

## Bristol Energy Committee

April 17, 2024 Meeting Notes

Meet at 7:00pm in the Holley Hall Conference Room and by Zoom

Town of Bristol is inviting you to a scheduled Zoom meeting.

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Meeting ID: 836 8134 7139

Passcode: 624907

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Attendees: Ben Skolozdra (BEC via Zoom), Jared Rodriguez (Member of the Public), Debbie New (Member of the Public), David Flaschenriem (BEC), Carl Engvall (BEC), Richard Butz (BEC via Zoom), Allison Pouliot (BEC via Zoom), Sally Burrell (BEC via Zoom), Jim Quaglino (Member of the Public via Zoom), Patricia Hunt (Member of the Public via Zoom), Ian Albinson (Bristol Selectboard Member via Zoom), John Pickens (Member of the Public via Zoom)

1. Citizen Comments/Concerns
  - a. None
2. Approve March 2024 meeting minutes: [Bristol Energy Committee Meeting Minutes 3.20.2024.odt](#)
  - a. Approved
3. Approve agenda
  - a. Approved
4. Jared Rodriguez and Debbie New give a TEN's intro with Q&A.  
[TEN - Gmail - Announcing a New Toolkit\\_How to Develop a Thermal Energy Network.pdf](#)
  - a. Purpose of this presentation is to think broadly about TENs and more specifically how they could be used in Bristol using ground source heat pumps and other distributed heat capture technology.
  - b. Ground Source Heat Pumps – use water instead of air for convection.
  - c. The concept is that the hot and cold cycle of the GSHP uses water as the medium to reject or extract heat.
  - d. GSHP is about the depth of a typical residential water well.
  - e. Use GSHPs to link different buildings together with distributed piping, balancing thermal loads is big benefit.
  - f. TENs are safe and clean: only water as the heat transfer (no explosions, emissions, dangerous leaks)
  - g. Generally affordable and reliable after initial installation.

- h. Flexible and non-invasive (no aesthetic issues). Less vulnerable because they're underground
- i. Equitable: not a house-specific infrastructure. It's distributed to across the community
- j. Installation and maintenance requirements have commonality and overlap with existing fossil fuel company activities. Plumbers and construction experts are needed.
- k. Heat pumps and pipes are typical for residential heating systems.
- l. Champlain College has a system of GSHPs in a network. Retrofit system in operation since 2008. Another system in place is at Hula in Burlington, retrofit system in operation since 2021. In general, there are systems across the state that are installed and being considered.
- m. There are non-VT applications for this type of system in smaller rural communities, e.g. West Union, IA.
- n. Another source of heat: wastewater. This heat can be captured in winter and rejected to in the summer.
- o. Another source of heat: waste heat. Buildings generate heat through a variety of means (for example, a refrigerator). Other larger industrial operations can have cooling towers that reject heat to the atmosphere.
- p. A Thermal Energy Network can be considered a blend of multiple things: waste heat rejection, wastewater heat extraction, and GSHPs all connected to the same distributed piping system.
- q. TENs are not a silver bullet. House-by-house air source heat pumps are a crucial tool to rapidly expand along with TENs.
- r. Financing thermal energy networks is a challenge. Federal funding exists through some programs, in particular the Inflation Reduction Act (30% tax incentive off the top, for example). Other opportunities exist at the state and local level (such as a local or regional utility) using the rate payer utility model similar to municipal electricity and water utilities.
- s. Policy shift is needed in Montpelier. H.669/S.252/S.305. Thermal Energy Networks Act authorizes municipalities to set up TENs, along with co-ops and businesses. Municipalities are great candidates for this legislation because most already operate some degree of distributed utility infrastructure for water, wastewater, etc. S.305 would be a "green light" for Vermont to go forward with TENs.
- t. Question from Carl: instead of vertical piping, can they go horizontally/shallow? Answer: yes, if adequate space is available.
- u. Question from David: what is the longest practical distance from a GSHP well to the last user on the loop/network? In Bristol, it may be most practical to build smaller clusters first and then build them out from there to eventually connect

together as more users connect to the system. Answer: it depends on how many users and how far apart they are but there could be a situation where a set of 3 or more smaller island systems are slowly honeycombed outward to eventually fully interconnect with each other.

- v. Question from Ian: how to assess the waste heat coming from a building?  
Answer: if the building owner or business operator is not willing to discuss energy usage directly, it can be reasonably estimated by a square footage calculation based on the size of the grocery store or school and what type of equipment can be expected to be in use, for example.
- w. Question from Ian: what infrastructure is needed for heat capture? Answer: compressor/condenser that gets cut into an existing waste heat system (LG hydro kit is an industry example of what can be installed). If there is a cooling tower in Bristol somewhere (unlikely), a water-to-water heat exchanger can be installed. There are other considerations with potential capital improvements at the existing systems, lots of timing considerations.
- x. Question from Jim: If connecting different areas together creates the need to demolish existing infrastructure, it could create additional costs and complications during construction. Answer: Certainly this is a potential but with proper timing, planning, and coordination the impacts to existing infrastructure that needs to be modified can be minimized.
- y. Main Street seems like a prime candidate for something like this. Several water users (restaurants and the laundromat) with offices and apartments above, Shaw's nearby, Bristol Beverage nearby, etc.
- z. Other small areas that could be TENs: Bristol Works, Mount Abe Union High School, Firehouse Drive area
  - aa. The town is already a utility for water in the village area. TEN could become a town owned and operated utility. Is it more efficient for each private entity to operate on its own or would the town being the overarching supplier/utility manager be better? Answer: similar concept to the water utility model. The economics of collectively sharing water as a community resource using the utility model are strong. The economic principles are consistent with other types of municipally-sourced infrastructure.
  - bb. How to scale up with a TEN? It's a lot like an electrical utility. It takes good planning, both from an infrastructure angle and a municipality planning commission angle. If the municipality is ready to fully commit and go for it, educated inferences about long term expandability planning should be built into the initial design for the system(s).
  - cc. There are ways to help alleviate the burden of responsibility on the municipalities; co-ops and private businesses that can help bring these TENs online for future

transfer to municipal operations. Spin offs of different elements of the TEN can be considered.

- dd. As with most things in Vermont, there has to be political will and political inertia locally to make the TEN concept functional and realistic.
  - ee. Question: who are the community members that can bring these things to the forefront? Answer: initial interest typically comes from energy committees. However, there are other avenues (town employees, selectboard members, private landowners, regional planning commissioners) where that motivation can come from to start these projects.
  - ff. As with most things, it is hard to determine a ROI before knowing what the acceptable ROI is for a project. Most lenders want 12-15% in general. The range is very dependent on specific factors on a per-project basis. Bristol ROI would theoretically higher than places with NG (Bristol has no NG) where the TEN would compete with NG rates.
  - gg. Starting point for Bristol: ask interested building owners to evaluate a map of the town? It is one way to go, that has been done in other towns. Use the workshop model with local people to conceptually design the system with local input. Two workshop format: first one is high level and second gets into the details to determine feasibility and financing avenues.
  - hh. Are there studies on environmental impacts on existing systems? Seems like the biggest issue in VT is on cooling the ground too much and freezing resources. Existing power generation systems reject heat into surface water: this is very bad for the environment. Glycol based systems that leak can have adverse impacts. Any refrigerant leak is not good.
  - ii. Good long term planning should be considered: you can always put more and larger pipes in the ground if the ground is opened up rather than opening it up more than once to expand the network.
  - jj. Jared and Debbie are open to helping us host a community-wide workshop and for whatever comes next and what works best for Bristol.
  - kk. Thanks to Debbie and Jared for their time and detailed presentation!
5. MERP Report - [MERP Level II Energy Assessment Report Bristol Library DRAFT 2024-04-11 .pdf](#)
- a. No update beyond the draft of the Library report from Dubois & King.
  - b. Consensus is to move the conversation for all of the MERP items to a time after we have all the reports.
  - c. Library Update from Ian Albinson
    - i. Dave from Champlain Valley Heating and Plumbing met with Ian, Val, and the library staff. Dave thinks ventilation and an ERV/HRV would require visible ductwork (not aesthetically pleasing). He did, however, suggest a system that would not require as much ductwork. Not as

efficient but could be more aesthetically pleasing in the upstairs and downstairs areas. There are other industry-specific heat exchangers that could be put in strategic wall locations.

- ii. Mini split AC/heat pumps would be the best solution, in Dave's opinion. This could replace the boiler (MERP draft report states something similar). There are a few locations upstairs and one downstairs that could work. Potential to replace the old oil boiler and oil tank with a propane boiler and put a propane tank outside (saves footprint inside the building).
- iii. Big consideration with anything MERP related: how much will the funding be?
- iv. Heat pumps in the library have the best payback in the draft MERP report in conjunction with the oil boiler.
- v. There is a concern with efficiency of mini split heat pumps at certain low temperatures. The best solution is probably a combination of envelope updates, mini split units, and a new energy efficient propane boiler.
- vi. CVHP was engaged perhaps a bit early (before the MERP report has been finalized) but it serves as a good exercise to see what is feasible and what the Selectboard might want to do even if MERP funding is murky.
- vii. Something to remember: library staff have made it clear that the upstairs is the coldest part of the library while the downstairs is generally warm enough. The lived experience of the day-to-day library occupants can inform us greatly on what to prioritize.

6. Update on Geothermal System for Bristol Schools

- a. Due to the length and depth of the discussion of TENs and the Library, this topic has been moved to the next meeting.

7. Other business?

- a. N/A

ADJOURNED 8:35pm ET. Next meeting: 15 May 2024, 7pm ET