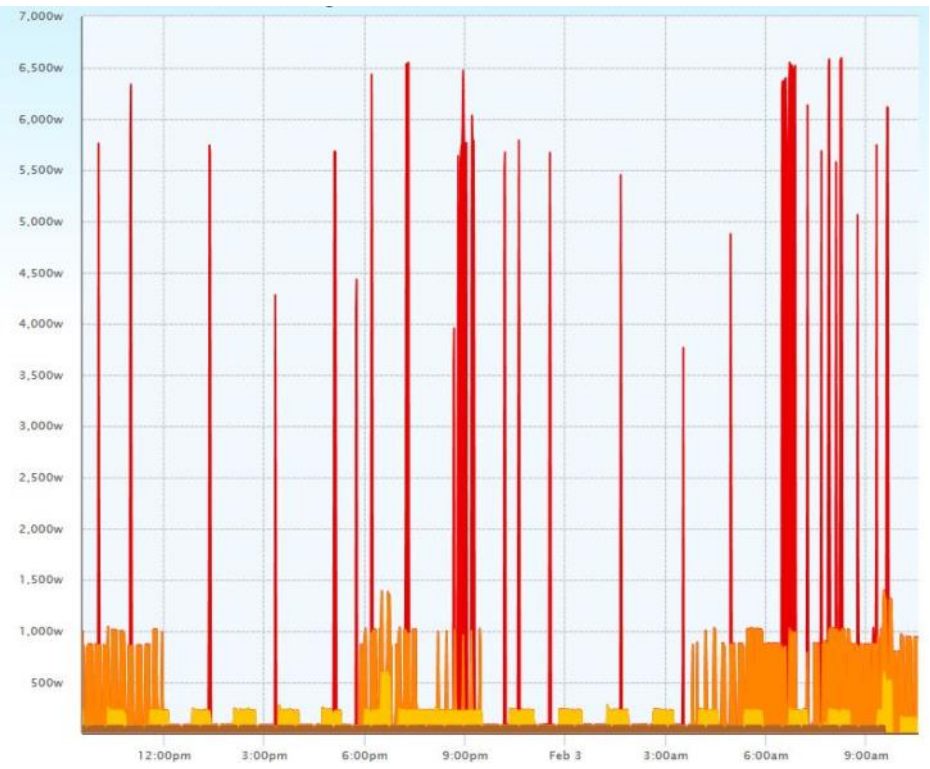
HRV

2.5 kW PV





- Circuit**
 (Click label to hide or show)
- Water Heater - Electric[1]
 - Bath Electric Heat - Radi
 - Dryer - Electric
 - Refrigerator (Primary)
 - HRV
 - Upstairs Elec. Heat - Air
 - Oven/Range - Electric[1]
 - Kitchen Outlets/Lighting
 - Washing Machine / Dishwas
 - Downstairs Elec. Heat - A
 - LR/Kitchen/Dining Outlets





Modern - Energy Freakshow #2

Extensive work in attic

Densepack walls

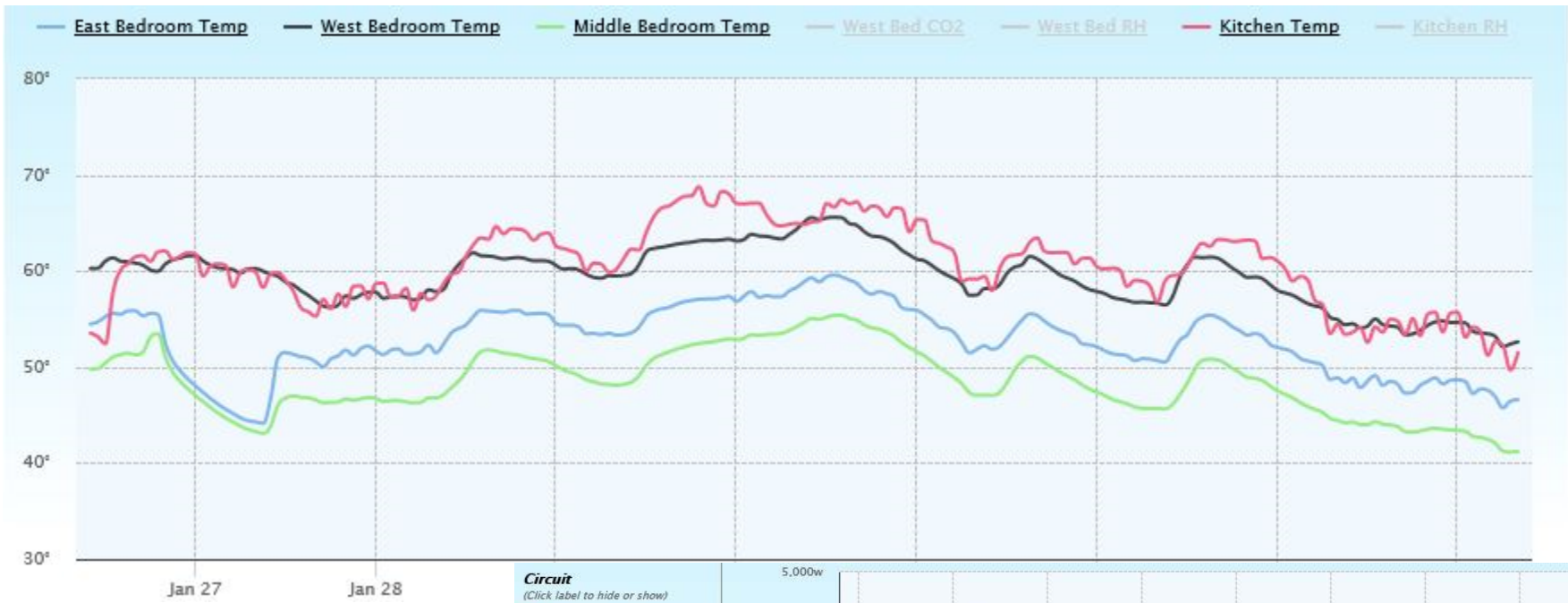
Future crawlspace insulation

Two mini-splits, planning to rely on wood heat

Heat pump water heater

No ventilation

Potential for solar in future phase



- Circuit**
(Click label to hide or show)
- 1st Flr Elec. Heat - Air
 - 2nd Flr Elec. Heat - Air
 - Fish Tank/Bath Outlets
 - Living Room Lighting
 - Living Room Outlets
 - Oven/Range - Electric
 - Refrigerator (Primary), KI
 - Boiler - Propane
 - Master Bed/Bath Lighting
 - Water Heater - Electric
 - Washing Machine
 - Dryer - Electric





On the Path to Zero Energy



QUESTIONS AND DISCUSSION

Thank You in Interstate Regular

Name, Title

Organization

Contact email and/or phone

In Interstate Bold or Regular