

2024 CCLEP Clean Energy Home Tour
Chris O'Brien and Jane Alexander
97 Old Ski Hill Road



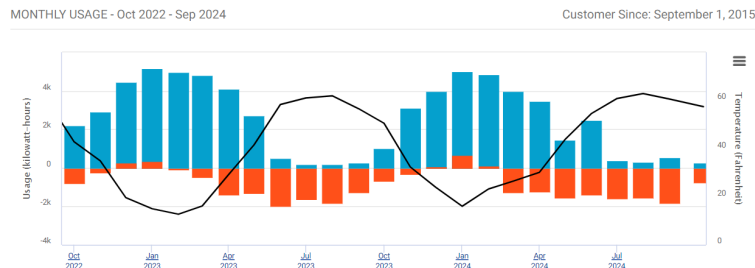
Home description

The home was built in 2005. Chris and Jane are the second owners. They purchased the home in 2015. Home construction is quite efficient - post and beam frame with Structured Insulation Panel (SIP) walls, high quality windows, etc. The heating system includes an electric furnace and a backup propane furnace that enables the home to participate in Arrowhead's dual-fuel program for discounted electricity for heating. There are two air exchanger systems in the home that ensure adequate ventilation in an otherwise tight home.

The separate garage was built in 2016 and was deliberately designed and oriented to be suitable for a PV solar array (45-degree pitch, south-facing roof). The 15.6kW solar array was installed in October 2019 by TruNorth Solar. TruNorth installed solar on several other homes in the neighborhood at the same time.

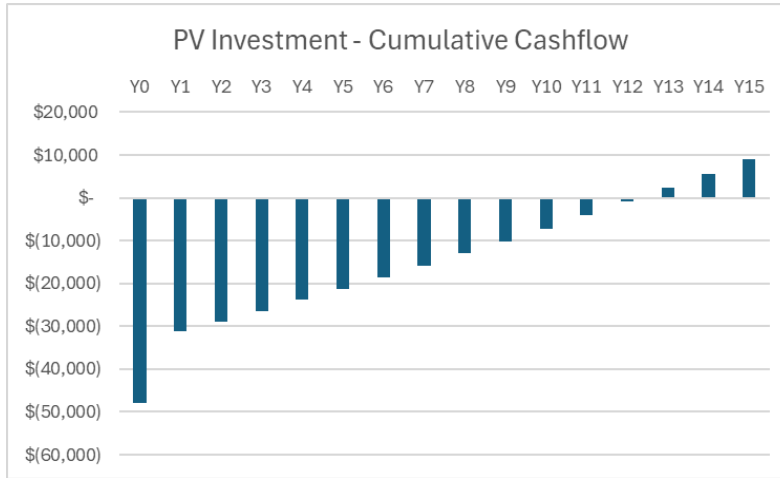
Electricity Consumption

The chart below shows the energy consumption (net of PV generation) for the past two years. The blue bars represent the consumption of electricity for heating, which is approximately 85% of our total electricity consumption. The red bars represent the net electricity generation and non-heating consumption. Total consumption varies significantly by temperature, ranges roughly from 30,000 to 40,000 kWh per year.



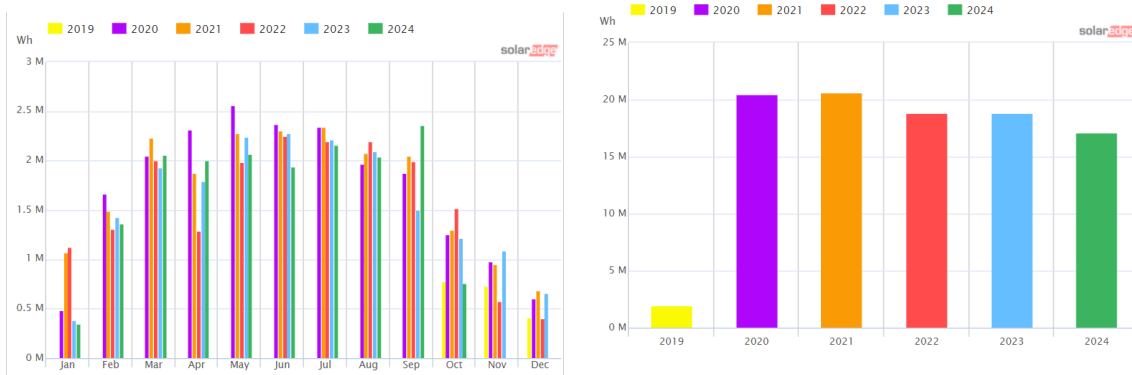
Solar PV Investment Analysis

The installed cost of our system in 2019 was approximately \$48k. We received a 30% Federal tax credit to offset a portion of the cost. Based on forecast production and forecast electric rates (assume 3% increase per year) the payback for our system is expected to be approximately 12 years and the Internal Rate of Return (IRR) over the expected 30 year life of the PV system is approximately 8%.



Solar Generation

Solar generation history is shown in the charts below. Annual generation has been roughly 19,000 to 20,000 kWh per year, which is approximately 1,250 kWh per kWdc of PV capacity and approximately 60% of our total electricity usage.



2023 Energy Audit

We hired Mike Senty (Senty Inspections) to complete an energy audit of our home in 2023. CCLEP has a long affiliation with Mike Senty and recommends his home audit services to identify and prioritize home efficiency improvements. The survey found no significant issues with the thermal performance of the home. The audit included a “blower door test” where the house is depressurized and a thermal camera used to identify specific locations where there are thermal “leaks”. This test identified some minor issues related to our fireplace and wire chases.

PROPERTY CONDITION

The purpose of this report is to present infrared images in a format that allows for detailed viewing of the images. When viewing the images on the server, click on the images to enlarge them for closer inspection. A pdf copy of this report can be created from the server for a permanent record. My knowledge is that this report will remain on the server for years. Contact me in the future if you lost your password.

SAFETY CONCERNS

None

ITEMS NOT OPERATING

None

MAJOR CONCERNS

None

MODERATE CONCERNS

None

MINOR CONCERNS

None

BUDGET TO REPLACE

None

NEEDS FURTHER EVALUATION

None

ITEMS TO MONITOR

None

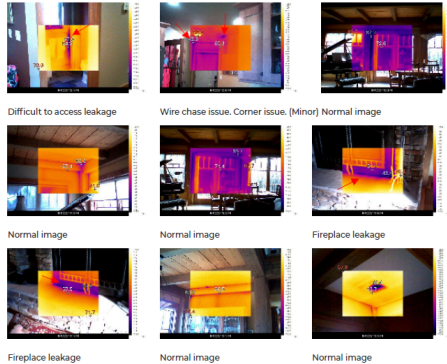
INFRARED IMAGES: HOUSE DEPRESSURIZED

COMPLIMENT See images for observation comments.

OTHER INFORMATION

House was depressurized to -40 pa at the time of the imaging. Outside air temperature was 25°F, interior air temperature 70°F.

PHOTOS



What Next?

We are actively looking at options for replacing our electric furnace with a heat pump. This would likely reduce our electricity usage sufficiently so that we would be a “net zero” home, which is our objective. We will likely choose a heat pump that is compatible with the hydronic in-floor heating in our home - either a ground source heat pump or an air-to-water heat pump.