**Q&A FOR APRIL 18 WEBINAR Draft 1.0 4/21/2024 (check for an update on 4/28)**



**COMPANIES INSTALLING COMMERCIAL SOLAR** Does anyone have any suggestions on companies who work on commercial buildings for solar?

  Steve Answer:   I can dig thru old records and provide names for commercial building solar installers (~3 years ago) whom my large church solicited and the subset of those who subsequently bid in Monmouth County. These installers are mostly a different group than residential solar installers who deal with small residential installations. Half these commercial installers will reject a large church as too small!

**RECORDING AND SLIDES WILL BE SHARED** Will presentation slides be shared with participants or the video recording of this presentation? Would it be possible to send me a video of the presentation ? Pats Answer: Yes. Link will be emailed for recording, slides, and Q&A

**MICROGRIDS IN NJ**  (regarding microgrid projects): How about the laws in NJ that don't let us not use PSE&G distribution system for homes?   From Matt:  New Jersey residences are "net metered” and can not provide backup power to neighbors.  However, we can invite neighbors over when our house is heated and theirs is not.   I'm hoping for a future of sharing with a neighbor, but right now I can only be an island mode with just my property.  Steve Answer: The problem is not necessarily NJ laws.  A few years ago there was a NJ-wide competition for microgrid proposals.  One project was jointly proposed by Middletown and Earle Naval Base.  The proposal was a Microgrid supporting critical Middletown buildings, fire stations, etc. all networked to Earle on wharf area of Raritan Bay, and also networked to remote Earle  area in Colts Neck, separated by several miles along a private military highway & military railroad.  JCP&L refused use of their distribution: poles, wires and transformers,....  The microgrid project became too expensive because of the need to duplicate the distribution, and the project was dropped.

**WHAT IS “ISLAND MODE” AND HOW DOES IT WORK**?  do you manually go in and out of island mode? [Applies to battery supply of electricity independent of grid] MATT WILL ANSWER LATER

**WHY NOT GO FULL EV INSTEAD OF HYBRID**?  Steve Answer: The battery is a major portion of the cost of an EV, which uses expensive large batteries for 200-300 mile range.  A plug-in hybrid uses a much lower cost battery- 10 to 15% of the size and range, and accordingly much lower cost. 30 mile range plug-in hybrid is fine for around town and halts CO2 emissions.  For longer trips, a hybrid vehicle solves range anxiety, and Matt buys offsets for his longer trips.  Steve described his Toyota Prius Prime hybrid, which currently achieved 156 miles per gallon over its 53K life (measured after a recent 3000 mile trip to southern Florida).  With return to local driving, mileage will now inch back up to the normal 160-170 mpg.  On the other hand, EV prices continue down, and # of charging stations continues up, so EVs are becoming the way to go.  MATT Answer:  Battery technology is dramatically improving ranges; better solid state batteries are coming to the market to provide  30 - 40% more range and electric vehicles are getting less and less expensive.  Total cost of EV ownership is less than an internal combustion engine.  EV carbon emissions can get to zero when charged with renewable electricity (if a homeowner has rooftop solar, or subscribes to Community Solar).   Matt then stated that "purchasing an EV is just a function of probably convincing some people in my household"

**WHAT AIR SOURCE HEAT PUMP OPTIONS ARE AVAILABLE TO TOWNHOME OWNERS?** **HOW TO INSTALL HEAT PUMPS IN TOWN HOMES** Steve's answer: Examples of Townhome restrictions include physical appearance restrictions by the condo association, and limited electrical power availability for townhomes furthest from the main power feed.  Matt's answer: it does depend upon your the rules and regulations with that town home .  If you have a small piece of roof and it has good southern solar exposure a good angle and the the town home allows it you can install a solar system.  I don't recommend installing anything that's facing north or Northwest or Northeast that's just a a waste of dollars it doesn't produce enough and doesn't have a reasonable financial return so you're looking for something that's facing east west southwest South East and ideally something that's uh as close to due South as possible. If you can install a level two charger at your town home that's good.  Sometimes multifamily properties are moving towards putting in spaces that have EV Chargers in them so you can charge and then move your car.  Some are installing DC fast Chargers which are even faster to charge and then you you can move your car .  Also your emissions can approach zero if you charge from rooftop solar, or electricity purchased from a  Community Solar project, or purchased 100% clean electricity from a third party.  Over time, you hopefully h can generate enough support in your community to advocate for a change to the rules or regulations.  You can communicate and influence the board be more forward leaning.  In addition you can galvanize a community and get them to advocate for a new feeder or a new utility upgrade to that property, or to the entire multifamily complex.  It might take a few years to get more power on site or solar on the roofs of townhouse complexes.

  Links to Previous Webinar with TOWNHOME Case Studies. [Announcement](https://climate.smiller.org/50x30/building-electrification/2023-12-21/announce-sc.html); [Recording](https://youtu.be/c1jBEAKQxXU); [Slides](https://climate.smiller.org/50x30/building-electrification/2023-12-21/Electrification%20Story%20of%2087%20Ambassador.pptx);

**HOW TO GET A HOME ENERGY PROJECT APPROVED FOR FINANCING?**

Steve answer: Many utilities supply zero or low interest loans of 7 to 10 years, with monthly payments added to the monthly utility bill.  Contractors can arrange this.  Matt answer:  I took out two separate loans: one was a 20-year loan through the Solar Company and the other was a a lone through the geothermal company.  Your cash flow analysis can estimate what you are saving immediately, and there are tax benefits.  There is a strong movement and a lot of conversation around packaging solar with heat pump (air or ground source).  Matt suggests talking to him.

**DID YOU LOOK AT DX GEOTHERMAL VS WATER COOLING LOOPS?** Great presentation!  (STEVE:  ADD BILL AMANN's LAST TALK ON TYPES OF HEAT PUMPS. See [**Energy Efficiency Meeting Materials Archive**](https://r20.rs6.net/tn.jsp?f=001KvIcwCAo7hzZgT-qLBHEHcO2rHIYUQxtp87T9m_MXny5YQzSW04uAVslqBW7K-_ODDSCT4Jxte-3FtT_jYJGeNgjcB1aEGdsDZEuk40VJpFz00FifYDHmDR0mo3-B86X6MlQMC7pPLSnTeF1yiktJrrTXn9J6MDPO7kifDGcAKcOWUBZZjGqbprB6RuvFK6pBOJZNYb6TOI=&c=dbI1xXvZVUlvEL4cGKB-gtFjMgVpduP1IBxJSwi6GX6H7opbxHvLFA==&ch=zmeFWpSJNUN3YzxSLDP5I9y-8BWKMdNeHMBtW2wm1Fg0QcCMEtXKCA==) to view following:

1. A recording of the April 18, 2024 Energy Efficiency Stakeholder meeting along with the slides used in the meeting and a Progress to Goals Report is available at the
2. See 3/21/2024 talk on heat pumps by Paul Meierdierck to the BPU Clean Energy Program (watch recording, beginning at slide 33)
3. See 2/15/l2023 EXCELLENT talk beginning slide 18, and especially slide 44 (last slide) by Matt Christie, TRW

  Matt Answer: no we we I don't think we were able to get any direct thermal (DX) Loops approved in my town, but contact me to discuss.

**COMPANIES WHO WILL BID GEOTHERMAL SYSTEMS** if I wanted to do  a ground source heat pump, how do I find companies to get estimates from? Matt answer:  I found a company through "Water Furnace"  They have various approved suppliers.  You type in your ZIP code or your address and it will show you who's close by then you can reach out to them, and they'll come to your house and do an Ashrae audit (a full audit) of your house to look at your windows, insulation, thermal exposure, heating and cooling load.  Then they will size a system that's appropriate for your house:  How many BTUs you're using in Heating and Cooling modes.  There are other  Brands  of heat pumps that you can go with and several companies to install.  I would suggest you start the process soon because a lot of areas are backed up with their Drillers.  There's a longer lead time to get the drilling done.  My best resource is Water Furnace .

**TRAINING AND PRACTICE** Hello thanks for sharing. Do you have any opportunities for training and practice?  Steve answer: local (online) "Electrification coach" training is now available from at least two sources.  Contact Steve Miller for currently trained coaches who can discuss this opportunity.  Each individual HVAC contractor typically specializes in one manufacturer which supplies training at their own training centers (Example: Mitsubishi has a new HVAC training center in NJ).    Another training opportunity is the Climate Reality Project.   Last weekend was a 3 day training in New York City.  Links to all previous webinars: <https://climate.smiller.org/50x30/building-electrification/All-heat-pump-webinars.html>

ALL Building Electrification publications: <https://climate.smiller.org/REF/>

**IS TRAINING AVAILABLE** ? Yes, there is training available here:  <https://homes.rewiringamerica.org/learning/electric-coaches>

**HOW DO HEAT PUMPS WORK?** Can you please explain how does the Heat Pump works and reduce the carbon foot print.    ANSWER:  Rewiring America.org site explains the heat pump operation.  Here's an explanation:  the heat pump is highly energy efficient.  The pump is powered by electricity and uses expansion and contraction of refrigerant gas to move heat (the heat pump does not generate the heat).  Matt's answer:  in heating mode the heat pump circulates water in the ground loop- which is an average of 55 degrees  year round.  In the winter, the heat pump is moving heat from the 55 degree ground loop into the house loop at a temperature of about 110 to 120 degree.  This 120 degree water is pumped to the attic air handler in my attic, where a fan circulates air through the attic heat exchanger.  This hot  air is then piped to my second floor and first floor.  The 120 degree hot water also loops through my baseboard heaters in my basement and my first floor so it's a combined zone system.    In summer cooling mode the heat flow reverses direction.  The attic air fan forces hot air into the heat exchanger, which heats the cool water flowing in the house water loop.  The heated  house loop water enters the heat pump, which pumps the heat from the hot water into the 55 degree circulating ground loop which moves the heat back into the ground.  Extra heat is used to keep the hot water tank heated.  There is also backup electric heating to keep the hot water in case of equipment failure.  MATT ACTION: DETERMINE HOW HOT WATER TANK IS HEATED IN SUMMER

**IS A FURNACE REQUIRED FOR BACKUP?** We have had several estimates for heat pumps.  All claimed that we need to have a furnace too, as heat pumps will not adequately heat our house in the winter.  Is that true?  STEVE answer: A heat pump  (even a cold climate heat pump) may not be able to handle a high winter energy loss (& need backup gas furnace) if  the homeowner has an older house, has NOT done an energy audit, and has not weatherized to minimize heat loss.  (There is a balancing act: a sufficiently large heat pump to handle high winter heat loss may be too large to reduce humidity in muggy summer days).  A gas furnace may also be bid if the HVAC service company has not carefully evaluated the house heat loss. In both cases, the HVAC company will specify a sufficiently large gas back up to shield themselves from future homeowner complaints. See detailed  [DISCUSSION](https://climate.smiller.org/REF/Dual-Fuel/2023-comments.html)

**CAN NOT INSTALL STORAGE BATTERIES IN GARAGE?** My town tells me I can not put batteries in my garage - they have to be outside - have you run into that?   Steve’s answer: Battery installers will have developed experience with town to town permit requirements.  Matt's Answer: his town had no problem providing a permit for battery in the garage.

**EXPLAIN BASEBOARD HEATING USING GEOTHERMAL** Can you explain a little more about your combination of baseboard and geothermal?  MATT Answer: the attic heating/cooling is described above.   I had hydronic heating before baseboard hot water.  Baseboards were retained and the ground source heat pump  puts the hot water heating through the baseboard heaters on my first floor and my basement, but NOT on my second floor.  This is a dual heating system and a single cooling system.

**HOW DOES GEOTERMAL SYSTEM HOT WATER TANK WORK IN COOLING SEASON**  MATT WILL ANSWER LATER

**CAN EXISTING AIR DUCTS BE USED WITH HEAT PUMPS?**  Also, I have forced air heating and cooling how would heat pump system affect it ? or the changes that need to go with Heat Pump upgrade? Steve Answer: Original ducts need to be evaluated for ability to provide the needed BTU heat at the lower temperature provided by a heat pump versus the higher temperature of the previous fossil fuel furnace.  MATT’s answer:  we  used the same ducts, with some enhancements, that we originally used for our original gas furnace.

**HOW TO REPLACE A GAS FIREPLACE** what options are there to replace a gas fireplace?  Steve Answer: See photos and discussion of really beautiful  synthetic fireplaces, as well as real electric heating fireplaces on page 68 of the download found at "[A Pocket Guide to All Electric Retrofits of Single Family Homes](https://www.redwoodenergy.net/research/a-pocket-guide-to-all-electric-retrofits-of-single-family-homes)"

**HOW TO FINANCE GEOTHERMAL AND SOLAR** When you financed the geothermal and solar, did you go thru the suppliers or do you recommend specific banks? Matt answered previously: “I took out two separate loans: one was a 20-year loan through the Solar Company and the other was a loan through the geothermal company.  Your cash flow analysis shows you are saving immediately, and there are tax benefits.  There is also strong movement and a lot of conversation around packaging solar with heat pump (air or ground source)”.  Matt suggests talking to him.

**REBATES AND CREDITS FOR SOLAR AND HEAT PUMPS**  Can you also please provide more information about the credits for the solar and heat pump upgrade? Both NJ and Federal. Steve Answer:  See a summary of heat pump rebates and tax credits: <https://docs.google.com/document/d/10vSXEtbjYZ3fBYhZbBahOLVxXrn82QKHkJGHGTRnvyg/edit>

Lookup exact heat pump utility rebates for your utility [here](https://energyefficiencyalliance.org/wp-content/uploads/2023/08/NJ-HP-Incentives.pdf)

Solar tax credits in NJ are described [here](https://www.energysage.com/local-data/solar-rebates-incentives/nj/#does-new-jersey-offer-solar-tax-exemptions)

2025 utility rebates (“up to” TBD) are planned to “stack” – The goal is to be simple and be the same process for the NJ resident to apply for the Federal IRA rebates, and apply for the utility rebates in 2025 in NJ

**HOW DO I ELECTRIFY RADIANT HEAT SYSTEM** Geothermal is a full metal jacket approach to decarbonization.   If we are limited in this choice, what do you recommend as perhaps an intermediate step?  We have a boiler with wall based radiant heat and that heat is the best.   Is there an electrification approach to radiant heat?  Steve’s Answer:  wait a year or two for high temperature heat pumps MATT’s answer:

**HOW TO INSTALL LEVEL 2 EV CHARGERS**: I do have EV but to get a level 2 charger has become a hassle with PSEG.  Steve Answer: Here are work-arounds, instead of trying to get permission for a larger electrical panel:

* "[Electrification of Homes Without an Electrical Service Upgrade](https://www.redwoodenergy.net/research/electrification-of-homes-without-an-electrical-service-upgrade)": appliance swapping; load-sharing devices; "Watt Diet"
* ["Watt Diet Calculator](https://www.redwoodenergy.net/watt-diet-calculator)" (calculate electrical panel remaining capacity; share circuits; calculate house heat loss)

**HEAT PUMP WATER HEATERS OPERATE ON 120 Volts (just plug in)**

            There are new 120 volt heat pump water heaters now being produced.

**WHY ARENT DEVELOPERS BUILDING ELECTRIFIED HOMES** Why aren't more developers building using these technologies?  Steve Answer: NJ residential buildings are constructed using the NJ Uniform Construction Code.  This code is based upon the International Energy Conservation Code (IECC).  Regretfully, in March 2024, the NJ Building Electrification Committee almost won, and then ultimately lost our  battle to have the 2024 IECC require new construction and rehab to prewire for full electrification, EV charging, and solar.

**WINDMILLS IN NJ?**  Do you know anyone who has a windmill in NJ? Steve Answer:  I  know of no successes.  Here are two known failed attempts:

1. Bayshore Regional Sewerage Authority, Union Beach NJ planned a 380 foot(peak) 1.5MW wind turbine, received permits, invested in concrete pads and the turbine tower, was rejected by nearby homeowners, and ultimately withdrawn as a project
2. Long Beach Island homeowner erected a smaller wind turbine and was forced to remove it by the local township.

**IRA GRANTS TO COMMUNITIES** In NYC this week, we heard how the IRA provides grants to communities for electrification, are those funds available direct to a homeowner (even if town has not applied for the IRA funds) - or best source of savings thru tax credits.  Steve Answer: As far as I know, the community must apply in order to have grant money available for a project.  See current block grant opportunities: <https://energyefficiencyalliance.org/municipal-opportunities/>  and <https://docs.google.com/spreadsheets/d/1_o7n2gm8sgcwyUjXVTUerLY2QiXNQ4-SlATswrJwBNc/edit#gid=0>

  Steve Miller has created this helpful summary document that shows 2024 and 2025 NJ and Federal rebates/incentives: <https://docs.google.com/document/d/10vSXEtbjYZ3fBYhZbBahOLVxXrn82QKHkJGHGTRnvyg/edit>

**CAN SAVE CHAT**  Hi Steve, this presentation was quite valuable. Is there a way you can turn on the option to save the chat or will you send out the chat after the call ends? Thanks, Marty

  Steve Miller answer:  Sorry, I am using a shared Zoom account.  Other users of this same account had configured chat such that it could not be copied.  I cannot change it during the Zoom call.  However, after our Zoom call, I re-configured chat so it can be copied during future webinars.

**GROUND SOURCE HEAT PUMPS**  Bill Amann also gave a presentation about various types of ground source heat pumps today at the Clean Energy Stakeholders meeting hosted by the BPU. If you want to dive deeper, here are the slides and recording: STEVE CHECK <https://njcleanenergy.com/committees/energy-efficiency/archive>

**DETAILS OF MATT’S GROUND SOURCE SYSTEM**  Matt, It sounds like you have a closed loop system. Have you found it helpful to add other chemicals to your water to increase the thermal load this liquid can carry?  MATT- ANSWER

Did you have to replace your hydronic registers? I didn't think the geothermal system could heat the water enough through the older style heat registers  MATT ANSWER

**ACCOLADES**  thank you!!; Many ThX!!; Thank you!!!; Thanks for all the great information!; thank you this was excellent!; Thanks, Matt! Great data on your slides!; That was an awesome presentation thank you; Thank you so very much!; Thank you so much;  Thank you for interesting presentation and questions after.

