

Presentation on District Energy

Vermont Climate Council

7.13.22





About Burlington Electric Department (BED)

- Burlington's municipal electric utility
 - Public Power since 1905
 - 118 employees, including the McNeil Generating Station
 - Third-largest electric utility in Vermont
- 21,000+ customers
 - 17,282 residential, 3,983 commercial and industrial
 - 5,500-6,000 residential accounts turn over each year
- Renewable Energy and Innovation :
 - Summer peak: ~65 MW; Annual energy Use: ~330,000 MWH
 - McNeil is the largest energy producer in Vermont with Vermont Yankee Retirement
 - 100% of power from renewable generation as of 2014
 - No rate increase from 2009-2021; first rate change in FY22 due to pandemic; FY23 rate change – 3.95% proposed
 - BED is working with the City of Burlington on implementing the ambitious Net Zero Energy 2030 Roadmap





About the McNeil Generating Station

- ❑ **Jointly Owned by Vermont Utilities** - Jointly Owned by Burlington Electric Department (50%), Green Mountain Power (31%), and Vermont Public Power Supply Authority (19%). Built in the 1980's under Mayor Bernie Sanders to replace the Moran coal plant.
- ❑ **Jobs and Economic Impacts** - Third-party analysis from 2019 indicated McNeil supported 80 jobs (both direct at the plant, and in wood supply chain), with \$4.5 million in annual wages. The analysis showed McNeil provides nearly \$50 million in annual economic impact in Vermont, and that McNeil wood purchases in that year included wood from lands in 8 Vermont counties.
- ❑ **Renewable Energy** - Unique for a renewable generator, McNeil can store fuel on-site and be dispatched based on market pricing signals. Can run 24/7 during the winter to reduce the ISO-New England region's overreliance on fossil fuels during that high-price time of year. McNeil was able to store a full winter wood supply for 21-22, a period of high cost and where ISO-NE had reliability concerns.
- ❑ **Air Emissions Reductions** - In 2008, McNeil installed a Regenerative Selective Catalytic Reduction system, reducing nitrogen oxide emissions to levels well below state requirements. McNeil's particulate emissions are also below state and federal requirements.





About the McNeil Generating Station (continued)

- **Sustainable Forestry** - McNeil employs four professional foresters to monitor harvests and maintain sustainable wood supply. Recent data indicates that 76% of our harvests occurred on lands covered by State-approved Use Value Management Plans, and 95% of our harvests were developed under U.S. Forest Service guidelines. By providing a market for lower-value residues, the McNeil Station allows landowners to follow their forest management plans and keep lands as working lands, instead of developing them and reducing carbon sequestration. McNeil also operates a popular waste wood yard, for residents to dispose of untreated wood that can be used at the plant instead of landfilled. Wood ash from McNeil is used as a soil conditioner, and heavier ash for road projects.
- **Harvest** - In 2019, the annual growth of Vermont forests was three million green tons per year. Total yearly harvests for all forest products was approximately 50% of the annual growth, leaving the other 50% to continue adding to the state's total above ground stored biomass. In 2019, McNeil wood residue usage accounted for 8% of all Vermont harvests and 4% of the state's annual growth.
- **Innovation** – McNeil will be host to a new solar research facility, in partnership with UVM and supported by Senator Sanders. Considering battery storage at the plant as well.





Background on District Energy System (DES) in Burlington

- **What is district energy?** – District energy in Burlington is the idea of capturing waste heat and additional steam from the McNeil plant, and transporting it underground (via steam or hot water pipes) to be utilized for thermal energy at large buildings, such as UVM Medical Center (UVMHC) or UVM.
- **Why is it important for Burlington?** – McNeil was designed to accommodate district energy, and the project would turn McNeil into a combined heat and power plant, moderately improving efficiency. For Burlington, district energy was identified as one of four key pathways in Burlington’s 2019 Net Zero Energy Roadmap, and is projected to help reduce commercial sector natural gas emissions by 11.5% or more in the City. It is the single-biggest step we can take to address emissions in that sector.



Background on District Energy System (DES) in Burlington

- ❑ McNeil Generating Station state permit (first issued in **1981**) included language referring to plant's capabilities to support a DES specifically for UVM and UVMCMC.
- ❑ Feasibility studies were completed in **1994, 1996, 1998, 2002, and 2014**, but there never was agreement to move beyond feasibility to Phase 2 detailed engineering work for any of those efforts.
- ❑ **2014** – Mayor Miro Weinberger tasked BED with determining once and for all if Burlington would be able to advance a DES and explaining why such a project could or could not move forward.
- ❑ **2016** –BED, VGS, UVM, UVMCMC, CityPlace partnered with Corix Utilities through MOU on new feasibility study.
- ❑ **June 2017** – Corix released feasibility study showing DES cost-competitive on lifecycle basis at high level with Business As Usual Case (including fuel, maintenance, capital/reserves for thermal systems).



Background on District Energy System (DES) in Burlington (continued)

- ❑ **2017/2018** – Corix discussions with potential customers on letter of intent; City Council voted to approved filing with Public Utility Commission (PUC) for declaratory ruling on local rate regulation of DES (PUC approves).
- ❑ **2018/2019** legislative sessions – BED sought and received authority to use Thermal Energy Process Fuel (TEPF) funds to support district energy feasibility work (Act 102 of 2018 and Act 31 of 2019).
- ❑ **Summer 2018** – despite serious discussions, customers were unwilling to sign letter of intent with Corix.
- ❑ **Winter/Springer 2019** – Corix MOU expired, BED and VGS began phase 1 feasibility work with Ever-Green Energy.



Moving Forward with Ever-Green Energy

- **Follow-up** - BED had discussions with key potential customers and partners – UVMMC, VGS, UVM, and CityPlace in late 2018 and early 2019 to assess whether DES remained viable.
- **Re-Engagement with Ever-Green** – Based on those discussions, BED and VGS engaged with Ever-Green (which had studied DES in Burlington in 2014) to conduct a revised feasibility analysis focused on bringing steam system to UVMMC, and a second scenario that would include UVM buildings.
- **Ever-Green analysis** – Ever-Green Phase 1 analysis found that the optimal approach is to take steam to UVMMC and focus on a smaller district system, cutting project cost from \$40 million to approximately \$16 million at that time. The steam system is less complex to integrate with UVMMC existing system.



District Energy Historic Progress – Phase 2

- **Phase 2 February 2020** – In an historic moment for district energy, for the first-time ever, the key partners to the project – The City of Burlington, BED, VGS, Ever-Green Energy, UVMCM- agreed to advance beyond initial feasibility to a Phase 2 involving:
 - Conducting street-level engineering analysis, examine rights of way, and coordinate with Burlington’s Department of Public Works to explore potential synergies between DES and planned street work;
 - Refining the economic analysis, review available incentives and grants, and develop a final DES cost estimate;
 - Including in the economic modeling a proposed revenue structure to compensate the McNeil joint owners for the production and sale of thermal energy;
 - Examining multiple regulatory, financing, and ownership structures to determine which model would provide the greatest benefit, as well as appropriate operational and financial risk mitigation; and
 - Analyzing operational protocols for dispatch and integration of McNeil thermal energy and the existing UVMCM thermal system to ensure the reliability of a DES.



District Energy Historic Progress – Phase 3

- **Phase 3 Feb. 2021** – In another milestone, the key partners to the project – The City of Burlington, BED, VGS, Ever-Green Energy, UVMCC - agreed to advance the project to Phase 3 analysis.
- **Innovative model** - Phase 2 resulted in the creation of an innovative model for district energy, separating physical energy delivery (steam) costs for customers from the purchase of Burlington District Energy Renewable Thermal Credits (RTCs) representing the environmental attributes. This approach is modeled on community solar projects, and would allow any VGS customer in Burlington to purchase District Energy RTCs regardless of whether they are physically connected to the steam system, just like they currently can purchase Renewable Natural Gas (RNG) through a voluntary tariff on their bill. Phase 2 also found costs for the project increasing (from est. \$16 million to \$24 million), and found ways to increase carbon reduction from the project. This included adding an electric boiler as a supplementary renewable steam source that could run during times when McNeil was offline and/or during times of excess renewable capacity on grid.
- **Phase 3** work was to include identifying grant funding to support the project, test run at McNeil for district energy operational feasibility, developing thermal energy agreements for the various parties, and additional engineering work.
- <https://www.burlingtonvt.gov/Press/mayor-miro-weinberger-burlington-electric-department-vgs-uvm-medical-center-ever-green-energy>

Burlington District Energy System - Contracting Approach

Working Concept: February 2021

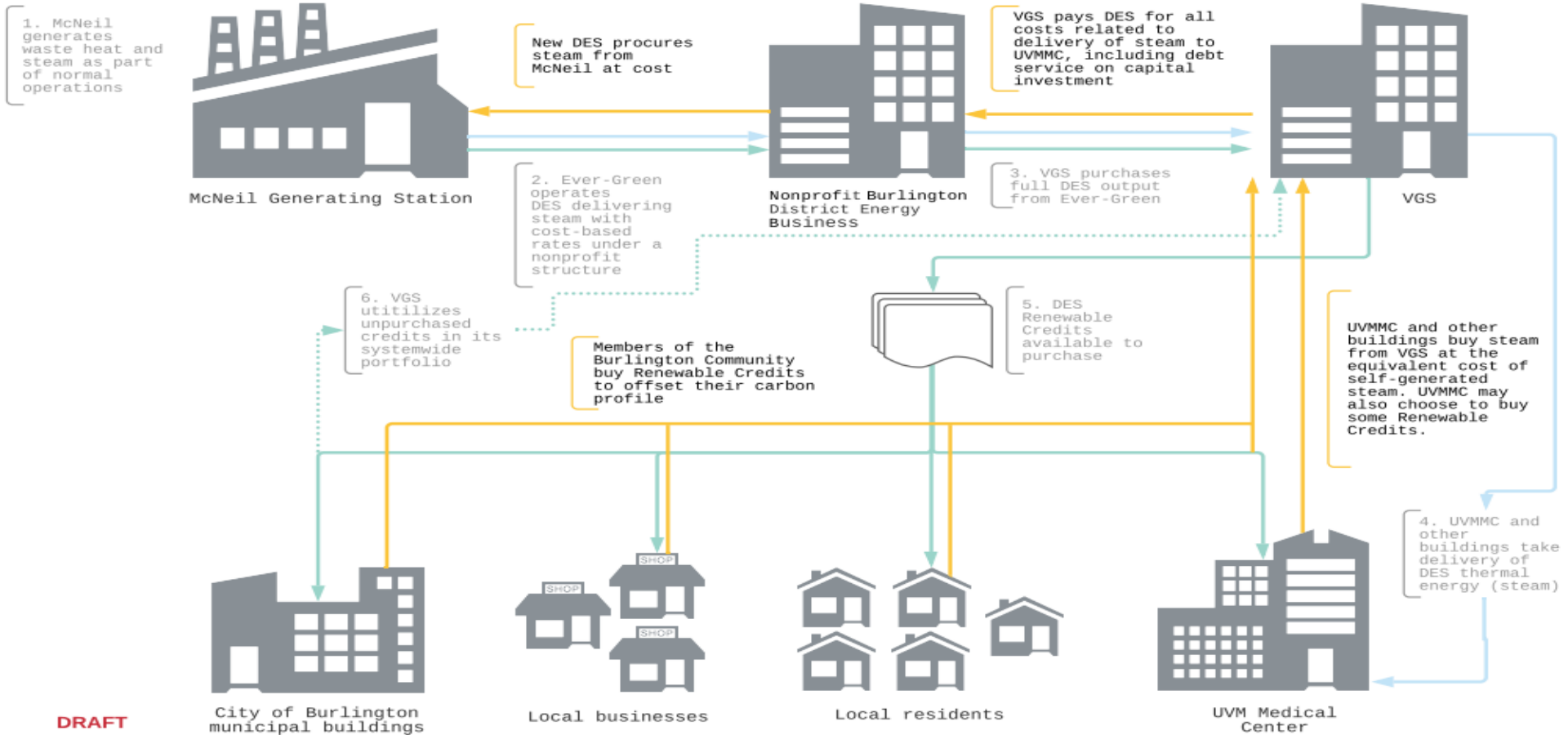
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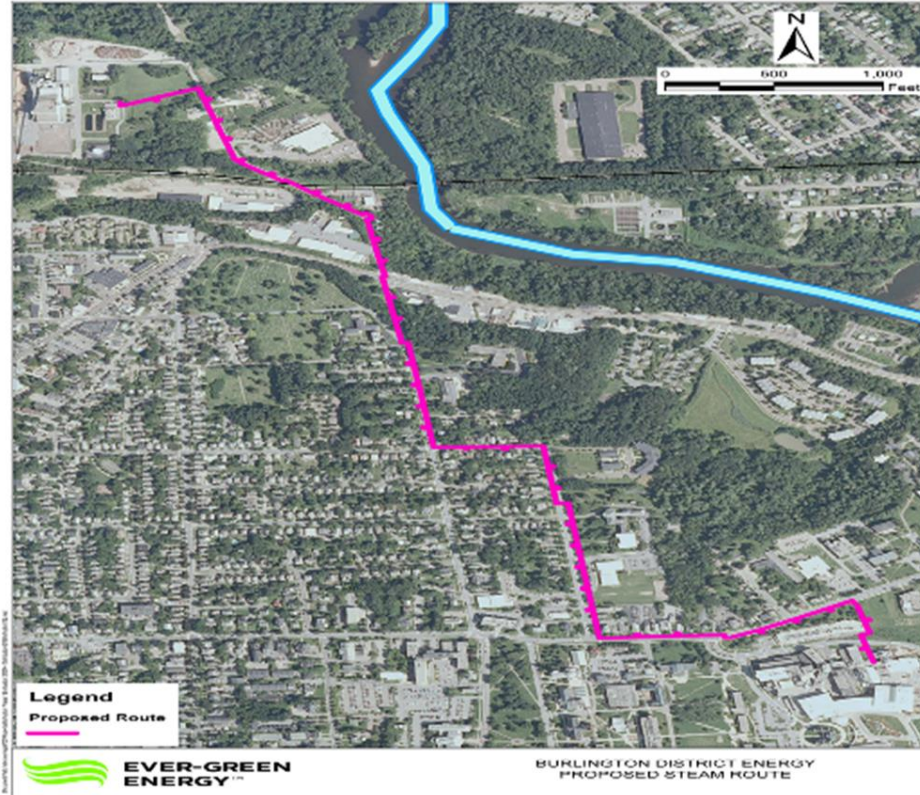
DES: District Energy System

— Thermal Energy (Steam) —>

— DES Renewable Credit —>

← Contracting







District Energy Historic Progress – 2022

- **Phase 3 complete** – The partners completed Phase 3 work, including a successful McNeil operational test, developing thermal energy agreements, completing third-party engineering review, and updating pricing for the project.
- **Senator Leahy Funding** – In March of 2022, appropriations legislation was enacted that included \$5.16 million for district energy from Senator Leahy, which the Burlington City Council has since unanimously voted to accept. The Council also passed a Resolution in 2022 to support creation of a 501 (c)(3) entity to be run by Ever-Green that would develop and operate the district energy system. BED has also applied for additional competitive federal funds and that application is still pending.
- **Letter Agreement** – In June, 2022, BED, VGS, Ever-Green Energy, the City of Burlington, UVM, UVMMC, and the Intervale Center signed a letter agreement to guide additional development work during 2022. The project has strong support, but also faces certain headwinds due to the broader economic context, including rising interest rates for financing, volatile energy markets, and rising construction costs. Ultimately, there has to be buyers for the RTCs to support project financing. The partners hope to make a decision on a GO/NO GO in late 2022 or early 2023.



Thank you!

Questions?

- Darren Springer, General Manager, Burlington Electric Department
- Neale Lunderville, President and CEO, VGS
- Michael Ahern, VP, Ever-Green Energy
- Betsy Lesnikoski, Chief Forester, BED and McNeil Generating Station
- James Gibbons, Director of Policy & Planning, Burlington Electric Department
- Paul Pikna, Senior Generation Engineer, BED and McNeil Generating Station