

Are You Ready for ALL-ELECTRIC Home Heating & Cooling?

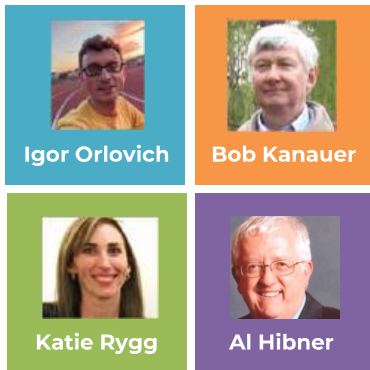
ColorPenfieldGreen.org

HeatSMART MONROE-FLX

Grants & Incentives for Energy Efficient Heating & Cooling

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Your Instructors – All ARE Penfield Residents Who Have Heat Pump HVAC Systems Installed



Igor Orlovich
Air Source Heat Pump System

Bob Kanauer
Air Source Heat Pump System

Katie Rygg
Geothermal (Ground Source) Heat Pump System

Al Hibner
Geothermal (Ground Source) Heat Pump System & Air Source Heat Pump System

August 25th, 2022



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Guest Presenter
Matt Corona
 HeatSMART MONROE-FLX
 Campaign Director




HeatSmart is a Program of





Matt Corona (he/him) ^{cz}
 HeatSmart Monroe Campaign Director

August 25th, 2022

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Session Agenda



- Part I** Introduction to Clean Heating & Cooling
- Part II** HeatSMART MONROE-FLX Presentation
- Part III** Penfield Resident Heat Pump Case Studies
- Part IV** Next Action Steps for Course Participants
- Part V** Session Appendices

August 25th, 2022

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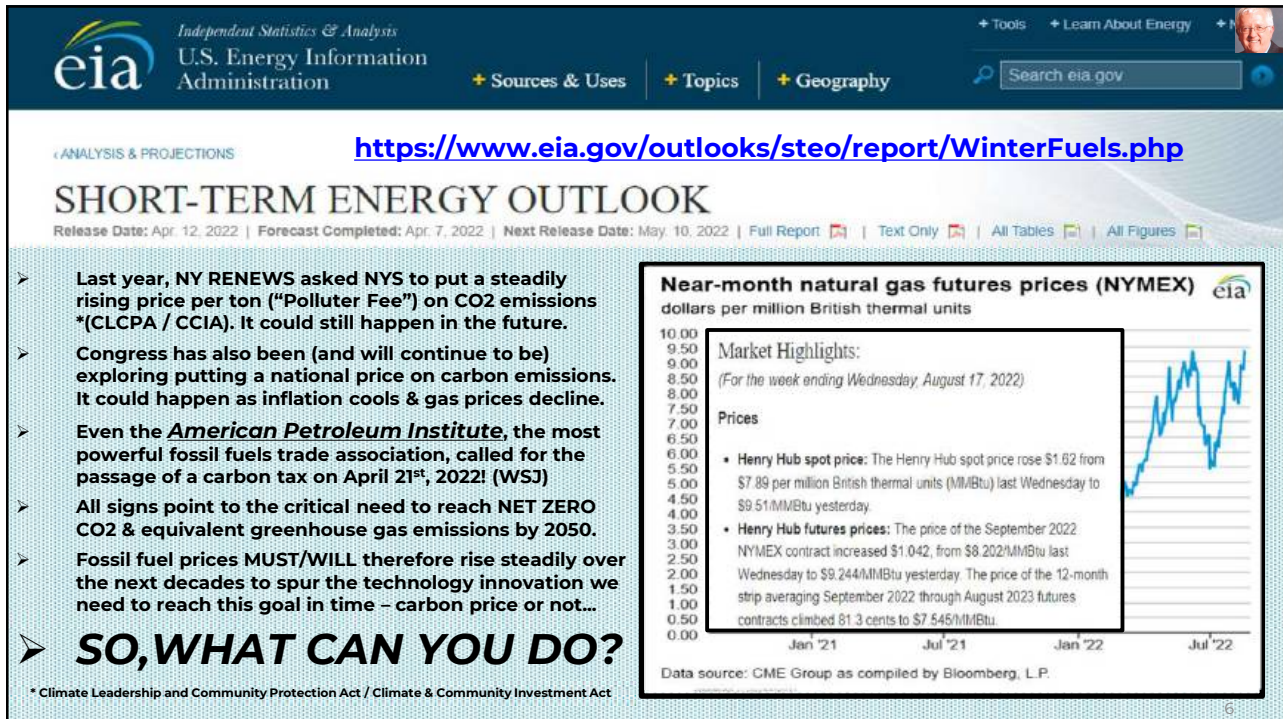
Session Agenda

Part I

Introduction to Clean Heating & Cooling

August 25th, 2022

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U.S. Energy Information Administration

SHORT-TERM ENERGY OUTLOOK
 Release Date: Apr. 12, 2022 | Forecast Completed: Apr. 7, 2022 | Next Release Date: May. 10, 2022 | Full Report | Text Only | All Tables | All Figures

Near-month natural gas futures prices (NYMEX)
 dollars per million British thermal units

Market Highlights:
 (For the week ending Wednesday, August 17, 2022)

Prices

- Henry Hub spot price: The Henry Hub spot price rose \$1.02 from \$7.89 per million British thermal units (MMBtu) last Wednesday to \$9.51/MMBtu yesterday.
- Henry Hub futures prices: The price of the September 2022 NYMEX contract increased \$1.042, from \$8.202/MMBtu last Wednesday to \$9.244/MMBtu yesterday. The price of the 12-month strip averaging September 2022 through August 2023 futures contracts climbed 81.3 cents to \$7.545/MMBtu.

SO, WHAT CAN YOU DO?
 * Climate Leadership and Community Protection Act / Climate & Community Investment Act

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**Electricity Prices Rose an Average of 1.8%/year
For the 7 Years From 2016 to 2022**
(U.S. Energy Information Administration – August 2022)

The left chart shows U.S. monthly nominal residential electricity prices in cents per kilowatt-hour from 2016 to 2023. The right chart shows the annual growth in nominal residential electricity prices in percent for the same period.

Year	Annual Growth (%)
2016	-0.8%
2017	2.7%
2018	-0.1%
2019	1.1%
2020	1.1%
2021	4.3%
2022	6.1%
2023 (forecast)	2.5%

REWIRING AMERICA

<https://www.rewiringamerica.org>

This is Saul Griffith.

Saul Griffith
Co-Founder & Chief Scientist

Saul Griffith is an engineer and inventor. As Founder and Chief Scientist at Otherlab, an independent R&D lab, he helps government agencies and Fortune 500 companies understand energy infrastructure and deep decarbonization. He's been a principal investigator and project lead on federally-funded research projects for agencies including NASA, Defense Advanced Research Projects Agency (DARPA), Advanced Research Projects Agency-Energy (ARPA-E), National Science Foundation and United States Special Operations Command (SOCOM). He was awarded the MacArthur "Genius Grant" in 2007.

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08.16.22

The Inflation Reduction Act will help you go electric today.

We want to make adoption of this electric future as quick and seamless as possible, so we've built a calculator to help make households aware of how much money they'll get through the incentives available to them in this bill. It's an easy-to-use tool that provides an instant snapshot of what a household can do. Now.

[Try our Calculator](https://www.rewiringamerica.org/app/ira-calculator)

REWIRING AMERICA

<https://www.rewiringamerica.org/app/ira-calculator>

YOUR SAVINGS CALCULATOR

How much money will you get with the Inflation Reduction Act?

Enter your household information to find out.

Heed the cry...

ELECTRIFY!

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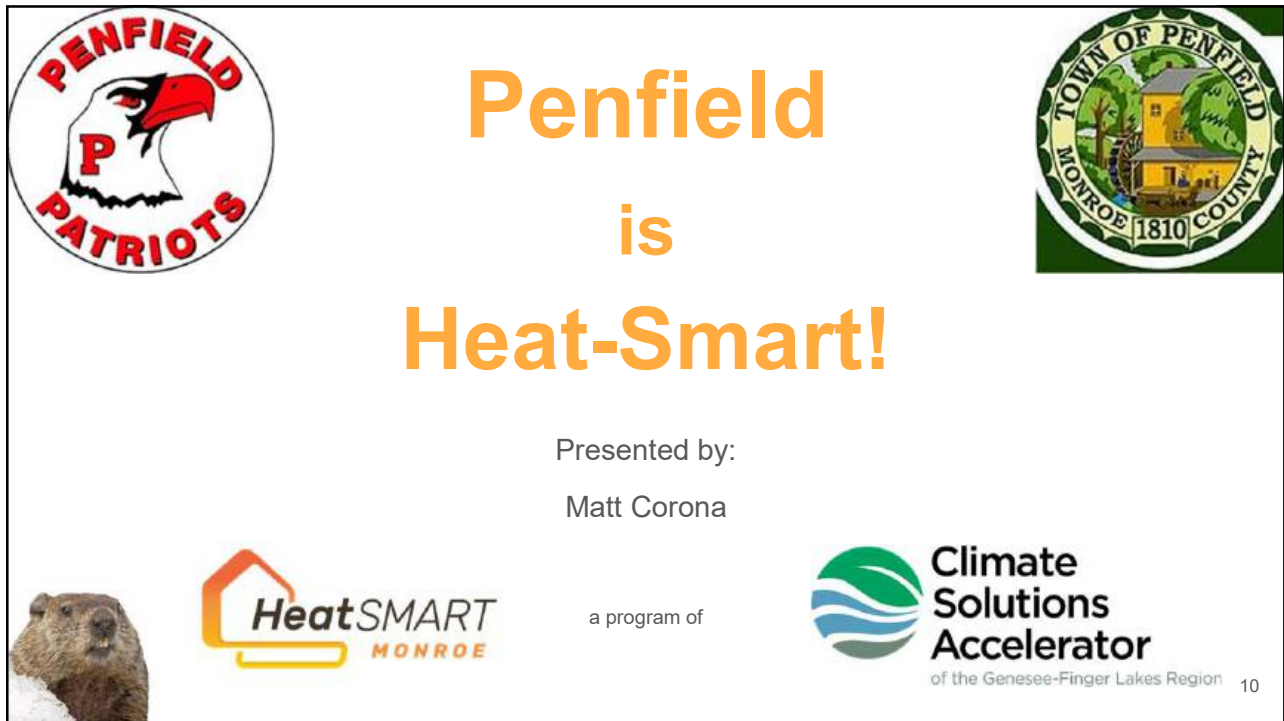
Session Agenda

Part II

HeatSMART MONROE-FLX Presentation

August 25th, 2022

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Penfield is Heat-Smart!

Presented by:
Matt Corona

HeatSMART MONROE


a program of

Climate Solutions Accelerator
of the Genesee-Finger Lakes Region

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Outline

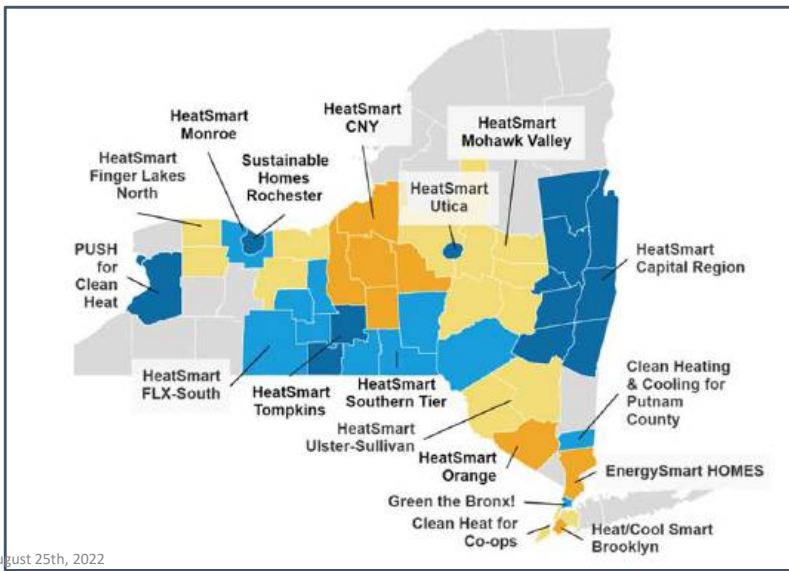
- The campaign
- Heat pumps
- How to get started



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NYSERDA Clean Heating and Cooling Community Campaigns




HeatSmart Monroe:

Launched 2/02/2021

400+ clients helped

100+ heat pump installs



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NYSERDA Clean Energy Communities Program

Community Campaigns

The Town of Penfield is *"In It To Win It..."*
 The town can earn 500 points and \$5,000 in grant monies for completing this campaign

What is the focus of your Campaign? (Check all that apply)

Clean Heating and Cooling and Energy Efficiency

The intent is for the local government to develop partnerships with NYSERDA-approved Clean Heating and Cooling Community Campaigns if they are available in the area. The local government along with partner organizations and volunteers organize a structured campaign to encourage the adoption of clean heating and cooling technologies (e.g., ground- and air- source heat pump systems and heat pump water heaters) as well as energy efficiency retrofits to homes, businesses, and community institutions.

Municipality Size by Population	Required Number of Campaign Participants	Action Grant Amount	Number of Awards
Large (40,000+)	10	\$15,000	15
Small/Medium (0-39,999)	5	\$5,000	45

NOTE: At least three (3) of the five (5) required participants must install air or ground source heat pumps.

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Campaign Goals

Help Penfield homes to..

1. **Go all electric!**
 "Building electrification"
1. **Become more energy efficient**

Goals	Target
Energy assessments	5
Heat pumps/Wx installed	3

End result:

Cleaner and greener
homes in Penfield

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Get "Heat Pump Ready" and then get a heat pump!

HeatSmart Recommendations

Building Envelope:

- Air Sealing
- Insulation

Space Heating/Cooling:

- Air Source Heat Pumps
- Ground Source Heat Pumps

Domestic Hot Water:

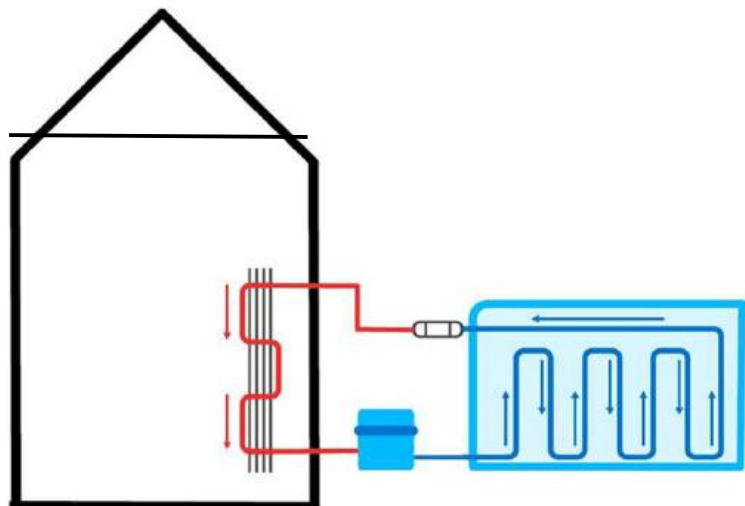
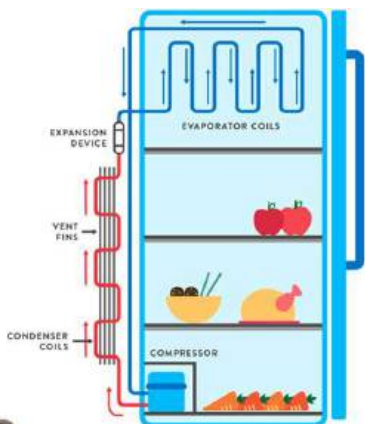
- Heat Pump Water Heaters



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Heat Pumps- you already have one!



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Heat Pumps: One Technology, Multiple Applications

Air-Source



Ground-Source



Heat Pump Hot Water



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Ground-source Heat pump

"Geothermal"



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Air-source Heat pump

No ducts? No problem!

↓

Minisplit heads

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Air-source Heat pump

Ductless "minisplits"

Insulation and air sealing are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

Ductless heads distribute heated or cooled air into a space. They operate very quietly. See next page for options.

Outdoor units operate very quickly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

Window and door upgrades can improve comfort and efficiency.

Thermostats Some thermostats can operate both heat pumps and other heating systems.

Refrigerant lines are small, insulated tubing that connect ductless heads and outdoor units. Coordinate placement and color with your installer.

High-wall ductless heads are among the most common and versatile.

Low-wall ductless heads may be installed where radiators once were. Do not block them with furniture.

Ducted air handlers come in a wide range of configurations. Some serve a single room; others can serve most of a home.


Each indoor unit can have its own thermostat, but all indoor units connect to a **single outdoor unit**.










HeatSMART MONROE


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Ground Source vs. Air Source




	Air-Source	Ground-Source
Heating + Cooling		
Hot water		
Co-benefits		
Upfront cost	Similar to natural gas + A/C	~1.75x ASHP cost
Operating cost	Similar to natural gas + A/C	Significant savings 
Lifespan	15-20 years	25-30 years
No ductwork?	Works in any home 	Maybe
Lot Size?	No constraints	Need open space with access
Maintenance	Annual check up	Minimal 


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Hey. I'm Doug Burroughs,


Official Spokesrodent of




I live in the ground because I can stay comfy down there year-round.

Get this: you humans can enjoy geothermal heating and cooling *above* the ground.

Get started at heatsmartmonroe.org.
You're welcome.




Climate Solutions Accelerator
of the Genesee Finger Lakes Region




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Why Heat Pumps?

- Super energy efficient - 200-400% efficient
- Provide heating and cooling
- Dehumidify: water heater
- Heat your hot water
- Can improve your indoor air quality
- Will reduce your bills if you heat with propane, oil, or electric
- Convenient, remote control or thermostat
- **Reduced climate impact**



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It has never been more affordable

- No-cost home energy assessment
- **Grants** for insulation/air sealing
- Geothermal federal tax credit (30%)
- State tax credit (\$5,000)
- Utility rebates
- Low-interest NYS financing
- And more (Inflation Reduction Act??)

Get in touch to find out what you qualify for!


In many cases loan payments can be lower than the amount you save on energy!




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How to get started







Share
information about your home with a HeatSmart energy advisor




Schedule
a *home energy audit* with one of our building performance professional






Review
recommendations provided by the contractor




Decide
which measures, if any, are best for your home and for your budget




Install
the equipment recommended by the contractor


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Program Resources



Unbiased energy advisor (me)

Knowledge, advice, grant help

Our installer partners: vetted, reliable, accountable.

matt@climategfl.org | 585-340-7047


Additional Resources:

NYSERDA Heat Pump Planner

<https://www.nyserdera.ny.gov/All%20Programs/Programs/Heat%20Pump%20Program/Heat%20Pump%20Planner>







NYSERDA Income-Based Incentives

<https://www.nyserdera.ny.gov/All-Programs/Programs/Home-Energy-Efficiency-Upgrades>



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We Recommend Our Installer Partners

<https://heatsmartflx.org/installer-partners>



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Start with a ...

no-cost, no-obligation

home energy assessment!

Schedule a call with a HeatSmart advisor





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The Story Of Us


Are You Ready for ALL-ELECTRIC Home Heating & Cooling?




Igor Orlovich



Bob Kanauer




Katie Rygg



Al Hibner

WHO KNEW
HEAT
PUMPS
WERE SO
COOL?



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WARMER. COOLER. CHEAPER. COMFIER.

Heat pumps are a **better** way to heat and cool your home.

[LEARN MORE](#)

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Igor Orlovich



Case

Study

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House Stats

Blower Door Tests


year	value
2008	1510
2010	1010
2018	850
2019	817

Ryan built 1983 split level home. 2000 square feet - 3 people

- **Installers:**
 - Insulation and air-sealing- Comfort.
 - Solar- Renewable Rochester
 - Electrical updates- Mike Williams Electric.
 - HVAC- Parina Heating and Air.
- **Energy usage:**
 - Annual gas use- 0 therm. Still paying connection fee...
 - Annual electricity use- 11000 kwh including charging one EV to drive 12k miles/year.
- **Production:**
 - 3800 kwh a year on average (from a 5kw SunPower array).

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Stopping Burning Things - Our Path



2006

Moved into our first ever house. Selected electric stove and dryer. Kept gas water heater and furnace.

2013

Installed 5kw of solar.

2019

Hybrid heat pump setup, heat pump water heater. Furnace is kept as an air handler and backup in case of power outage.

2008-2009

Airsealing, attic insulation. House became too airtight for proper water heater exhaust using flue. Installed tankless heater that brings combustion air in.

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Equipment and Costs

Description	Model	Price installed	Rebates
HP Water Heater	Rheem 50 gallon PROPH50	\$2500	RGE \$500
Heat pump	Bosch Bova-36 Evergreen IM6500 blower	\$5595	None at the time Up to \$3k now
Honeywell Tstat	THX9321	\$200	
Air cleaner	AprilAire 2210	\$200	NA

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Water Heater Path - 2006 to Now



2006- Gas tank

2009- Gas Tankless

2019- HPWH tank

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Water Heater Details

- **Gas Tank**- standard natural gas draft water heater that was nearing end of its life and could no longer vent properly in a tighter house.
- **Tankless (Navien CR240A)** - required upgrade to a larger gas pipe. Complex, unreliable, unstable. Trained us as users to set shower temp and leave it or temp swings would follow. Frequent leaks, failed parts. We as owners became quite proficient in repairing. Manufacturer did have good support and constantly updated design as they learned. Burned a lot of gas to heat water from cold, especially in the winter.
- **HPWH - Rheem 50 gallon** - uses electricity to move heat from basement air to water. Well insulated so stays hot longer. Can run in HP mode or electric heat mode for faster recovery or a mix. It does cool and dehumidify the basement as exhaust air is pretty chilly (32F). In our climate bringing outside air in is impractical so this is one downside. It also makes a quiet noise similar to a refrigerator. No combustion means safer operation, no pilot lights, no toxic exhaust. Has self monitoring and diagnostics.

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Water Heater - Energy Use and Cost

Taking gas use in warm months (June-Sept) x 3 and assuming \$1/therm.

- **Gas tank water heater used 144 therms or about \$144.**
- **Tankless used 96 therms or about \$96.**

HPWH used 952 kWh last year as reported by the unit.

- **At our effective electricity cost of 9c/kwh, that's \$86/year.**
- **Even at full RGE rate of 14c/kwh it's \$133/year.**
- **Not bad for not burning anything and drying basement a bit too.**



Usage Report
2020
You've used 951.84 kWh units of energy
ENERGY CONSUMPTION
View current and historical data
kWh Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Previous Year Current Year

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HVAC Upgrade Details



Keep existing furnace as air handler part of heat pump.

- Add transfer switch to allow running from inverter or generator during outage.
- Replace single speed blower with a more efficient ECM one that has low power circulation mode.
- Upgrade air cleaner to new one tighter one (can take up to MERV16 filters).

Replace indoor AC coil with Heat Pump coil.

Replace outdoor AC unit with Heat Pump unit.

Add smart thermostat:

- Configure furnace to only fire as a backup (below 5F outside or if temp drops below setpoint).
- Run constant ventilation using low fan speed.
- Bring fresh outdoor air via damper and intake when outside conditions allow.

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HVAC: Two Years later



- No gas is burned in a typical year except for maintenance furnace runs.
- House is more comfortable year around.
- Constant ventilation plus outside air intake helped lower radon a bit.
- Outside unit is very quiet when cooling but a bit louder in winter. Location...
- Defrost cycles turn heating into AC for about 5 minutes. Typically during that time system is supposed to start furnace or electric strip heat. We did not wire it that way, so getting AC blasts every so often. Not a problem with fully electric HP systems.
- Power consumption in summer is 1-2kw, in winter it is 2-4kw.

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CLEAN HEATING & COOLING







Bob Kanauer


Case
Study

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Net Zero ALL ELECTRIC Home With an Air-Source Heat Pump



Air Source Heat Pumps




- **Net Zero means ALL our home energy needs are supplied by a renewable energy power source on our lot, specifically by a Solar Photovoltaic system using Net Metering (see image below left).**
- **Note RG&E Electricity Bill Below**
- **ZERO kWh Used From RG&E for that Month**
- **In addition, we charge two Plug in Hybrid Electric Vehicles (PHEV) when the cars are parked at home.**

Electricity Delivery Charges	
Customer charge	21.70
Subtotal Electricity Delivery	\$21.70
Electricity Taxes and Surcharges	
Taxes on delivery charges @ 2.0408%	0.44
Subtotal Electricity Taxes and Surcharges	\$0.44
Total Electricity Cost	\$22.14
Total Energy Charges	\$22.14

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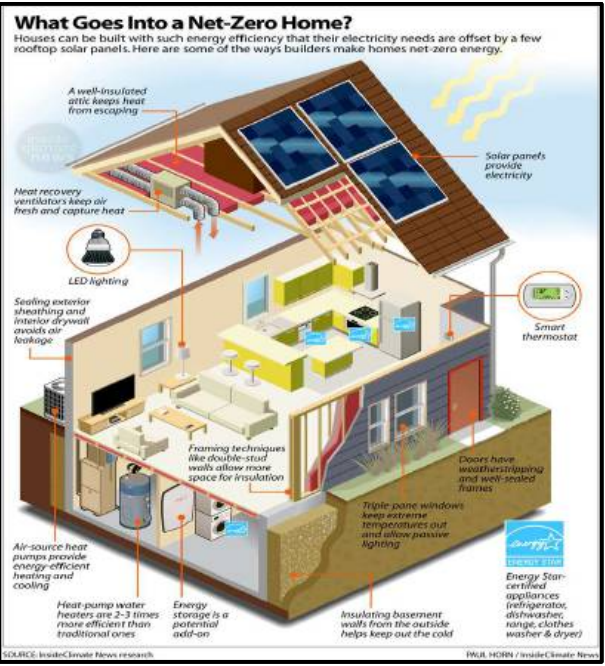
House Design



- **Our house was built in 1986**
 - House has 2475 Sq. Ft. of living space plus a 975 Sq. Ft. basement
- **No Natural Gas service available (East Penfield)**
- **Designed for minimal heat loss:**
 - R28 walls, R50 attic
 - Triple glazed windows
 - No plumbing, electrical penetrations on exterior walls, no heating supply or return ducts in exterior walls
 - Insulated band joists (band joists inset)

What Goes Into a Net-Zero Home?

Houses can be built with such energy efficiency that their electricity needs are offset by a few rooftop solar panels. Here are some of the ways builders make homes net-zero energy.



A well-insulated attic keeps heat from escaping

Heat recovery ventilators keep air fresh and capture heat

LED lighting

Sealing exterior sheathing and interior drywall avoids air leakage

Framing techniques like double-stud walls allow more space for insulation

Energy storage is a potential add-on

Insulating basement walls from the outside helps keep out the cold

Triple pane windows keep extreme temperatures out and allow passive lighting

Smart thermostat

Doors have weatherstripping and well-sealed frames

Triple pane windows keep extreme temperatures out and allow passive lighting

Air-source heat pumps provide energy-efficient heating and cooling

Heat-pump water heaters are 2-3 times more efficient than traditional ones

Solar panels provide electricity

Energy Star-certified appliances (refrigerator, dishwasher, range, clothes washer & dryer)

SOURCE: InsideClimate News research

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The Energy Story Of Our Home (cont.)

- Solar Photovoltaic System generates ~ 17,550 kWh annually.
- HVAC System is a Daikin Air Source Heat Pump with a high efficiency air cleaner.

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The Energy Story Of Our Home (cont.)

- Air Source Heat Pump was installed by Wise Home Energy.
- Installation qualified for NYSERDA rebates plus 0% financing.
- Installed Heat Pump Water Heater and Clothes Dryer (photos below)
- All lighting in the house is LED with some CFLs.
- All Energy Star Appliances.

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The Energy Story Of Our Home Some Recommendations:

- All Electric Homes can be economical - but it takes planning and time to implement the upgrades for an existing home.
- A Home Energy Audit and the proper selection of appliances and heat pump systems will result in cost effective solutions.
- Investigate NYSERDA rebate programs, equipment manufacturer rebates, and low or no interest loans.

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PROS AND CONS of geothermal heat pumps

PROS	CONS
Significant heating and cooling cost savings	High upfront installation costs
Environmentally friendly	Potential landscape alterations
GSHPs work well in almost all climates	Open-loop systems may contaminate groundwater

Geothermal Heat Pumps

1 kWh to power the system

400-600% Efficient

4-6 kWh thermal energy delivered

3-5 kWh of geothermal energy moved from the earth



Katie Rygg





Outside Air Temp
94°

Ground Loop Temp
55°


House Temp
67°

Case Study


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Why did we want Geothermal?



- Efficiency
 - 4x on heating.
 - 6x on cooling.
- Could also upgrade our water heater to electric at the same time.
- Cut off our gas supply!!!! → We now have an all electric house.
 - We had changed out our gas stove top to an induction cooktop a few months earlier. No other gas appliances.
 - We have opted-up to the 100% renewable electricity through Penfield's Community Choice Aggregation. We have a zero emission house.



	\$5.00	\$10.00	\$15.00	\$20.00	\$25.00
7 Series					\$6.63
10 HSPF Heat Pump					\$11.99
98 AFUE Natural Gas					\$12.04
85 AFUE Fuel Oil					\$22.39
98 AFUE Propane					\$27.49

Heating Cost per Millions BTUs

7 Series					
2-Stage geo					
23 SEER A/C or Heat Pump					
18 SEER A/C or Heat Pump					

Show Heating Cost per Millions BTUs





Cooling Costs

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Installation: the Outdoor Work

- Oct 21: Drilled one 500' well for the loop field.
- Dug a trench from the well to the house.

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Installation: the Indoor Work

- Nov 4th: Connect the well to the house - tubes ~6' underground.
- Tubes run up along the ceiling in the basement to the utility room:
 - WaterFurnace 5-ton, Series 7, variable speed water-to-air Heating & Cooling geothermal heat pump.
 - Desuperheater and A.O. Smith Voltex 50-Gallon Heat Pump Water Heater.
 - High efficiency fan-powered humidifier.
- Heat was off for 30 minutes total.
- Touchscreen thermostat with wi-fi.



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Final Touches

- Nov 13th: RG&E disconnected our gas supply!
- Online Symphony temperature control installed
 - With the Symphony App I can remotely change the temperature in the house, schedule a vacation, etc.



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Cost Breakdown

WaterFurnace Series 7 (5-Ton Unit) with Full Time Hot Water with Desuperheater and Heat Pump Water Heater	Price: \$41,400.00
NYSERDA Rebate: \$8,650.00 (Paid Directly to ACES)	Contract/Customer Price: \$32,750.00
*Expected 26% Fed. Tax Credit: \$8,515.00	Expected FINAL Cost After Incentives: \$24,350.00





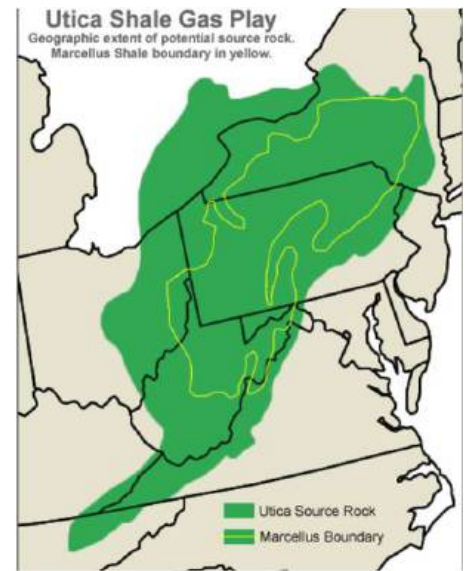
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One MASSIVE Issue: Venting

- This should not happen to you if you decide to install a geothermal system with ACES. ACES will not drill past 250' in Penfield again.
- Penfield sits directly on the Utica Shale and very close to one of the other largest reserves of natural gas in the country: the Marcellus Shale (under much of NY, PA, and WV).
- The depth of naturally occurring gas pockets is variable and no one can predict the size/volume.
- We were warned that the well might vent for a couple of days, up to two weeks even!
- It is STILL venting twenty months later.

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Venting...continues ...and continues

- Venting was horrible for the first few weeks. RG&E and the fire department were called out for gas leaks a number of times by people up to 2 neighborhoods away.
- The fire marshal insisted that the tube be extended to vent the gas over the top of the roofs.
- 60' tube with 6 supporting ropes stayed up through the winter into the spring.
- Late spring: tube cut to 8'. Venting continued - little stinky poofs every few minutes.
- Recently: poofs are harder to detect, less frequent, less stinky. *Still happening.*

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Reflections/ Takeaways


April 26th, 2022

- We are so sad about the venting. Methane is a GHG that is 32x more potent than CO2.
- We love the system inside. Because it is so much more efficient, we've allowed ourselves some luxuries.
- It turns out that geothermal heating is roughly 4x the efficiency of the gas-fired furnace.
- In 2021, we only used 172 kWh total to cool our 3300 square foot house through all of June (51 kWh), July (28 kWh), August (91 kWh), and Sept (2 kWh). **So far in 2022: May-Aug 23 = 137 kWh**
 - Our house is set to 80 degrees except for bedtime when we kick it down to 75-76.
- We have mild concerns about a power outage but are willing to risk the discomfort for the savings of stopping the gas service entirely.

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NOW...We're Living the ALL-ELECTRIC-Life!
<https://www.colorpenfieldgreen.org/post/now-we-re-living-the-all-electric-life>
 By Allen Hibner: As of Friday, March 25th, 2022, with the installation of our new Whirlpool electric heat-pump clothes dryer, the Hibner household became **ALL-ELECTRIC and 100% decarbonized** in its daily energy usage within our 1950's ranch home in Penfield.



AI Hibner

Case Study

Where to Electrify Everything in Your Home



Name
Allen Hibner

Home
Penfield, NY
Raised ranch
Integral garage
Built in 1955
Upper level: 1500 sq. ft.
Lower level: 700 sq. ft.
Lot Size: 0.4 Acres

Contractor
A.C.E.S.
Geothermal

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Decarbonizing Our Home - Our Path

Four New Heat Pumps & A Promise...

Our-Big-Beautiful-Green-ALL-ELECTRIC-Life

Sept. to Dec. 2006
Preparing to Decarbonize Home - Installed Side-Wall, Attic & Garage Insulation Plus New Windows & Doors.

April 2021
Replaced Gas Furnace #2 & Gas Hot Water Heater with WaterFurnace Ground Source Heat Pump System.

July 2021 to Future
Installed a SENSE Circuit Monitoring System to Manage Electricity Usage. *3/25/2022 - Installed Heat Pump Electric Dryer. 5/2/2022 - Had Extensive Air-Sealing & Insulation Work Done.*

January 2020
Replaced Gas Furnace #1 with a Carrier Mini-Split Air-Source Heat Pump. Also Installed Level II EV Charger.

June 2021
Upgraded Breaker Box Panel to 200 Amp Service. Installed Generac 22 kW Gas Whole House Generator.

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April 2021 Actions Taken

Replaced Second Gas Furnace & Gas H/W Heater by Installing:

- WaterFurnace Series 7 Geothermal ALL-ELECTRIC Ground-Source Heat Pump System.
- AO Smith Hybrid Electric Hot Water Heater.
- De-Superheater & Geotank for Compressor Waste Heat Recovery (to Pre-Heat Hot Water).



August 25th, 2022

Project Installations

- WaterFurnace 4-ton, Series 7 (NVV048), water-to-air heating & cooling geothermal heat pump
- High-efficiency fan-powered humidifier
- 50-gallon hybrid electric heat pump water heater
- Vertical closed loopfield
- Desuperheater and 50-gallon storage tank
- Main panel upgraded to 200 amps

Costs & Incentives

Geothermal Project:

Initial Cost:	\$43,950
Incentives:	\$16,718
Final Cost:	\$27,232

System Usage:

Before: Heating:	Avg. \$126/mo.
After: Heating:	Avg. \$71/mo.
Cooling:	Avg. \$37/mo.

June 2021 Actions Taken

Hardening Our Home's Electrical Infrastructure:

- Upgraded Main Breaker Box Panel to 200 Amp Service to Support New Heat Pump Systems & Regular EV Car Charging.
- Installed Whole House Surge Protector in Panel.
- Had Generac 22 kW Whole House Natural Gas Generator & Automatic Transfer Switch Installed.
- Natural Gas Service from RG&E Left In Place ONLY for Use By Backup Generator!

August 25th, 2022



NEWS
Your energy use spiked by 126% yesterday compared to your average weekday.

TODAY
02:51 pm Living Room Media Center (Living Room) turned on
02:48 pm Keurig Coffee Maker (Kitchen) was on 3 times, now off
02:34 pm Kenmore Refrigerator (Kitchen) turned on
02:24 pm Kenmore Refrigerator

1,187 W

- Kenmore Refrigerator 125 W
- Living Room Media Center Always On: 25 W 229 W
- AI's Office Media/PC Center Always On: 15 W 102 W
- Other 246 W
- Always On 216 W
- AO Smith Hybrid

Sense Flex
Combines the Sense monitor and additional Flex sensors to offer the capabilities listed below.
All the benefits of Sense, plus:
Dedicated circuit monitoring, or
Split-service 400A systems, or
Standby generators, or Solar monitoring
+ [Show more](#)
\$349

July 2021 to the Future:
August 25th, 2022

Managing Our Overall Electric Usage:

- Had a Sense Flex System Installed to Monitor and Manage ALL Electrical Appliances, Heat Pumps, Circuits & Devices. *"Seeing It In Real Time Means More Savings Over Time..."*
- Sense Uses Artificial Intelligence Software to Identify Your Electric Devices.

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Promises Kept!

Gas Supply To Dryer Is Now Turned OFF!

Whirlpool Heat Pump Dryer Model - #WHD862CHC

July 2021 to the Future:
August 25th, 2022

March 25th, 2022 – Heat Pump Dryer

- Our FOURTH Heat Pump Installed!
- ALL-ELECTRIC-Life Promises KEPT!
- The Hibner Home is Now 100% ALL-ELECTRIC & 100% Decarbonized in our Daily Energy Usage.

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Conditioned Basement door open



Use Less Of It!

CFM50 is the airflow (measured in cubic feet per minute) from the blower door fan needed to create a change in building pressure of 50 pascals. The most common measure of building airtightness, CFM50 indicates the total air leakage in the building enclosure.

May 2nd, 2022 – Air-Sealing & Insulation Results:

- 2525 Sq.Ft.–Conditioned Space–475 Sq.Ft.–Unheated Garage
- **Pre-Work:** Blower Door Test = **3,022 CFM50**
- **Post-Work:** Blower Door Test = **1,764 CFM50** – 42% Lower
- Air Changes/Hour (ACH) Went From **8.98 (Pre-Work)** to **5.24 (Post)** – a 42% REDUCTION in Air Infiltration. NICE!





May 2nd, 2022 – Work Completed:

- Extensive Integral Garage Ceiling (Kitchen, LR & DR are above Garage) & Ductwork Insulation Installed
- Retro-Foam Installed in Above Ground Concrete Block Walls (Blocks are 60% Dead Air Space)
- Attic, Basement Rim Joist and Other Air Infiltration Sources – Extensive Air-Sealing Work Performed

July 2021 to the Future:

August 25th, 2022

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Preliminary Results – Electricity Savings from Insulation / Air-Sealing Work Done May 2nd, 2022 by Wise Home Energy–Hibner Home–85 Highledge Drive–Penfield, NY

2022 -Hibner Family - WaterFurnace Series 7 - A/C - kWh Usage Data Recorded <i>Set @ 73F Day Temp. (16 Hrs./Day) / 71F Night Temp. (8 Hrs./Day)</i>										2021 -Hibner Family - WaterFurnace Series 7 - A/C - kWh Usage Data Recorded <i>Set @ 73F Day Temp. (16 Hrs./Day) / 71F Night Temp. (8 Hrs./Day)</i>									
Date	Max Temp. Degrees F	Min Temp. Degrees F	Avg Temp. Degrees F	Departure From Normal Degrees F	Water Furnace Cooling - kWh Used	kWh Per Cooling Degree Day	Cooling Cost Per Day @ \$13/kWh	Cooling Degree Day (CDD-Above 65F)	Date	Max Temp. Degrees F	Min Temp. Degrees F	Avg Temp. Degrees F	Departure From Normal Degrees F	Water Furnace Cooling - kWh Used	kWh Per Cooling Degree Day	Cooling Cost Per Day @ \$13/kWh	Cooling Degree Day (CDD-Above 65F)		
8/4/2022	87	72	79.5	7.4	6.22	0.4147	\$0.81	15	6/25/2021	85	66	75.5	5.4	5.55	0.5045	\$0.72	11		
8/5/2022	87	70	78.5	6.5	5.68	0.4057	\$0.74	14	6/27/2021	93	75	84	13.5	9.66	0.5084	\$1.26	19		
8/6/2022	90	67	78.5	6.6	6.56	0.4686	\$0.85	14	6/28/2021	92	74	83	12.3	10.27	0.5706	\$1.34	18		
8/7/2022	93	72	82.5	10.7	8.42	0.4678	\$1.09	18	6/29/2021	94	70	82	11.1	9.18	0.5400	\$1.19	17		
8/8/2022	89	74	81.5	9.7	8.46	0.4926	\$1.10	17	6/30/2021	85	70	77.5	6.4	8.14	0.6262	\$1.06	13		
Average	89.2	71.0	80.1	8.2	7.07	0.4509	\$0.92	15.60	Average	89.8	71.0	80.4	9.7	8.56	0.5499	\$1.11	15.60		
REDUCTION / SAVINGS From Insulation / Air-sealing Work Done 5/1/2022					17.4%	18.0%	17.4%							↑	↑				

NOW: Some Cool Results

August 25th, 2022

Five HOTTEST DAYS in 2021 & 2022:

Summer 2021 - Our new WaterFurnace cost us \$1.11/Day to Cool 2,000 Sq. Ft. of conditioned space. NICE!

Summer 2022 - We Saved ANOTHER 15-20% over that number with Air-Sealing/Insulation Work. \$0.92/Day Now...

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Hibner Family - WaterFurnace Series 7 + Carrier Mini-Split + Space Heater - HEATING & COOLING - kWh Usage Data
 Set @ 70F (Day-Heating) - 73F (Day-Cooling)-67F (Night-Heating)-71F (Night-Cooling)-Day=16 Hrs./Night=8 Hrs.

Month	Avg Max Temp. Degrees F	Avg Min Temp. Degrees F	Avg Temp. Degrees F	Avg Departure From Normal Degrees F	1500 Watt Space Heater-kWh Used Lower Level-350 Sq.Ft.	Carrier Mini Split Heat Pump-kWh Used Lower Level-350 Sq.Ft.	Water Furnace kWh Used: Upper Level-1500 Sq.Ft. +1/2 of Lower (350 Sq. Ft.)	kWh Per Heating / Cooling Degree Day For Whole House	1/2 of Lower Level Heating / Cooling Cost Per Month @ \$.13/kWh	Upper + 1/2 Lower Levels Heat/Cool Cost Per Month @ \$.13/kWh	Cooling Degree Days (CDD-Above 65F)	Heating Degree Days (HDD Below 65F)
May, 2021	68	45.8	56.9	-1.9	0.0	0.0	124.00	0.38	\$0.00	\$16.12	42	286
June, 2021	81.5	60.1	70.8	3.2	0.0	0.0	126.00	0.55	\$0.00	\$16.38	205	23
July, 2021	78.1	61.1	69.6	-2.7	0.0	0.3	123.10	0.75	\$0.04	\$16.00	156	9
August, 2021	82.9	64.8	73.8	3.1	0.0	1.4	200.60	0.71	\$0.18	\$26.08	282	2
September, 2021	74.1	54	64.0	0.4	0.0	1.1	51.00	0.50	\$0.14	\$6.63	41	63
October, 2021	64.8	50.4	57.6	5.4	0.0	26.8	89.70	0.46	\$3.48	\$11.66	17	237
November, 2021	48.6	32.7	40.6	-0.9	0.0	144.9	309.60	0.63	\$18.84	\$40.25	0	722
December, 2021	42.8	30.6	36.7	4.7	2.7	169.9	448.80	0.72	\$22.44	\$58.34	0	868
January, 2022	28.4	10.3	19.5	-6.7	211.4	187.8	832.00	0.88	\$51.90	\$108.16	0	1407
February, 2022	35.9	16.3	26.1	-1.3	195.7	177.6	617.90	0.91	\$48.53	\$80.33	0	1084
March, 2022	46.9	28	37.4	2.2	149.0	170.4	480.30	0.94	\$41.52	\$62.44	0	848
April, 2022	55.9	36.9	46.4	-0.4	14.1	155.3	258.80	0.77	\$22.02	\$33.64	2	551
TOTAL					572.9	1035.5	3661.80		\$209.09	\$476.03	745	6100
Average	59.0	40.9	50.0	0.4	47.7	86.3	305.15	0.68	\$17.42	\$39.67	62	508

ROC Climate Data Source: <https://w2.weather.gov/climate/xmacis.php?wfo=buf>

TOTAL \$ YTD= \$685.13
 AVG\$/Month = \$57.09

NOW: First 12 Months Results
 August 25th, 2022

First 12 Months w/New Geothermal System:

- Electricity Costs of our WaterFurnace Geothermal System Over 12 Months TOTAL: **\$476.03**
- Our average MONTHLY Heating/Cooling cost is: **\$39.67**

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Closing Thoughts & Lessons Learned



Al Hibner





August 25th, 2022

- We've BANISHED Natural Gas to the "Practice Squad..."
 - To be called up ONLY when our utility power goes down.
 - We would have preferred solar panels & storage batteries as backup, but our shaded N/S oriented roof is not suited for that.
- We are NOT "Climate Austerity Nuts!" We value our comfort. INSTEAD, We are "Climate Preppers!" Preparing for the Climate Change coming.
 - 70 degrees in winter (not 60) / 73 degrees in summer (not 80). No compromise required here at all, just like Saul Griffith said!
 - Our Geothermal system and its very efficient use of electricity allows us to "have our cake and eat it too!"
- "My Battery is BIGGER Than Your BATTERY!"
 - Nature provides FREE, GREEN, sustainable and unlimited heating and cooling from an estimated 5,000 Cubic Yds. of earth in my backyard.
 - That's a BIG BROWN battery w/some Green on Top!
- This feels AMAZING! I pinch myself every day.

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Al Hibner

Closing Thoughts & Lessons Learned (cont.)

- The Hibner's passed their own *"Inflation Reduction Act"* to invest in our home's green, renewable infrastructure for the future!
- We're not worried in the least about short-term payback (5-10 year ROI) on the investment in our heat pump systems.
 - We are *"aging in place"* for the next couple of decades.
 - To think that electricity and heat generated from fossil fuels will stay the same or go down in price over the next several decades is just not going to happen! Good luck with that...
 - We WILL make out very well on ROI over the next 20 years!
- With our selection of Penfield CCA's – Opt-In - 100% Green, Renewable Electricity at 6.443 cents/kWh (fixed price for 2 years)
 - We can laugh at future rising costs for heating & cooling!
 - We can also laugh at rising gasoline prices over that period While charging our Chevy Bolt EV (259-mile range)!

August 25th, 2022

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Al Hibner

Closing Thoughts & Lessons Learned (cont.)

- **REAL NEAT HEAT! (+REAL COOL COOL!)**
 - Our WaterFurnace, arguably the best residential HVAC system in the world today (*the "Tesla" of HVAC systems*) has 12 compressor & fan speeds! How many speeds does your furnace have?
 - Compressor and fan speeds step up or down as needed based on outside temps and calls for heating/cooling.
 - 12 variable speeds mean much greater efficiency using electricity, more comfort and greater savings over time.
 - Example: throughout the day in winter, air temperatures at our registers range from 75 to about 90 degrees maximum. In summer, register air temps can dip to 50 degrees = rapid cooling.
 - The WaterFurnace system runs much more frequently than our old natural gas furnace (*22 hours/day in winter's coldest days*).
 - This design keeps air temperatures in our home more constant and more comfortable all day long.
- All these incredible benefits without burning a single cubic foot of natural gas? *That feels very good. Indeed, It's PRICELESS!!!*



August 25th, 2022

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Our Pipe Dreams Came True!

Thank You A.C.E.S.!

Mother Nature Approves!

Our New Gas Meter Is Very Lonely!

REWIRING AMERICA

WHO KNEW HEAT PUMPS WERE SO COOL?

The Hibner's Home Is NOW:

- Powered by 100% Renewable Electricity! (Penfield 100 - NYS Low Impact Hydro Electricity)
- 100% ALL ELECTRIC & 100% Decarbonized (On a Daily Basis)!

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Q & A

WHAT'S ON YOUR MIND?

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Session Agenda

Part IV

**Next Action Steps for
Course Participants**

August 25th, 2022

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Take action NOW!

Start with a ...

no-cost, no-obligation home energy assessment!

Schedule a call with a HeatSmart advisor

<https://heatsmartflx.org/enroll-now>





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Making Heat!




Start Moving Heat!



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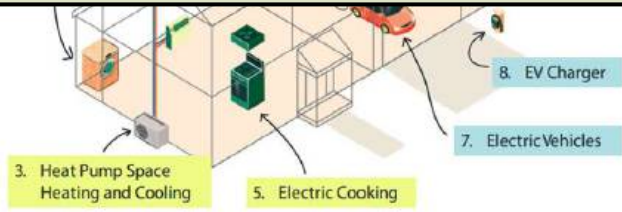


Where to Electrify Everything in Your Home



➤ **SO, WHAT SHOULD YOU DO AFTER THIS CLASS?**

- *If right now, or at any time in the future, you need to replace an old; gas powered automobile, gas furnace, A/C only unit, gas hot water heater, gas stove, gas dryer, gas lawn mower or any other type of gas lawn equipment, etc.*
- **REPLACE IT WITH AN ALL-ELECTRIC MACHINE, BEV, PHEV OR HEAT PUMP! IT'S JUST THAT SIMPLE...**

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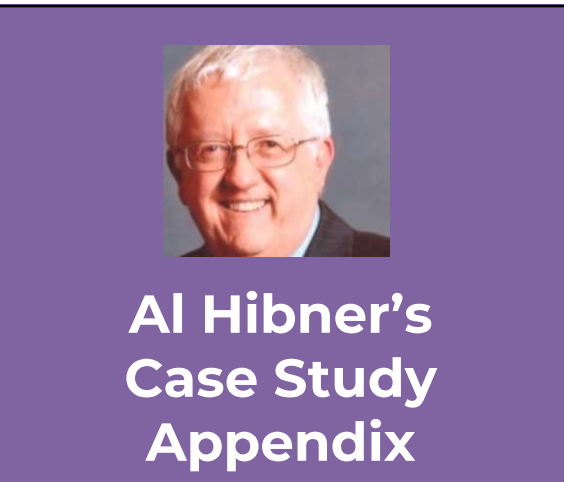
Session Appendices

Part V

Al Hibner's "ALL-ELECTRIC-Life" Blog Series
Wise Home Energy – Energy Assessments

August 25th, 2022

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I invite you to read my "ALL ELECTRIC Life" blog series at our Color Penfield Green website for more details on how we selected our heat pump systems and had them installed:

<https://www.colorpenfieldgreen.org/blog/categories/electric-life>

August 25th, 2022

Al's Blog Series "ALL ELECTRIC Life"

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Background & Rationale for ALL the Actions We've Taken

Our-Big-Beautiful-Green-ALL-ELECTRIC-Life

Read More >>>



August 25th, 2022



Allen Hibner
Jul 6, 2020 · 4 min

Our-Big-Beautiful-Green-ALL-ELECTRIC-Life-Part I

By Allen Hibner: I have been volunteering full time in the "reversing global warming," climate change solutions movement for well over...

<https://www.colorpenfieldgreen.org/post/our-big-beautiful-green-all-electric-life-part-i>

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2006 Actions Taken

Preparing to Decarbonize:

- Insulated the Attic (16"=R50).
- Insulated Our Home's Sidewalls (3.5" Blown-In Dense Pack Cellulose +3/4" Styrofoam Under New Siding =R20).
- Insulated the Garage Ceiling Below Our Living Room (7" Blown-In Fiberglass =R22).
- Installed All New Energy Efficient Windows (Low-E / Dual Pane / R3) & Doors (Metal with Insulated Foam Cores).

Read More >>

August 25th, 2022

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-ii-preparing-to-decarbonize-our-homes>

Allen Hibner

Aug 13, 2020 · 3 min

...ALL-ELECTRIC-Life - Part II - Preparing to Decarbonize Our Homes...

By Allen Hibner: David Roberts of Vox, quotes Paul Griffith, author of Rewiring America, in

81

January 2020 Actions Taken

Replaced Our First Natural Gas Furnace with Air-Source Heat Pump:

- Replaced Inefficient On-Wall Gas Furnace (In-Law Apt.-Heating ONLY) With Carrier Mini-Split Heat Pump (Now Provides Heating AND Cooling).
- Installed 32 Amp – 240 Volt - Level II – EV Charger.

Read More >>

August 25th, 2022

Allen Hibner

Nov 4, 2020 · 3 min

...ALL-ELECTRIC-Life - Part III – Goodbye Gas Furnace – Hello All Electric Heat Pump...

By Allen Hibner: In 1988, I had an on-wall natural gas furnace installed in our 700 square foot lower level in-law apartment – now my...

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-iii-goodbye-gas-furnace-hello-all-electric-heat-pump>

82

Researched Options For Replacing Main Gas Furnace & H/W Heater



READ

Hybrid Heat™ Technology
Combining the hybrid heat pump and gas furnace with hybrid heat™ technology is both efficient and intelligent. This technology gauges the outside air temperature and selects the fuel source that's just cost effective for the conditions.

In cool weather, for example, using your gas furnace may be essential, and an electric heat pump may be all you need to stay comfortable. But when temperatures turn up, furnace heat may be best. Your system will automatically shift modes, keeping you cozy all the while, and saving energy.



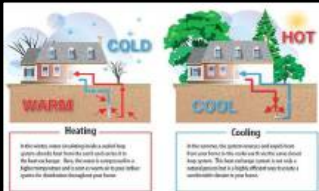
Allen Hibner
Dec 15, 2020 · 4 min

...ALL-ELECTRIC-Life - Part IV - What are Dual Fuel (Hybrid) Home Heating/Cooling...

By Allen Hibner: In 2000, I finally had a central air-conditioning unit installed in my home. Like many Penfield residents out there,...

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-iv-what-are-dual-fuel-hybrid-home-heating-cooling-systems>

MORE



Allen Hibner
Feb 6 · 5 min

...ALL-ELECTRIC-Life - Part V - Hello Geo(thermal), How Ya Doin?!

By Allen Hibner: In the December, 2020 "...ALL-ELECTRIC-Life - Part IV" blog article that I wrote (click here to read that article)...

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-v-hello-geo-thermal-how-ya-doin>

ABOUT IT

And the Winner is??? Geothermal...Find Out Why in This Blog Article



Allen Hibner
Mar 6 · 5 min

...ALL-ELECTRIC-Life - Part VI - And the Winner is??? Geothermal...Find Out Why

By Allen Hibner: In the February, 2021 "...ALL-ELECTRIC-Life - Part V - Hello Geo(thermal), How Ya Doin?" blog article that I wrote (click...

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-vi-and-the-winner-is-geothermal-find-out-why>



<https://www.colorpenfieldgreen.org/blog/categories/electric-life>

April 2021 Installed Geothermal System



READ / WATCH



Allen Hibner
Apr 9 · 1 min

...ALL-ELECTRIC-Life - Part VII - Drill Baby Drill! Let the Geothermal Installation...

By Allen Hibner: April 6th, 2021- Day #1 of drilling multiple 100' deep wells for our new WaterFurnace geothermal system installation....

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-vii-drill-baby-drill-let-the-geothermal-installation-begin>

MORE



Allen Hibner
May 11 · 2 min

...ALL-ELECTRIC-Life - Part VIII - FINAL "WELL-ness" Report...

By Allen Hibner: April 22nd, 2021- This image shows THE FINAL DAY of drilling six (6) 100' deep wells for our new WaterFurnace...

<https://www.colorpenfieldgreen.org/post/all-electric-life-part-viii-final-well-ness-report>

ABOUT IT



Allen Hibner
Jun 8 · 2 min



...ALL-ELECTRIC-Life - Part IX - Waging Trench "WELL"-Fare ...

By Allen Hibner: April 23rd, 2021- This image shows the installation crew at the end of digging the trenches. Once those were finished,...


<https://www.colorpenfieldgreen.org/post/all-electric-life-part-ix-waging-trench-well-fare>





<https://www.colorpenfieldgreen.org/blog/categories/electric-life>





We Recommend Our Installer Partners











<https://heatsmartflx.org/installer-partners>



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Home Energy Assessment 101


What we look for and what to expect:


Not all audits are the same: AHP, Empower, Comfort Home, etc.

But they are similar: attic to basement, hvac, envelope inspection

Report and proposals: recommendations, costs and energy savings

Suggestion: have a detailed discussion about your concerns, goals and hopes for your home.





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What Makes a Home Heat Pump Ready

Talking here about ASHP specifically:

- A good thermal envelope
- A relatively air tight home
- An electric service to handle a heat pump
- A decision on ducted or ductless or mixed
- A heating and cooling load calculation



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What Manufacturers Does Wise Use and Why

We always install COLD CLIMATE RATED HEAT PUMPS!

System selection is more important than manufacturer.

Manufacturers we use:

Daikin - Largest HVAC manufacturer in the world

Good tech support, readily available (Until COVID)

Mitsubishi - First to develop cold climate tech,

Has some of the best efficiencies (but barely)

Samsung - Product lines on par with Daikin and Mitsu

Has some unique designs for "heads"

System design and install is more important than manufacturer.



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