

# A HEALTHY, HAPPY HOME

## A BOZEMAN HOME ELECTRIFICATION STORY



### GETTING OFF GAS

When the time came to make home improvements, Bozeman residents Kelly Pohl and Warren Vaughan set out to stop using natural gas in their home.

With young kids with asthma and allergies, Kelly and Warren wanted to create a healthier and more comfortable environment in their home. After researching the health impacts of gas combustion in the home and deciding it was time to add air conditioning, they found electric appliances and HVAC options were both practical and economical.

### Project Highlights

- Air-Source heat pump installed to add cooling and efficient heating
- Induction stove
- Electric water heater replaced natural gas water heater
- 4kW solar PV array

Kelly and Warren were also interested in decreasing their climate footprint. They had already installed a solar photovoltaic (PV) array on their roof and knew switching to electric would allow them to use more clean energy.

### TIME FOR AIR CONDITIONING

With summers getting increasingly hotter and wildfire smoke becoming more intense, Kelly realized that their old tactic of opening windows at night to cool the house down was not going to be enough.

While exploring cooling options, Kelly and Warren wanted to avoid drastically increasing their energy use by choosing an efficient option. They found that an air-source heat pump was the best option for energy efficiency and performance.

In addition to cooling, the heat pump became their main source of heating in the winter!



*"As we gradually made upgrades to our home, it was a no-brainer to go electric.*

*It's economical, more comfortable, and healthier for our family and the planet."*

- Kelly, Homeowner



# 50%

**DECREASE IN ANNUAL  
HOUSEHOLD NATURAL  
GAS CONSUMPTION**

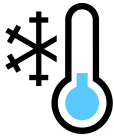
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## ALL ABOUT THE HEAT PUMP

Kelly and Warren's home built, in 2003, had existing ductwork for forced-air gas heating. A ducted heat pump unit could be connected to the existing ductwork. This gave them the option to heat and cool their whole house, rather than installing multiple window air conditioners. They selected a BOSCH Heat Pump Condenser.



### Cold Climate



Air-source heat pumps have limitations when outdoor temperatures drop well below freezing, so a backup heat source is necessary for Montana's cold climate. Kelly and Warren kept their existing natural gas furnace as a backup.

### Comfort & Air Quality



They have found that the heat pump provides more consistent heating with fewer indoor temperature swings and no big bursts of blowing air. The cooling in the summer has been a game-changer, especially for staying cool while keeping wildfire smoke and allergens out.

## Heat Pump Lessons Learned

### Plan Ahead

- Finding the right contractor and choosing equipment can be difficult and takes time.
- Every home is different, explore your heat pump options.

### Get To Know Your System

- Once the heat pump is installed, playing around with the switchover temperature and thermostat settings can help find what settings provide the most comfort and highest efficiency.

## 30 SECOND BOILING WATER

When Kelly and Warren remodeled their kitchen, they selected an induction stove. Induction stoves are great electric options that provide similar (or better) cooking performance to gas stoves.

A few things Kelly and Warren love about the stove are:

- The precision and responsiveness
- It's fast - it boils water for tea in just 30 seconds!
- The cooktop is not hot making it safer, especially for kids
- Super easy to clean



**Induction Stove Lesson Learned:** Pick a stove with adjustable burner sizes rather than set burners to allow for more flexibility for different sized cookware

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## WATER HEATING

When Kelly and Warren's water heater was reaching the end of its life, they chose to switch from a natural gas water heater to an electric resistance water heater. They considered installing a natural gas tankless water heater but the installation would have required a new gas line in the utility space. They decided to reduce the amount of combustion in their home and switch to electric.

**Water Heating Lesson Learned:** At the time, electric resistance was the best available option. Today, a heat pump water heater (or hybrid heat pump) is a more efficient solution that could be an option for your home.



## SOLAR SYSTEM

Prior to other home upgrades, Kelly and Warren installed a 4 kW solar PV array on their roof. The solar system was sized to fit the energy load of the home at the time it was installed. Before switching gas equipment to electric, the solar PV array was able to cover all of the home's electricity load. They noticed the energy bill impacts immediately!

After adding the air-source heat pump and switching the water heater to electric, the home's electric load increased. The PV array still covers a big portion, but not all of the home's energy load. The system is set up to easily add more panels, so they might consider adding more in the future!

**Solar Lesson Learned:** When you are sizing the solar PV array consider any home upgrades you might make in the future that would increase the electric load. Either size the system up or add capacity to add panels in the future.



Tracking the solar PV array's energy generation has become a fun game for the entire family! With the app, they can track how much they are generating on a daily basis. Kelly noted that tracking energy generation has changed how they think about energy and how much energy they all use.



**In 2.5 years the solar system generated 10MWh of electricity**

**This is enough to power the average U.S. home for one year**



**25% of billing cycles have had \$0 for electric use since adding solar**