

Your Instructor Today



Al Hibner

Al Hibner (Retired)

- > Penfield Resident
- > Full Time Climate Solutions Advocate & Activist for Almost 5 Years

Recently Installed:


- > Air Source Heat Pump System (2020)
- > Geothermal (Ground Source) Heat Pump System (2021)

- > **National Level Climate Solutions Advocacy & Action:**
 - > 2017-2019 - (Former) Co-Lead of Lobbying - Citizens' Climate Lobby - Rochester, NY Chapter.
 - > 2021 - Currently lobbying for inclusion of carbon pricing in BBB Act.
- > **State Level Climate Solutions Advocacy & Action:**
 - > Currently lobbying NY State legislators to include the CCIA (Climate & Community Investment Act) legislation in the 2022 NYS Budget.
- > **Local Level Climate Solutions Advocacy & Action:**
 - > 2018 - Founded Penfield CCA Residents' Committee to lobby for CCA program in our town - that program begins as of Dec. 2021.
 - > 2020 - Co-Founded Color Penfield Green with Katie Rygg.
 - > 2021 - Leading NYSERDA - Clean Energy Communities - Community Campaigns for EVs and Clean HVAC adoption.
 - > Writing articles for Blog Series: "ALL ELECTRIC Life..."
- > **Family/Personal Level Climate Solutions Action:**
 - > My goal of living an "ALL ELECTRIC Life..." in our 1950's raised ranch home in Penfield is almost 100% complete. One (1) gas dryer to go!

Session Agenda

- Part I** WHY Move to All Electric Heating & Cooling?
- Part II** What are Air & Ground Source Heat Pumps?
- Part III** Hibner Family - Heat Pump Case Study
- Part IV** Penfield's Clean Heating & Cooling Community Campaign is Underway - What's Next for Brighton?
- Part V** Some Closing Thoughts and Lessons Learned

November 16th, 2021 3



Home heating sticker shock: The cost of natural gas is up 180%

By [Matt Egan, CNN Business](#)
Updated 3:30 PM ET, Tue September 28, 2021

Part I WHY Move to All Electric Heating & Cooling?

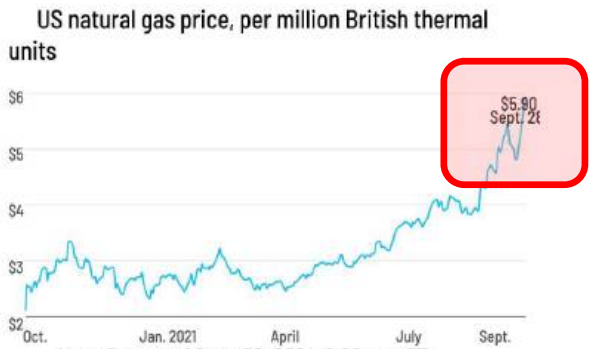
- NY State is exploring putting a steadily rising price per ton on CO2 emissions *(CLCPA / CCIA). It's happening NOW!
- So is Congress, nationally, in the *"Build Back Better"* bill. It's happening NOW!
- All signs point to the critical need to reach NET ZERO CO2 & equivalent greenhouse gas emissions by 2050 (50% by 2030).
- Fossil fuel prices MUST/WILL therefore rise steadily over the next decades to spur the technology innovation we need to reach these key emissions reduction milestones.
- ***SO, WHAT CAN YOU DO?***

* Climate Leadership and Community Protection Act / Climate & Community Investment Act

An expensive winter

Prices for natural gas, the most common way to heat homes and a major fuel source for electricity in the United States, have surged more than 180% over the past 12 months to \$5.90 per million British thermal units.

US natural gas price, per million British thermal units



Note: Data as of Sept. 28, 2021, 9:30 a.m. ET
Source: Refinitiv
Graphic: Tal Yellin, CNN

Part I WHY Move to All Electric Heating & Cooling?




<https://www.rewiringamerica.org>



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.



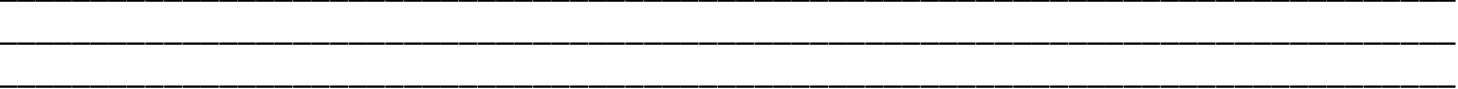
Part II What are Air & Ground Source Heat Pumps?

Outline

- Heat pumps
 - Ground Source vs. Air Source
 - Why Heat Pumps?
- How to get started as an Individual Homeowner

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

HeatSmart Recommendations

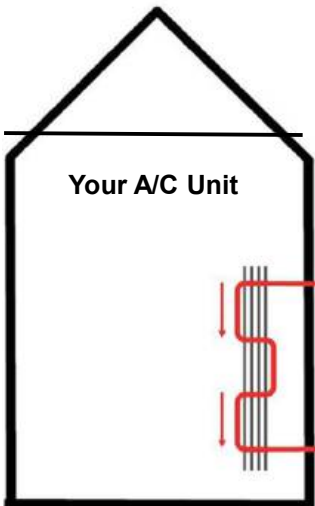
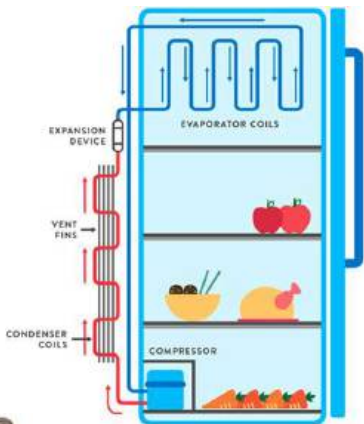
- Building Envelope:
 - Air Sealing
 - Insulation
- Space Heating/Cooling:
 - Air Source Heat Pumps
 - Ground Source Heat Pumps
- Domestic Hot Water:
 - Heat Pump Water Heaters



Heat Pumps-you already have one or two!



Your Refrigerator



But they only move heat in ONE direction!



Heat Pumps: One Technology, Multiple Applications

Air-Source



Ground-Source



Heat Pump Hot Water



November 16th, 2021



Ground-source
Heat pump

“Geothermal”



Air-source Heat pump

No ducts? No problem!

Minisplit heads



Ground Source vs. Air Source



	Air-Source	Ground-Source
Heating + Cooling		
Hot water		
Co-benefits		
Upfront cost	Similar to natural gas + A/C	~2x 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



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 (26%)
- NYS Grants + Utility rebates
- Low-interest NYS financing
- And more


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



Install
the equipment recommended by the contractor



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Program Resources



Unbiased energy advisor (Matt Corona)

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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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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What's on your mind?

Part III Hibner Family - Heat Pump Case Study


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



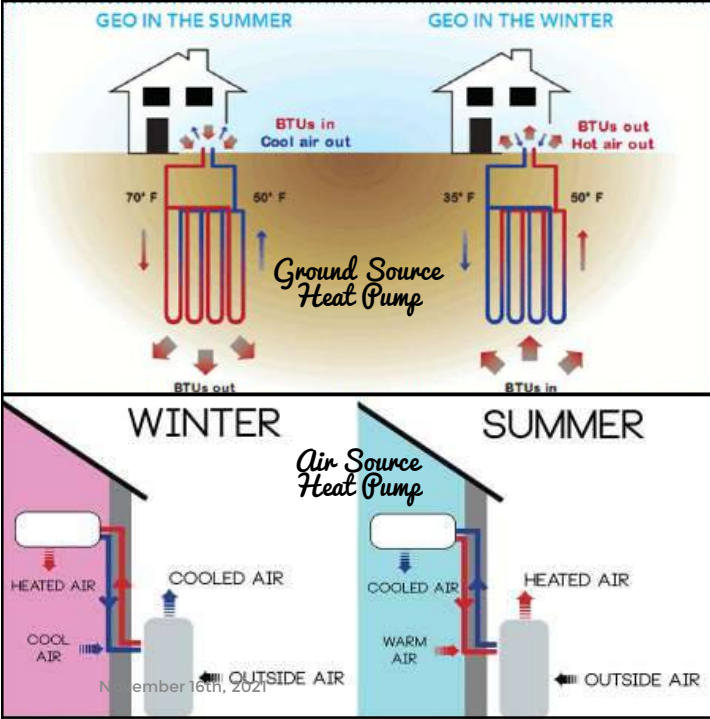
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WHO KNEW
HEAT PUMPS
WERE SO
COOL?



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Outside Air Temp
94°

Ground Loop Temp
55°

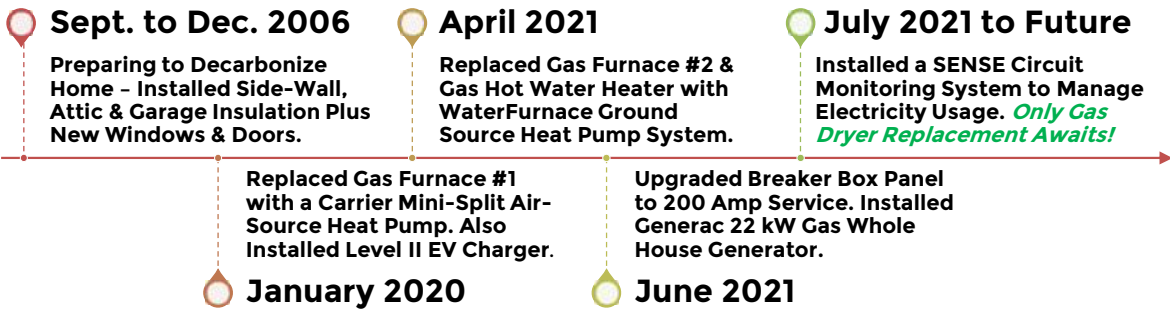
House Temp
67°

Heat Pump Case Study

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Decarbonizing Our Home - Our Path

Our-Big-Beautiful-Green-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 >>>



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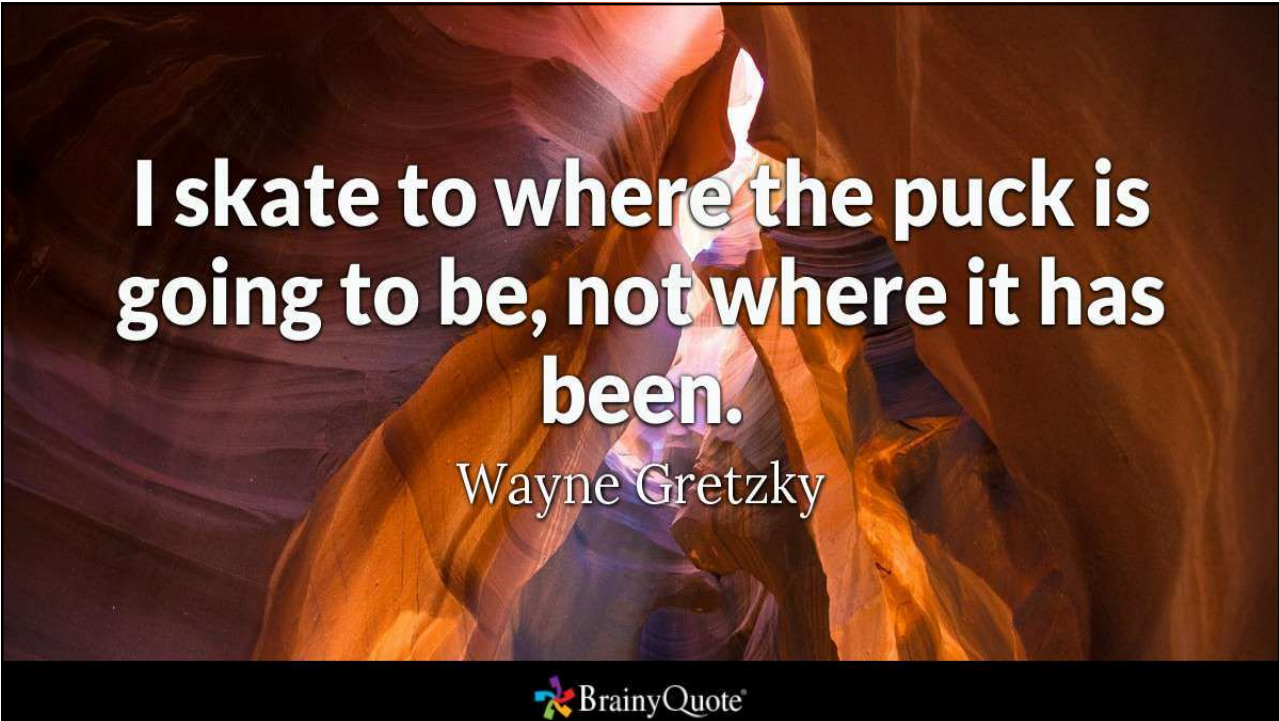


Allen Hibner
Jul 6, 2020 · 4 min

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>



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 >>>



November 16th, 2021



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 >>](#)



November 16th, 2021



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>

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. The technology senses the outside air temperature and selects the fuel source that's most cost-effective for the conditions.

In cool weather, for example, using your gas furnace may be overall, and an electric heat source may be all you need to stay comfortable. But when temperatures turn too, 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, 2021 · 3 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, 2021 · 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>



ColorPenfieldGreen.org

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

April 2021 Actions Taken

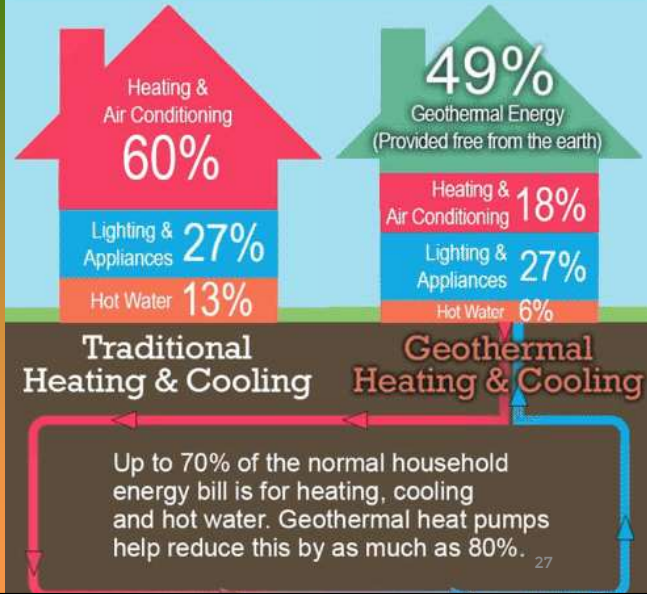
Replaced Second Gas Furnace & Gas H/W Heater by Installing:

- 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).



November 16th, 2021

Geothermal: Real Savings & How It Works



April 2021 Installed Geothermal System

Read / Watch



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

More



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

About It



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



ColorPenfieldGreen.org

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

**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 (Uses 2 Cubic Feet/Min.)
- Natural Gas Service from RG&E Left In Place ONLY for Use By Backup Generator!

November 16th, 2021

Uses 29 Therms/Day When Running 24 Hrs. Continuously

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

Appliance	Power Usage (W)
Other	246 W
Living Room Media Center	229 W
Always On	216 W
AO Smith Hybrid	102 W
AI's Office Media/PC Center	102 W
Kenmore Refrigerator	125 W

1,187 w

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

November 16th, 2021

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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Source of temperature and cooling/heating degree day - daily data information for Rochester, NY by month.

WaterFurnace Daily Electricity Usage - Screen Shots from Symphony iPhone App

**June 29th, 2021
9.18 kWh's Used That Day**

Five VERY Hot Days in June 2021:

- I recorded the TOTAL kWh used by our new WaterFurnace heat pump to cool our 2,200 square foot home EACH day during the month of June 2021 (see image above).
- I then focused on the 5 warmest days of all that month: **June 26th to June 30th**.
- The analysis that follows calculates the daily cost of electricity to cool our home for that five-day period.

NOW: Some Early Results
November 16th, 2021

Hibner Family - WaterFurnace Series 7 - A/C - kWh Usage Data Recorded
Set @ 73F Day Temp. (16 Hrs./Day) / 71F Night Temp. (8 Hrs./Day).

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	Heating Degree Days (HDD)	Cooling Degree Days (CDD-Above 65F)
6/26/2021	89	70	79.5	9.2	7.79	0.51933	\$1.01	0	15
6/27/2021	93	75	84	13.5	9.66	0.50842	\$1.26	0	19
6/28/2021	92	74	83	12.3	10.27	0.57056	\$1.34	0	18
6/29/2021	94	70	82	11.1	9.18	0.54	\$1.19	0	17
6/30/2021	85	70	77.5	6.4	8.14	0.62615	\$1.06	0	13
TOTAL					45.04		\$5.86	0	82
Average	90.6	71.8	81.2	10.5	9.008	0.5529	\$1.17		16.4
Normal	77.9	57.4	67.6						

NOW: Some Early Results
November 16th, 2021

Five VERY Hot Days in June 2021:
Our new WaterFurnace cost us \$1.17/Day to Cool 2,200 Sq. Ft. of conditioned space to 73F during the day and 71F at night. NICE!

Hibner Family - WaterFurnace Series 7 + Carrier Mini-Split - HEATING - kWh Usage Data Recorded									
Set @ 70F Day Temp. (16 Hrs./Day) / 66F Night Temp. (8 Hrs./Day).									
Date	Max Temp. Degrees F	Min Temp. Degrees F	Avg Temp. Degrees F	Departure From Normal Degrees F	SUM OF Water Furnace & Carrier HP's kWh Used	kWh Per Heating Degree Day	Heating Cost Per Day @ \$.14/kWh	Heating Degree Days (HDD Below 65F)	Cooling Degree Days (CDD-Above 65F)
11/1/2021	52	39	45.5	-1.2	9.68	0.50947	\$1.36	19	0
11/2/2021	49	34	41.5	-4.8	12.89	0.56043	\$1.80	23	0
11/3/2021	46	33	39.5	-6.5	15.8	0.632	\$2.21	25	0
11/4/2021	46	29	37.5	-8.1	16.83	0.62333	\$2.36	27	0
11/5/2021	49	30	39.5	-5.8	15.92	0.6368	\$2.23	25	0
TOTAL					71.12		\$9.25	119	0
Average	48.4	33	40.7	-5.28	14.22	0.592	\$1.99	23.8	0

NOW: Some Early Results

November 16th, 2021

Five VERY Cool Days in Nov. 2021:

Our new WaterFurnace cost us \$1.99/Day to Heat 2,200 Sq. Ft. of conditioned space to 70F during the day and 66F at night. NICE!

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- Every time you need to replace a Gas... (fill in the blank here) replace it with an ALL-ELECTRIC... (fill in the blank here).
- January 2020**
 - ✓ Old On-Wall, Inefficient Gas Furnace (In-Law Apt.)? - GONE!
 - ✓ 12,000 BTU Carrier Mini-Split Air-Source Heat Pump - INSTALLED!
 - ✓ Level II EV Charger - INSTALLED!
 - June 2020**
 - ✓ Gas - Toyota Camry HEV? - GONE!
 - ✓ 2020 Bolt EV (BEV) - PURCHASED!
 - April 2021**
 - ✓ Old Gas Furnace / Inefficient A/C Main House HVAC Unit? - GONE!
 - ✓ WaterFurnace Ground Source Heat Pump System - INSTALLED!
 - June 2021**
 - ✓ New 200 Amp - Main Panel Breaker Box & Surge Protector - INSTALLED!
 - July 2021 to Future**
 - ✓ SENSE Electric Circuit Monitoring System - INSTALLED!



November 16th, 2021

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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?

November 16th, 2021

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What's on your mind?





Town of Penfield, New York
Town of Planned Progress


Penfield is Heat-Smart!

Part IV

Penfield's Clean Heating & Cooling Community Campaign is Underway - What's Next for Brighton?

a program of



Climate Solutions Accelerator
of the Genesee-Finger Lakes Region

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NYSERDA Clean Energy Communities Program

Community Campaigns

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.

**The Town of Penfield is "In It To Win It..."
The town can earn 200 points and \$5,000 in grant monies for completing this campaign.**

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Campaign Goals

What's Next for Brighton?

- Is there a campaign in your future?
- Contact Matt Corona! 
 - matt@climategfl.org | 585-340-7047
- Become more energy efficient



Goals	Target
Campaign Participants	??
Heat pumps installed or energy saving products/services installed	??



End result:
Cleaner and greener homes in Brighton



Al Hibner

Part V Some Closing Thoughts and Lessons Learned



- I'm NOT a "Doomsday Prepper" - I'm a ***"Climate Prepper!"***
- I've BANISHED Natural Gas to the "Practice Squad..."
 - To be called up ONLY when a starting player goes down. Our shaded roof precludes Solar panels & batteries for backup.
 - I'm not letting the "perfect" be the enemy of the "good..."
- I'm NOT a "Climate Perfectionist!" We value our comfort.
 - 70 degrees in winter (not 55) / 73 degrees in summer (not 80). No compromise required here as 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!
 - This feels AMAZING! I pinch myself every day.



Al Hibner



November 16th, 2021

Part V Some Closing Thoughts and Lessons Learned

- I'm not worried about short-term ROI (5-10 years) or payback on the investment in our heat pump systems. Who cares!
- We are "aging in place" for the next couple of decades. We WILL make out like bandits over the next 20 years!
- To think that electricity and heat generated from fossil fuels will go down in price over the next 30 years or so is a fools errand. Our ROI will grow exponentially over time.
- 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 your rising costs for heating & cooling!
- Charging our Chevy Bolt EV (259 mile range) for 6.443 cents/kWh (fixed price) for the next two years means we can also laugh at your rising gasoline prices too over that time!
- Brighton residents can do the same at 4.2 cents/kWh fixed price in your CCA program for at least another year. NICE!

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Al Hibner



November 16th, 2021

Part V Some Closing Thoughts and Lessons Learned

- **REAL NEAT HEAT!**
- My WaterFurnace has 12 speeds! What does yours have?
 - Compressor and fan speeds step up or down as needed based on outside air temperature and calls for heat.
 - Variable speeds mean much greater efficiency using electricity and more savings over time.
- Air temperature at registers when running ranges from 75 to 90 degrees max.
- Runs much more frequently than our old natural gas furnace keeping air temperatures much more constant.
- Lower register temps mean that heated air does not dry out as much and humidity stays higher in winter. This greatly increases comfort levels.
- All these incredible comfort benefits without burning a single cubic foot of natural gas? That feels really good. It's PRICELESS!!!

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