CITY OF DOVER, NEW HAMPSHIRE

Citywide Resilience Plan

Resiliency for All

Citywide Resilience Plan

Resiliency for All

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Section 1: Introduction to Dover's Resiliency 1
Mission Statement 1
Definition of Key Terms 1
Executive Summary 2
Examples of the City's Progress 2
Section 2: Community Initiatives 3
Resilient Dover Outreach 3
Potential of Dover Community Power 9
Commercial Property Assessed Clean Energy 12
Resilient Food Systems 14
Section 3: Municipal Resiliency Projects 16
Overview of Municipal Energy Use 16
Energy Efficiency and Conservation 21
Integration of Heat Pumps 25
Municipal Solar Expansion 29
EVSE Expansion (Municipal and Public) 35
Forest and Ecosystem Management 41
Section 4: Plan for Council Objectives & Implementation Strategy 47
Relation to Council Goals 47
Summary of Next Steps 48
Implementation Table 51

List of Tables

Table 1. Comparison between default electricity usage and total usage per rate class for Dover. 10
Table 2. Examples of renewable and energy efficiency technologies that qualify for PACE. 13
Table 3. Actions Dover could consider taking to reduce single-use plastic waste. 15
Table 4. NHSaves program advantages summarized from the 2022 - 2023 New Hampshire Statewide Energy Efficiency Plan. 21
Table 5. EE improvements ranked by estimated household savings based on findings from the USDOE. .. 23
Table 6. Comparison of NH Fuel prices using December, 2022 data from the New Hampshire Department of Energy. 26
Table 7. Site characteristic table for the Library and McConnell Center parking lot. 36
Table 8. Site characteristics for the Henry Law parking area. 37
Table 9. Site characteristics for the Ice Arena, Jenny Thompson Pool and to skate park. 38
Table 10. Site characteristics for the parking area to be constructed as part of the Waterfront Development. 39
Table 11. Conservation lands monitored in 2022 by the Dover Open Lands Committee. 43
Table 12. Major recommendations and associated goals identified in the Forest Stewardship Plan. 46
Table 13. Connection between core subsections of the Plan and the 2022 - 2023 City Council Goals. 47

List of Figures

Figure 1. Default community and municipal aggregate electricity usage. Industrial, commercial, residential and outdoor lighting data are from calendar year 2020. Outdoor lighting is not displayed as it makes up only 0.004% of the total usage but it is incorporated into the 118,384 MWH value. Municipal usage (includes schools) is estimated from historical data as it was not provided by Eversource. 10
Figure 2. Monthly municipal purchased electricity usage between January 2018 and December 2021. Annual totals are listed in MWH for the represented years. Displayed dates indicate the start date for the usage month. 16
Figure 3. Total municipal electricity usage as a function of calendar year between 2016 and 2021. A P-value of 0.007 is below the 0.05 threshold indicating that the reduction over time is statistically significant. 17
Figure 4. Seasonal variability in municipal natural gas consumption between January 2018 and December 2021. Displayed dates indicate the start date for the usage month. 18
Figure 5. Annual municipal natural gas usage between 2016 and 2021 normalized by the number of heating degree days (HDD) that occurred in each year. 19
Figure 6. Timeseries of average monthly NH natural gas delivery rates between January 2016 and October 2022. 20
Figure 7. US Department of Energy explanatory graphic for how air source heat pumps operate. 25
Figure 8. Comparison of heating efficiencies between various common NH heating sources. 27
Figure 9. Comparison of cooling efficiencies between typical cooling methods. 28
Figure 10. Projected theoretical 3 MW and 1.5 MW solar array electricity outputs contrasted with three-year averaged electricity consumption data for the WWTF. 30
Figure 11. Projected theoretical 0.8 MW rooftop solar array electricity output contrasted with three-year averaged electricity consumption data for the WWTF. 32
Figure 12. The difference in AC power between historical consumption and projected solar output. A positive delta (purple) indicates excess monthly production. A negative delta highlights when historically averaged consumption exceeds projected generation. 33

Section 1: Introduction to Dover's Resiliency

Mission Statement

Resilience is the City of Dover's ability as an entire community to respond to adversity in the face of environmental, social and economic stressors. The core purpose of the Citywide Resilience Plan (Plan) is to publicly establish a work plan for the City to equitably increase its' resiliency, in fiscally responsible ways, across a variety of categories including public outreach, energy, food systems and ecosystem management. Emphasis is placed on items pertaining to the City Council Goals and the role the Planning and Community Development Department plays in supporting the work of citizen led bodies such as the Conservation Commission, Energy Commission and Open Lands Committee.

Definitions of Key Terms

Coefficient of Performance: The relationship between the power that is drawn out of the heat pump as cooling or heat, and the power supplied to the compressor.

Degree Day: Degree days assume that when the outside temperature is 65°F no heating or cooling is necessary for comfort in buildings. Degree days are the difference between the daily temperature mean and 65°F.

Energy Conservation: Measures taken to reduce energy consumption through methods like behavioral changes.

Energy Efficiency: Technical performance of technologies and processes that allow for the same task to be completed using less overall energy.

Electric Vehicle Supply Equipment: An electric component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles by permitting the transfer of electric energy to a battery or other storage device in an electric vehicle.

Heating Degree Days (HDD): Are degree days where the mean temperature is below 65°F.

Executive Summary

To Be Inserted

Examples of the City's Progress

In 2021 the NH Coastal Adaptation Workgroup with support from the National League of Cities' 2021 Leadership in Community Grant, the Piscataqua Region Estuaries Partnership and the Great Bay Stewards funded the Dover Path to Resilience Project. This led to the creation of timeline by consultant EF | Design & Planning LLC with assistance from the City of Dover, NH staff and residents. The timeline captures major climate resiliency efforts the City has undertaken from 2014 through 2021 and includes links to more information for the majority of listed projects and actions. Next steps identified in the timeline include the creation of this plan. Since the posting of this timeline the City's Resilience Coordinator has since been promoted to Resilience Manager.

Section 2: Community Initiatives

Resilient Dover Outreach

A major component of the Resilient Dover initiative is outreach and public engagement. The Resilient Dover web page serves as the main outlet for which updates and resources are made available to the public. The web page is currently broken up into five subpages: **Climate Resources, Path to Resilience, Citywide Resilience Plan, Green Tips and Community Power**. Descriptions of those pages are provided blow:

CLIMATE RESOURCES

- This page is the result of a collaborative effort between UNH Extension, NH Sea Grant, Strafford Regional Planning Commission and an ad-hoc climate forum planning committee comprised of members of the Conservation Commission, Energy Commission and Planning Board. The team received staff support from the then Resilience Coordinator.
- In preparation for hosting a Climate Resources Forum, the project team reviewed and grouped major climate resource documents released over the last decade or so into the following categories: *Energy Consumption and Emissions Reports, Risk & Vulnerability Assessment, Resilience Planning, Conservation, and NH Coastal Flood Risk Summary.*
- In addition to the categorization process, two-page fact sheets for each resource and category videos were produced to help make the resources more accessible to the public, City Officials and City Staff. That information is housed in this Climate Resources page.
- The Climate Resources page will be updated overtime to incorporate resources released following the work of the Climate Forum Planning Committee.

PATH TO RESILIENCE

- This page houses the result of the Path to Resilience project that was completed in parallel with the work of the Climate Forum Planning Committee.
- The Path to Resilience is an interactive timeline that documents the City's various efforts since 2014 to become a more resilient community.

- The Path to Resilience project was produced by EF | Design and Planning, LLC and funded by the National League of Cities' 2021 Leadership in Community Grant, the Piscataqua Region Estuaries Partnership, and the Great Bay Stewards.

CITYWIDE RESILIENCE PLAN

- This page will be the landing page for this document as well as a description of the process for its production and associated contact information to field questions.

GREEN TIPS

- This page houses the City's "Green Tips" which are one page handout meant to help citizens make informed decisions with regarding subjects such as home energy awareness, residential solar and composting.
- The Outreach Coordinator will continue to produce Green Tips with content support from the City's Resilience Manager.
- Three recent Green Tips are presented in the following pages:

COMMUNITY POWER

- The Community Power page is where information can be accessed pertaining to the development of the proposed Dover Community Power Program.
- The page contains an overview of Community Power, the blueprint for the program known as the Electric Aggregation Plan, an informational video from the Energy Commission and Resilience Manager as well as a description of the planning process to date.
- Please see the following *Potential of Dover Community Power* section for more details on the proposed program.

ENERGY AWARENESS

Resilient Dover has gathered these tips for residents interested in reducing their energy consumption at home.

 Turn off lights when leaving a room.	 Unplug devices when not in use.	 Use LED lights.
 Use a power strip.	 Wash clothes at a cold temperature.	 Use insulating window treatments.
 Keep vents and radiators unobstructed.	 Turn off faucets when not needed.	 Update to energy efficient appliances.

Resilient Dover

CONSIDERING SOLAR?

Resilient Dover has gathered this list of resources to assist with your decision.

Topics from the GW Solar Institute

- **Choosing a Solar Installer**- vimeo.com/226367124
- **Rooftop Solar Financing 101**- vimeo.com/225889178
- **Will Solar Save You Money?**- vimeo.com/227971207

Homeowner's Guide to Solar Financing

- **Clean Energy States Alliance's Homeowner's Guide-** bit.ly/CESASolarFinancing

Recommended Pricing and Vendor Comparison Tools

- **EnergySage Solar Cost Estimates and Comparisons-** bit.ly/PanelCost
- **SolarReviews Solar Cost Estimates and Comparisons**- solarreviews.com

City of Dover Property Tax Exemption

- **City of Dover Solar Energy Systems Exemption Application**- bit.ly/DoverTaxExemption
- **Revised Statutes Annotated (RSA)**- bit.ly/RSASolar

Residential New Hampshire Rebate Program

- **NH Residential Renewable Electrical Generation Rebate Program Information-** bit.ly/NHRebateProgram

Federal Solar Tax Credit

- **Federal Solar Investment Tax Credit Information-** bit.ly/FederalTaxCreditInfo

Energy Production and Cost Estimate Tool

- **National Renewable Energy Laboratory Cost and Energy Production Calculator-** pvwatts.nrel.gov

Resilient Dover

COMPOSTING IN DOVER

Resilient Dover has gathered this information for residents interested in composting at home.

Drop Off

The City of Dover's Recycling Center at 265 Mast Road provides a bin at no-cost for residents to drop off their compost materials.

The 64-gallon tote is located at the Recycling Center between the corrugated cardboard bin and the used book building. It is available for resident drop-off anytime the Recycling Center is open.

For hours and information, visit bit.ly/Dover-Composting.

Residential Services

There are residential compost services that cover the Dover area that include delivering a compost bin for compost collection and pick-up of compost materials at your residence on a frequency of your choosing.

You can learn more about these services available in Dover here:
mrfoxcomposting.com
citycompost.com

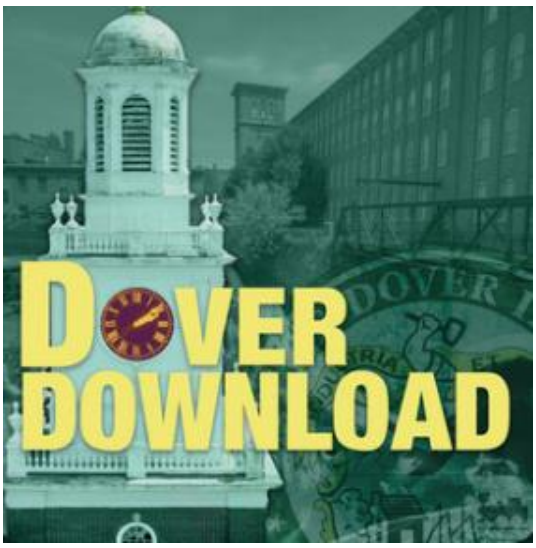
Do It Yourself

You can also create your own space for composting materials at home.

If you do not have an area for an outdoor compost pile, you can compost materials indoors using a special type of bin.

The U.S. Environmental Protection Agency has provided resources on the needed materials and how to get started here: epa.gov/recycle/composting-home.

Resilient Dover



While the Resilience Manager helps produce outreach content, the City has dedicated staff that are crucial to engaging the public such as the, Media Services Team, Outreach Coordinator, and Business Development Specialist. Outreach materials are disseminated to the public through various outlets such as e-newsletters like the Dover Download, Dover Planning Review and Down to Business. The Dover Download is issued weekly while Dover Planning Review and Down to Business are on an alternating bi-weekly schedule. Additionally, the weekly Dover Download Podcast effort led by the Deputy City Manager with support from the Director of Media Services has been a successful alternative outreach outlet for resiliency topics. Relevant podcast episodes include: *What is Stormwater and How is it Managed? / Protecting Dover's Water, an Essential Community Resource / COAST and Public Transit in Dover and on the Seacoast / Resilient Dover: How the City is Planning for the Future.*

The City has made significant progress in the outreach sector with the addition of a dedicated Outreach Coordinator to the Planning and Community Development Department, creation of the Resilient Dover Webpage and associated "Green Tips" as well as the launch of the Dover Download Podcast Series. Given these are ongoing efforts, the City should prioritize the continuous release of information through these outlets and work to expand public awareness of these information sources utilizing social media, word of mouth, mention in public meetings and publicly posted print materials.

Potential of Dover Community Power

The City of Dover is one of the founding members of the Community Power Coalition of New Hampshire (CPCNH). CPCNH is an all-requirements Joint Powers Agency that was incorporated by the State in October 2021 as a non-profit public entity to oversee the launch and operation of Community Power Aggregation (CPA) programs for its members for which there are currently 26. The New Hampshire Legislature enacted RSA 53-E which authorizes local governments to launch CPA programs that serve as an alternative to the default electricity supplier for residents and businesses. The City is currently developing a Dover Community Power (DCP) program, which is presented in much greater detail in Dover's Electric Aggregation Plan (EAP) complied by the Electric Aggregation Committee (EAC) comprised of the full body of the Dover Energy Commission. Through this model customers that are on default supply will be automatically enrolled in the CPA program, while those enrolled with a competitive supplier will have the ability to opt-in.

Upon launch, DCP will provide benefits to the individual consumer and community at large. These benefits will be realized through a decrease in monthly electricity bills, growth of local energy jobs, and voting power over energy procurement. As an Agency, CPCNH staff will support DCP by overseeing the energy portfolio and providing technical expertise when required. The principal objective of CPCNH is presented in the Agency's Joint Powers Agreement:

"The purpose of CPCNH is to promote the common good and general welfare by supporting the economic vitality and prosperity of local communities by enabling municipalities and counties to support and jointly exercise authorities granted to them pursuant to NH RSA 33-B, NH RSA 53-E, NH RSA 53-F, and NH RSA 374-D, all in accordance with NH RSA 53-A; to assist member municipalities and counties in complying with the provisions of NH RSA 53-E in developing and implementing Electric Aggregation Plans and Programs known as Community Power Aggregations ("CPAs"); to provide supportive services and technical assistance to community power aggregations serving member towns, cities, counties, unincorporated places, and village districts; and to support and promote public education and civic engagement by the residents and businesses of member communities in developing and implementing energy and climate policies and actions and the role of CPAs in advancing such policies and actions for the common good."

As of 2020, the Community consumed approximately 175,000 MWH of electricity in total. Of the 175,000 MWH, approximately 118,000 MWH or 67% could be expected to be provided by DCP as a result of change in default service. Figure 1 highlights the breakdown of aggregate electricity usage from the current default supplier and contribution of municipal usage. The residential, commercial and municipal rate classes comprise essentially 100% of the usage with the residential sector accounting for 70%. Table 1 provides a detailed comparison between annual default energy supplier usage and total usage for each rate class besides municipal. Prior to DCP, the municipality would go out to bid every two years to contract with a competitive supplier and thus was excluded from Table 1. Based on this analysis DCP would provide over 15,000 customers with cleaner electricity at a lower or comparable cost to the current default.

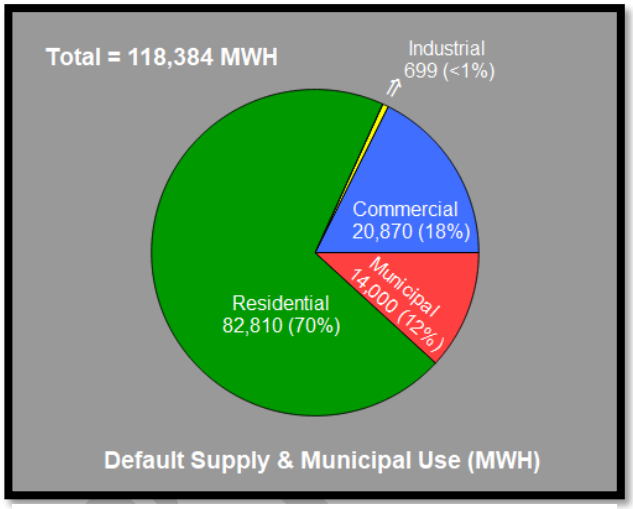
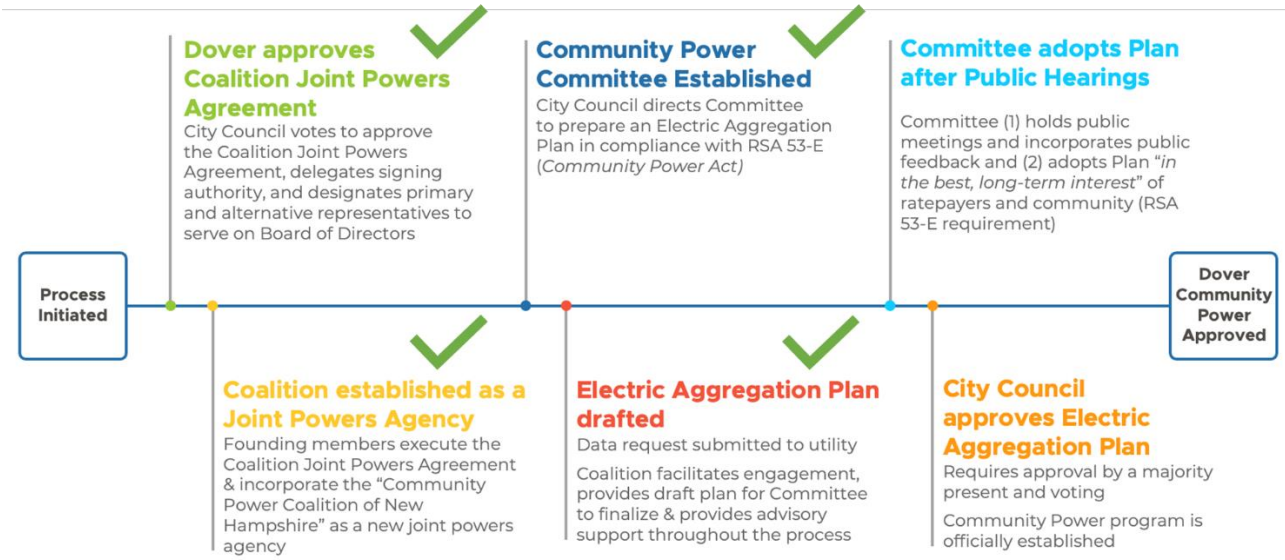


Figure 1. Default community and municipal aggregate electricity usage. Industrial, commercial, residential and outdoor lighting data are from calendar year 2020. Outdoor lighting is not displayed as it makes up only 0.004% of the total usage but it is incorporated into the 118,384 MWH value. Municipal usage (includes schools) is estimated from historical data as it was not provided by Eversource.

Table 1. Comparison between default electricity usage and total usage per rate class for Dover.

Rate Class	Default Usage (MWH/YR)	Total Usage (MWH/YR)	% on Default Supply
Commercial	20,870	59,669	35
Industrial	699	2,626	27
Outdoor Lights	5	33	14
Residential	82,810	98,946	87
Total	104,384	161,274	65

The following timelines indicate progress made to date as well as the required next steps:



At the time of this plan, the Energy Commission has held two public hearings for the proposed EAP on November 16th and December 14th, 2022. After collecting public input, the Commission adopted the EAP in the best, long-term interest of the ratepayers and community in accordance with RSA-53E during its' scheduled meeting on January 18th. Following adoption by the Commission the City Council must vote to enact the plan which serves as a blueprint and establishes objectives for program operations. However, even following the establishment of the EAP, there are additional steps required. Those steps are outlined below:

- If the Council enacts the EAP it then requires submission and approval from the NH Public Utilities Commission.
- The CPCNH Board of Directors has approved a Cost-Sharing Agreement. This governs how costs will be allocated equitably between operating programs through the Coalition. This Agreement requires review and adoption by the City Council before taking effect for DCP.
- Through the recommendation from the CPCNH Risk Management Committee, the Board of Directors adopted the Energy Portfolio Risk Management Policy, Retail Rates Policy, and the Financial Reserves Policy. These policies will also require adoption by the City Council to take effect for DCP.
- Even with Council adoption of the items mentioned above there is no financial commitment. That commitment however is enacted for a three-year term once the

Complete Services Bundle is executed by the City Manager. This is the last step prior to CPCNH providing DCP with community power services.

Commercial Property Assessed Clean Energy

Property-assessed clean energy (PACE) was first introduced on a federal stage in 2009 through the *Recovery Through Retrofit* report released by the White House Council on Environmental Quality. PACE programs help to remove financial barriers to clean energy projects by allowing a property owner(s) to place an additional tax assessment on the property. These assessments are then generally repaid over 15 to 20 years (maximum of 30 years) via additional annual payments on the annual property tax bills. In theory the energy efficiency or renewable energy project should provide savings that offset the increase in property taxes. A local government organization such as Dover could consider offering a PACE program to its property owners to help remove two major barriers to clean energy growth at the commercial, industrial, agricultural and multifamily residential levels. The first of these barriers is lack of capital to fund energy efficiency and/or renewable projects up front. PACE addresses this by spreading out the cost over a manageable time frame. The second may stem from hesitancy to lock into a long-term financial commitment. However, PACE assessments can be transferred with the property allowing an owner to potentially recoup the initial investment upon closing.

In New Hampshire, PACE is governed by RSA Chapter 53-F ENERGY EFFICIENCY AND CLEAN ENERGY DISTRICTS. Authorization for the development of a PACE program would have to be provided by a majority vote of the City Council through the form a resolution. From there the City would be able to establish one or more energy efficiency and clean energy districts and would have the authority to administer the PACE program.

Examples of qualifying improvements through PACE are included in the following Table 2:

Table 2. Examples of renewable and energy efficiency technologies that qualify for PACE.

Eligible Renewable/ Other Technologies	Eligible Efficiency Technologies
Solar Photovoltaics (Solar Panels)	Lighting
Wind Systems	Chillers | Air Conditioners
Solar Water Heat | Solar Space Heat | Solar Thermal Process Heat	Furnaces | Boilers | Heat Pumps
Biomass Systems	Systems/Building Controls
Geothermal Heat Pumps	Building Insultation | Windows

Offering a PACE program in Dover is aligned with the City's overall goals of becoming a more resilient community. This voluntary program once developed would allow commercial, industrial, agricultural and multifamily residential operations to improve their facilities, reducing the impact on the surrounding environment and dependence on grid electricity and/or traditional fossil fuel heating sources. A parallel effect would be realized through a lowering of community generated anthropogenic greenhouse gas emissions and associated air pollution. There may be opportunities to integrate PACE as part of the in-progress DCP program mentioned in the prior section.

The bordering State of Massachusetts, through MassDevelopment and the Department of Energy Resources has developed a successful PACE program model that launched in July 28, 2020. Since launch, fifty-two municipalities have opted into PACE Massachusetts as of March 2022 (*PACE Massachusets*, 2022).

Resilient Food Systems

Food is an integral part of our lives and substantially impacts human and environmental health in many different ways. Food production impacts the environment through the release of greenhouse gas emissions, nutrient pollution, biodiversity loss and freshwater consumption. Thus, a great challenge for humanity is to meet food needs while minimizing the environmental consequences. Fortunately, there are strategies to reduce environmental impacts such as supporting local farms, utilizing compositing, reducing food waste, supporting pollinators with native plant species and eating less meat. The City can play a direct role in terms of public outreach and expanding composting opportunities.

In New England food travels an average of 1,500 miles from farm to plate and as such there is generally only less than five days of food supply at grocery stores(Center for Urban Education about Sustainable Agriculture, 2020). In the event of a regional or national emergency this could lead to dire circumstances for the people of Dover. As such the City should work with advocacy groups such as the Southeast Land Trust through the Open Lands Committee and Conservation Commission to support farmland conservation efforts that provide critical land for local food production that has corresponding environmental benefits. Furthermore, the Planning and Community Development Department should consult the Local Regulation of Agriculture Toolkit from The NH Coalition for Sustaining Agriculture for guidance on how land use regulations impact the viability of local farming and food production (The NH Coalition for Sustaining Agriculture, 2017).

Food and beverage packaging account for a significant portion of plastic waste. Plastic waste possesses risk to environmental and human health. The most significant issue with plastic waste is that these materials do not biodegrade but instead break down into microscopic and even nanoscopic fragments over time. At that scale these fragments can easily dissipate into our valuable natural resources such as drinking water. A recent study that analyzed drinking water found that 93% of the samples collected were contaminated with some level of plastic particles (Mason et al., 2017). Geyer et al. highlighted that as of 2015 6,300 million metric tons of plastic waste had been generated with 79% of that figure accumulated in landfill or the natural environment (Geyer et al., 2017). In the US there has continually been an increase in the generation of plastic waste however recycling rates remain below 10%. Communities such has Dover should consider taking steps to reduce local single-use plastic waste. In April of 2019 the City Council passed a Resolution E-

2019.04.24: "To Support a City-Wide, Voluntary Initiative to Reduce the Use and Distribution of Non-Biodegrable, Single-Use Plastic Products in the City of Dover". This resolution laid a foundation for a series of potential actions the City should consider. The following Table 3 presents some possible steps the City could take if compliant with applicable state statutes.

Table 3. Actions Dover could consider taking to reduce single-use plastic waste.

Action #	Action Description
1	Make a commitment to use alternatives to single-use plastics at City events.
2	Provide education materials regarding the risk of plastics to environmental and human health.
3	Provide public water refill stations in frequented community locations.
4	Deploy smart trash bins that alert City services when they are full.
5	Support producer responsibility laws for end of life product management.
6	Install inceptor devices in waterways to capture plastic waste.

To accomplish these actions a coordinated effort will be required of City Staff, City Officials and the Citizens of Dover. Education is a key component, through the incorporation of a green tips section in the Dover Download and/or Dover Planning Review the City could help disseminate information to help spark change in consumer habits. The ultimate challenge will be to introduce systematic changes that relieves the consumer and places more responsibility on local producers and distributers.

Section 3: Municipal Resiliency Projects

Overview of Municipal Energy Use

This section provides an overview of municipal electricity and natural gas use which sets the stage for recommendations within subsequent sections.

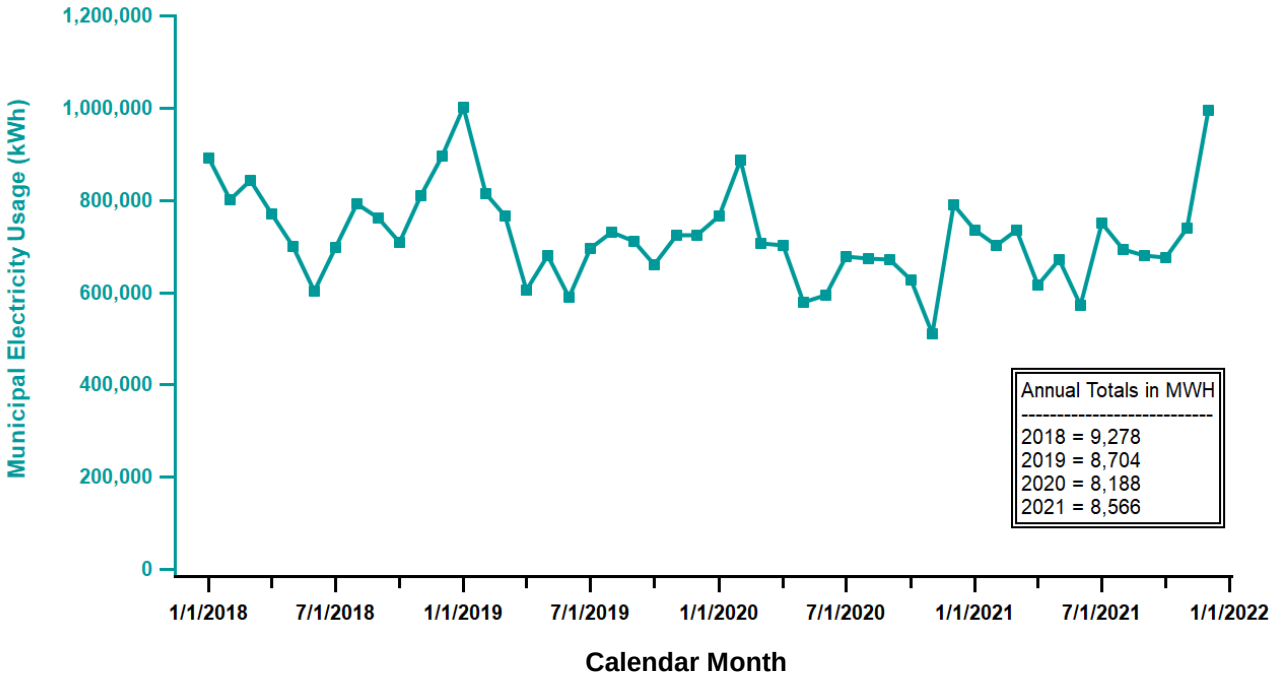


Figure 2. Monthly municipal purchased electricity usage between January 2018 and December 2021. Annual totals are listed in MWH for the represented years. Displayed dates indicate the start date for the usage month.

As is displayed by Figure 2 total monthly grid electricity consumption ranged from a high of approximately 1,000 MWH to approximately half of that value at 511 MWH between January of 2018 and December 2022. The monthly variability corresponds with the expected pattern in that municipal electricity usage increases during winter months when sunlight hours are limited as a result in increased consumption from lighting. While monthly variations provide some insight into seasonal and high to low bounds for total electric consumption, the data was probed further in an attempt to identify if annual total electricity use has changed since the competition of the 2018 Greenhouse Gas and Nitrogen Report for Municipal and School Operations. Total consumption is displayed as a function of calendar year between 2016 and 2021 (Figure 3). A linear model was applied to these six points which yielded an R^2 of 0.87 and p value of 0.007. These outputs indicate

that a statistically significant linear decrease in total municipal electricity use occurred between 2016 and 2021. When comparing 2016 to 2021 directly, the electricity usage declined by approximately 15%. This speaks to the success of efforts such as the street light to LED retrofit as well as various efficiency upgrades to facilities.

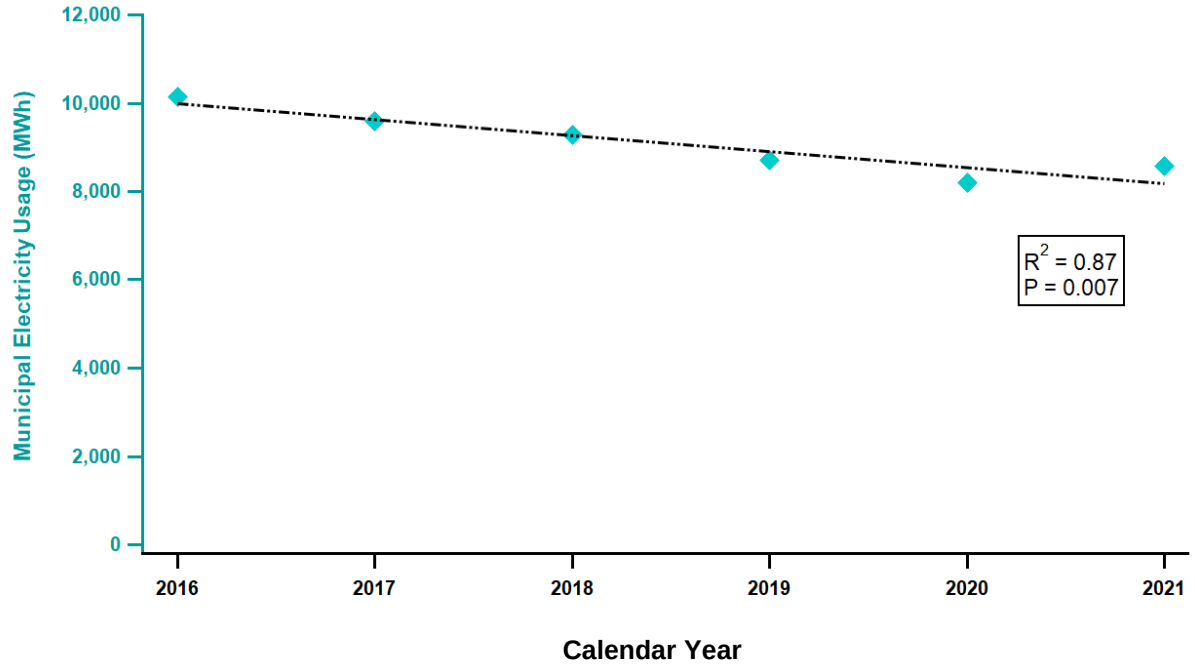


Figure 3. Total municipal electricity usage as a function of calendar year between 2016 and 2021. A P-value of 0.007 is below the 0.05 threshold indicating that the reduction over time is statistically significant.

Energy efficiency measures informed by data and formal audits should continue to be a priority of the municipal corporation as is discussed in the next section. If new solar arrays and storage are brought online to offset grid purchases of top consumers such as the Waste Water Treatment Facility, the City should expect to see substantial reductions in the amount of grid procured electricity in the coming years (see Municipal Solar Expansion section). However, it should be noted that the electrification of vehicles as well as heating assets will increase the required amount of municipal electricity local generation and/or grid procurement. That said, electrifying assets provides exciting opportunities to decrease total energy consumption, offset fossil fuel use and associated greenhouse gas emissions.

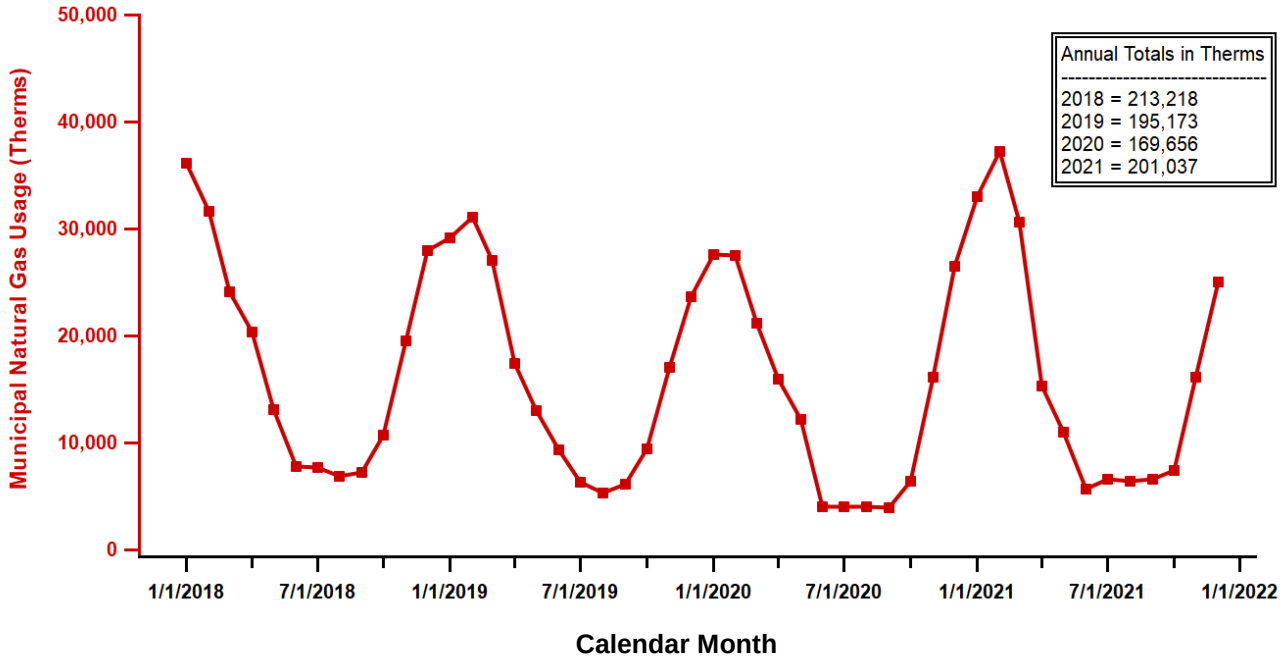


Figure 4. Seasonal variability in municipal natural gas consumption between January 2018 and December 2021. Displayed dates indicate the start date for the usage month.

While there is some seasonal variability apparent in the monthly electricity totals, the effect of New Hampshire's seasons is not surprisingly much more pronounced for the use of natural gas as a heating fuel source (Figure 4). Usage between 2018 and the close of 2021 consistently peaks during the months of December, January and February with a maximum of approximately 37,000 therms during February of 2021 and minimum of approximately 4,000 therms in September of 2020. In a similar fashion with an adjusted approach, annual natural gas usage was normalized by heating degree days (HDD) to account for weather variability and is displayed for 2016 to 2021 (Figure 5). By using HDD to normalize the data, any apparent trends that arise could be linked to operational changes or initiatives. The lack of any trend in Figure 5 is indicative that natural gas consumption has remained relatively consistent.

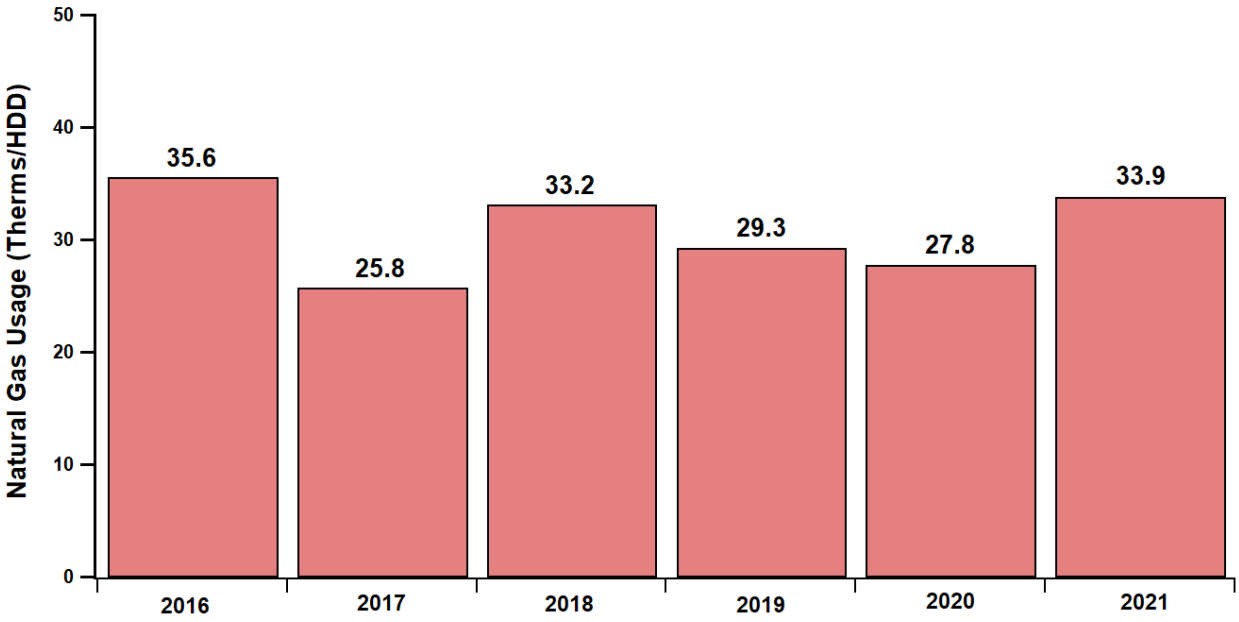


Figure 5. Annual municipal natural gas usage between 2016 and 2021 normalized by the number of heating degree days (HDD) that occurred in each year.

For many years natural gas has been a relatively inexpensive and reliable heating source. However, as was made very apparent from the war in Ukraine, reliance on non-local fossil fuel heating sources creates situations where the City and Community at large are subject to the fallout of international actions. Figure 6 shows the trend in the average residential NH natural gas delivery rates in dollars per thousand cubic feet (CF) using data from the U.S. Energy Information Administration (U.S. Energy Information Administration, 2022). From 2016 through 2021 rates remained stable with peak prices ranging from $22.78 per 1,000 CF in 2018 to $25.25 per 1,000 CF in 2017. In this period average annual rates fall within the sample standard deviations of one another and thus are statistically non-distinguishable highlighting the price stability. As is indicated on Figure 6, under the direction of President Putin, Russia initiated a major escalation of the ongoing Russo-Ukrainian war on February 24th, 2022. This in turn resulted in action from the North Atlantic Treaty Organization (NATO) and the European Union (EU). In 2020 Europe received approximately 35% of its' natural gas imports from Russia. In order to provide support to Ukraine and increase pressure on the Russia to withdraw, the EU announced the REPowerEU plan which aimed to reduce dependence on Russian gas by nearly two-thirds by the end of 2022. This led to an intense uptick in United Stated gas exports to Europe causing reductions in domestic supply and corresponding price hikes. For NH the rate exploded to as an all-time monthly average high of $35.10 per 1,000 CF which is a 39% increase from the 2017 peak.

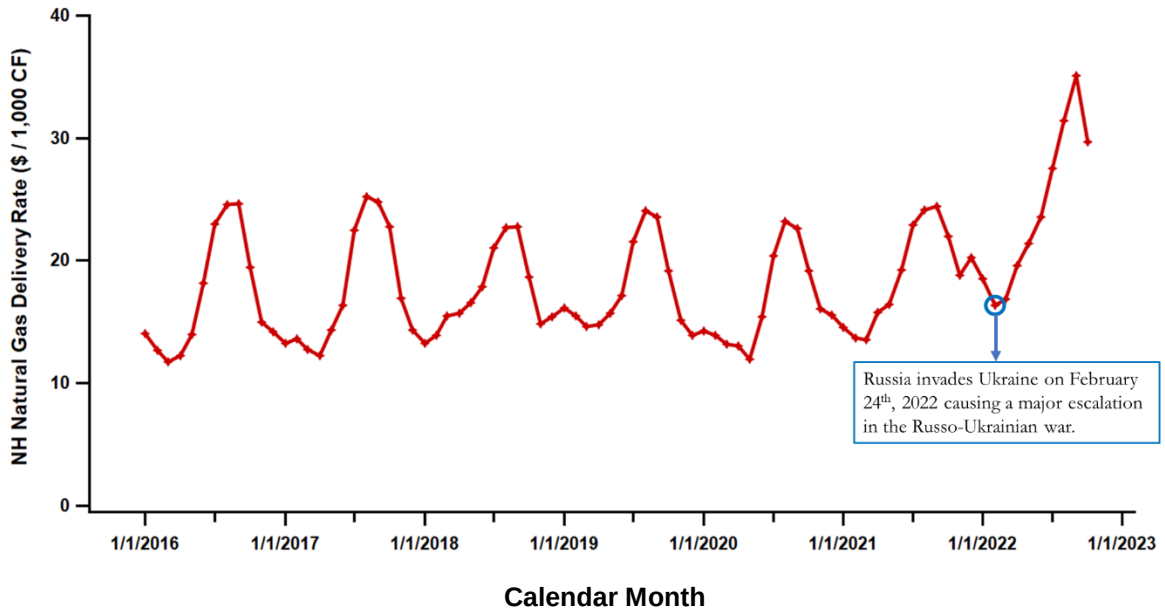


Figure 6. Timeseries of average monthly NH natural gas delivery rates between January 2016 and October 2022.

The purpose of this exercise is to highlight how Dover could increase its' resiliency to global energy market changes by decreasing its' reliance on natural gas through replacing or supplementing that heating source with heat pumps. This will be discussed in much greater depth in the Integration of Heat Pumps Section.

While there are other energy sources the city consumes such as No. 2 oil and propane, electricity and natural gas comprise approximately 95% of the municipal facilities heating energy profile. As such, emphasis was placed on electricity and natural gas for the sake of this plan. However, once recommendations from the plan are implemented an updated emissions inventory should be produced to gauge the effectiveness of the actions. This forthcoming analysis will incorporate consumption of all fuel types and their associated emissions.

Energy Efficiency and Conservation

Energy efficiency (EE) and energy conservation (EC) are two related concepts that seek to avoid or reduce energy consumption. EE generally refers to the technical performance of technologies and processes that allow for the same task to be completed using less overall energy. Energy conservation however, refers to measures taken to reduce energy consumption through methods such as behavioral changes. Using indoor lighting as an example, retrofitting lights with LEDs as the City has done on various scales, is an EE action while turning off the lights when they are not needed either manually or automatically using a sensor or timer is an EC action. EE and EC are widely considered the most cost-effective measures towards reducing air pollution and energy costs. When these measures are implemented they directly translate into improved public health, environmental quality and economic benefits to energy consumers. NHSaves is the top statewide initiative that helps promote and implement EE and EC measures. The City has and should continue to take advantage of and support the continuation of NHSaves. The 2022-2023 New Hampshire Statewide Energy Efficiency Plan highlights the benefits of NHSaves Programs and speaks to the effect that EE and EC measures can have (Table 4).

Table 4. NHSaves program advantages summarized from the 2022 - 2023 New Hampshire Statewide Energy Efficiency Plan.

Advantage	**2022 – 2023 NHSaves Programs will result in:**
Customer Cost Savings	$441 million in cumulative savings over the lifetime of the measures for participating and non-participating customers.
Energy Savings	2 billion kWh of electricity and 5.4 million MMBtu of natural gas
Peak Demand Reduction	22.4 MW in the summer and 23.5 MW in the winter
State Economy	• Support of local EE jobs with an estimated 1,698 full time equivalents. • Decrease in residential customer energy bills which allows for more local spending on goods and services. • Commercial and industrial investments in other company operations. • More efficient use of tax payer funds by municipalities.
Cleaner Environment	Significant reductions in carbon dioxide, sulfur and nitrous oxides with a lifetime reduction of more than 1.5 million tons of greenhouse gas emissions. A 1.5 million tons reduction is equivalent to the removal of over 327,000 passenger vehicles from the road for one year.

Conducting energy audits is an incredibly important step municipal governments and citizens can take to identify opportunities for EE and EC as well as possible integration of renewable energy generation. Two energy audits for the City of Dover are currently underway for the City's Wastewater Treatment Facility (WWTF) and water systems which include pump stations. As a whole, pump stations consume an average of 197 MWh monthly. An audit of the pump stations was conducted in 2019 by Process Energy Services, with support from the New Hampshire Department of Environmental Services, Eversource and Unitil. The City's Community Services Department has implemented many of the measures outlined in the 2019 report and as such a new audit by Process Energy Services is underway to evaluate the performance of those measures and identify additional opportunities. The City should continue to utilize energy audits for making informed investments in EE and EC. Furthermore, these audits should be consulted when developing the Capital Improvements Program.

Additionally, the City should expand promotion of EE and EC awareness throughout the community as it has done with the development of the Resilient Dover outreach materials. This can be achieved utilizing social media campaigns, local network broadcasting, electronic newsletters, print materials, podcast episodes, and webinars. For example, as part of a countywide effort through the Stafford Regional Planning Commission Resiliency Subcommittee, the Resilience Manager will facilitate a Roundtable discussion with representatives from Unitil with expert knowledge of the NHSaves program in January, 2023.

Table 5 presents findings produced from the U.S. Department of Energy that highlight the top ten residential EE measures as they correspond to estimated annual household savings. These saving figures are likely conservative given the recent escalation in energy costs.

Table 5. EE improvements ranked by estimated household savings based on findings from the USDOE.

Rank	Improvement Category	Improvement	Household Savings ($)
1	Enclosure	Drill & fill wall cavity insulation	695
2	Enclosure	R-5 insulated wall sheathing	524
3	Enclosure	R-10 basement wall insulation	280
4	HVAC	Duct sealing & insulation	196
5	HVAC	ENERGY STAR boiler upgrade	165
6	Enclosure	R-60 attic insulation	162
7	Enclosure	Low-E storm windows	147
8	HVAC	Smart thermostat	143
9	Lighting	LED lighting	142
10	Enclosure	Air sealing	111

The City should reference this list when sharing information about EE opportunities with the public and prioritize connecting citizens with existing successful EE and EC programs through NHSaves. The City should also continue to prioritize EE equity by collaborating with the Dover Housing Authority and Community Action Partnership of New Hampshire. Low to moderate income (LMI) individuals and households would realize the largest benefit in quality of life measures through EE projects and EC awareness. According to the 2024 – 2029 CIP, of the 14,226 housing units in Dover, approximately half are renter occupied. As such the City should consider spearheading an EC and EE campaign with a target audience comprised of owners of renter occupied buildings, specifically those with low to moderate income tenants. As is apparent from Table 5 a combination of EE improvements could result in over $1,000 in annual savings which is significant given that over 20% of Dover family incomes are under $35,000 a year.

The City is anticipating the arrival of $76,150 dollars via a direct formula grant allocation through the Energy Efficiency and Conservation Block Grant Program. Eligible uses of these funds are listed below:

(1) Development and implementation of an energy efficiency and conservation strategy

(2) Retaining technical consultant services to assist the City with strategy mentioned above

(3) Conducting residential and commercial building energy audits

(4) Establishment of financial incentive programs for EE improvements

(5) Provision of grants to non-profits and governmental agencies for the purpose of EE retrofits

(6) Development and implementation of EE and EC programs for buildings and facilities

(7) Development and implementation of programs to conserve energy used in transportation

(8) Development and implementation of building codes and inspection services to promote building energy efficiency

(9) Application and implementation of energy distributed technologies that significantly increase EE

(10) Activities to increase participation and efficiency rates for material conservation programs, including source reduction, recycling, and recycled content procurement programs that lead to increases in energy efficiency

(11) The purchase and implementation of technologies to reduce, capture, and, to the maximum extent practicable, use methane and other greenhouse gases generated by landfills or similar sources

(12) Replacement of traffic signals and street lighting with energy efficient lighting technologies

(13) Development, implementation, and installation on or in any government building of the eligible entity of onsite renewable energy technology that generates electricity from renewable resources

(14) Programs for financing energy efficiency, renewable energy, and zero-emission transportation (and associated infrastructure), capital investments, projects, and programs, which may include loan programs and performance contracting programs, for leveraging of additional public and private sector funds, and programs that allow rebates, grants, or other incentives for the purchase and installation of energy efficiency, renewable energy, and zero-emission transportation (and associated infrastructure) measures

The City's Resilience Manager should consult the Energy Commission and City Council regarding the use of these funds within the broad range of eligible uses.

Integration of Heat Pumps

Air source heat pumps (ASHP) offer an avenue to assist with the decarbonization of buildings. These systems can provide efficient heating and cooling and deliver up to three times the amount of heat energy than they consume in electrical energy from the grid. This ratio is known as the coefficient of performance (COP). This performance is strongly impacted by the ambient conditions, installation, and specific building characteristics. ASHPs work by using a vapor compression cycle to move heat from the inside to outside during the summer and from outside to inside during the winter. An example of the heating cycle from the U.S. Department of Energy is show in Figure 7 (U.S. Department of Energy, 2022).

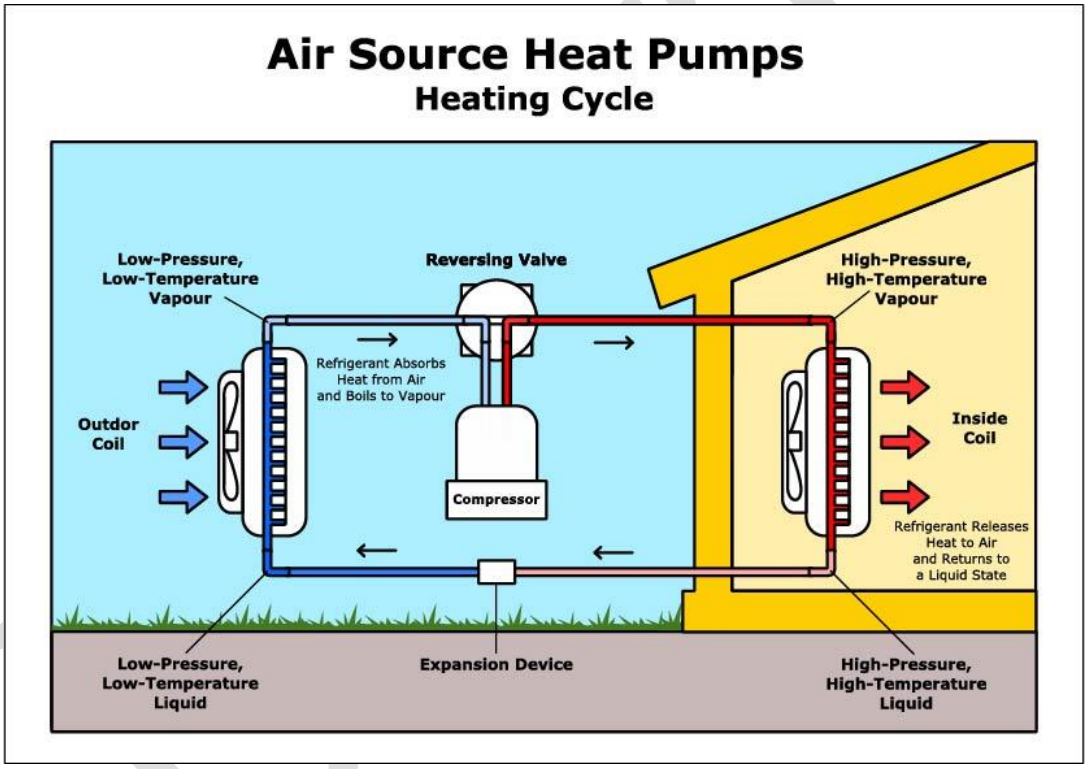


Figure 7. US Department of Energy explanatory graphic for how air source heat pumps operate.

Historically ASHPs had poor performance in cold weather climates which resulted in the need for heavy reliance on backup heating systems. In recent years however there have been substantial improvements through the utilization of variable-speed inverter driven compressors allowing for effective use of ASHP in places like Dover, New Hampshire (Northeast Energy Efficiency Partnerships, 2022).

The Northeast Energy Efficiency Partnerships (NEEP) views the expanded adoption of ASHP in the following ways:

- Reduction in on-site energy use.
- Reduction in heating costs.
- Reduction of GHG-E associated with space heating.
- Development of an effective solution for meeting heating/cooling needs of buildings.

NEEP has developed Cold Climate Air Source Heat Pump Specification Sheets with Version 4.0 effective January 1st 2023 which defines a set of performance requirements and reporting requirements for vendors to achieve cold climate ratings. These specifications will be vitally important to follow when looking into options for expanding ASHP integration in Dover.

Table 6. Comparison of NH Fuel prices using December, 2022 data from the New Hampshire Department of Energy.

Heating Type	Conversion Efficiency	Average Price ($/MMBTU)	
Electric Heat Pump	2.5	36.15	% Difference
Fuel Oil (#2)	0.8	43.19	18
Propane	0.8	51.06	34
Kerosene	0.8	64.53	56
Natural Gas	0.8	25.55	34
Electric Baseboard	1	90.38	86
Wood (Cord)	0.5	43.92	19

To determine the current economic viability of electric heat pumps as a heating source, a comparison analysis is presented in Table 6 using average cost data for various heating sources from the NH Department of Energy. Values listed in the far-right column highlight the percent differences between the normalized cost of common NH heating sources and electric heat pumps. Green indicates an economic advantage while red shows a disadvantage. Even during a time of unprecedented electric rates, electric heat pumps have lower heating costs than all other heating methods except natural gas. With the City's progress towards expanding local renewable electric generation capacity, the potential launch of a Dover Community Power Program and advances in heat pump technology it's expected that the cost of operating heat pumps will continue to decline.

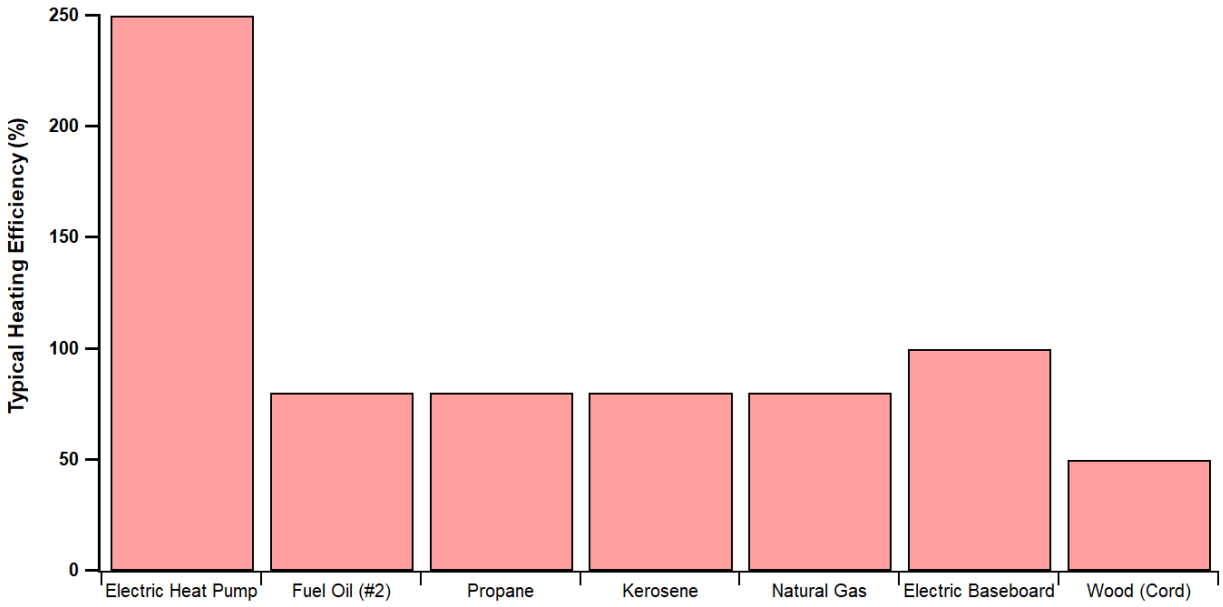


Figure 8. Comparison of heating efficiencies between various common NH heating sources.

The competitive operating costs of electric heat pumps, and environmental advantages are in part due to the high level of efficiency. Figure 8 shows a graphical comparison of the average efficiencies for the various hearting sources shown in Table 6. Electric heat pump efficiency is over three times that of conventional fossil fuel heating sources including natural gas. Combustion based processes can never achieve efficiencies of 100% or higher because heat is carried with the combustion products contained within the emissions.

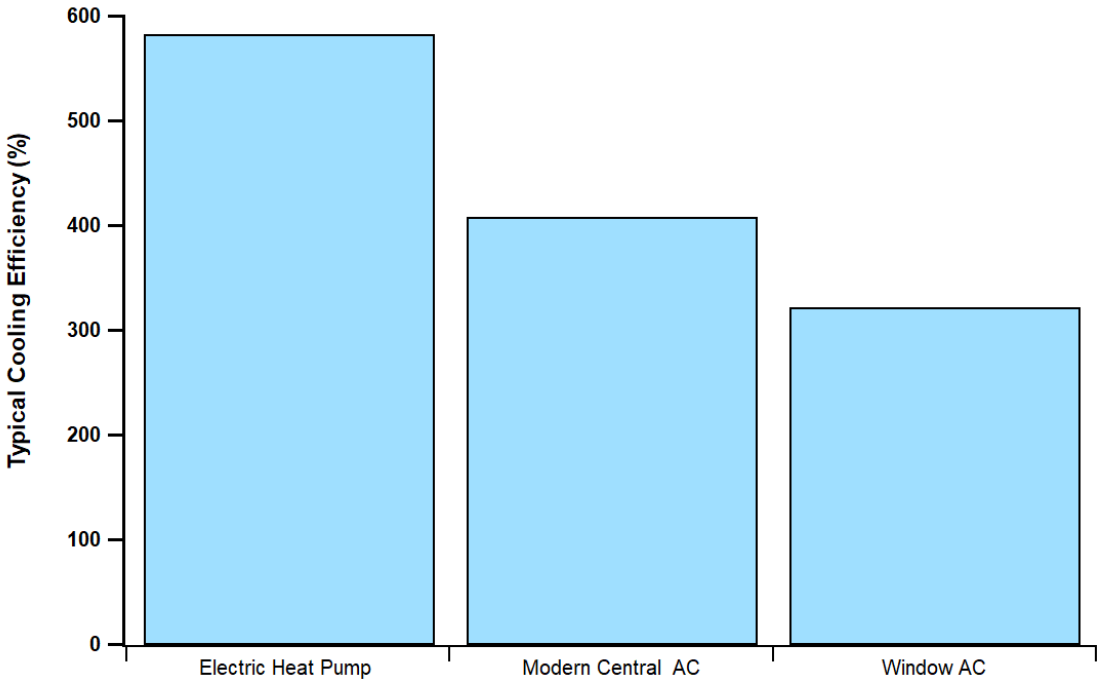


Figure 9. Comparison of cooling efficiencies between typical cooling methods.

Electric heat pumps also have cooling efficiency advantages over modern central air conditioning and window units as is shown in Figure 9. Furthermore, older window AC units are subject to fugitive emission releases that have high warming potentials (US Environmental Protection Agency, 2014). When evaluating buildings for potential conversion to ASHP, it's important to consider to existing heating system. If the building has central ducts, those can be utilized for the installation of a central ducted heat pump. If heating is distributed through radiators or baseboards, then ductless units can be employed along with ducted units.

The Community Facilities and Utilities Master Plan Chapter contains descriptions of existing heating and cooling systems in key city facilities. This resource will be vital to consult when identifying appropriate ASHP building candidates.

Municipal Solar Expansion

The 2022 Energy Commission Report included recommendations for the City of Dover to explore regarding the expansion of photo-voltaic (PV) solar arrays to provide renewable and resilient energy, offset grid electricity demand and reduce municipal greenhouse gas emissions. This section builds upon those recommendations and offers additional insight.

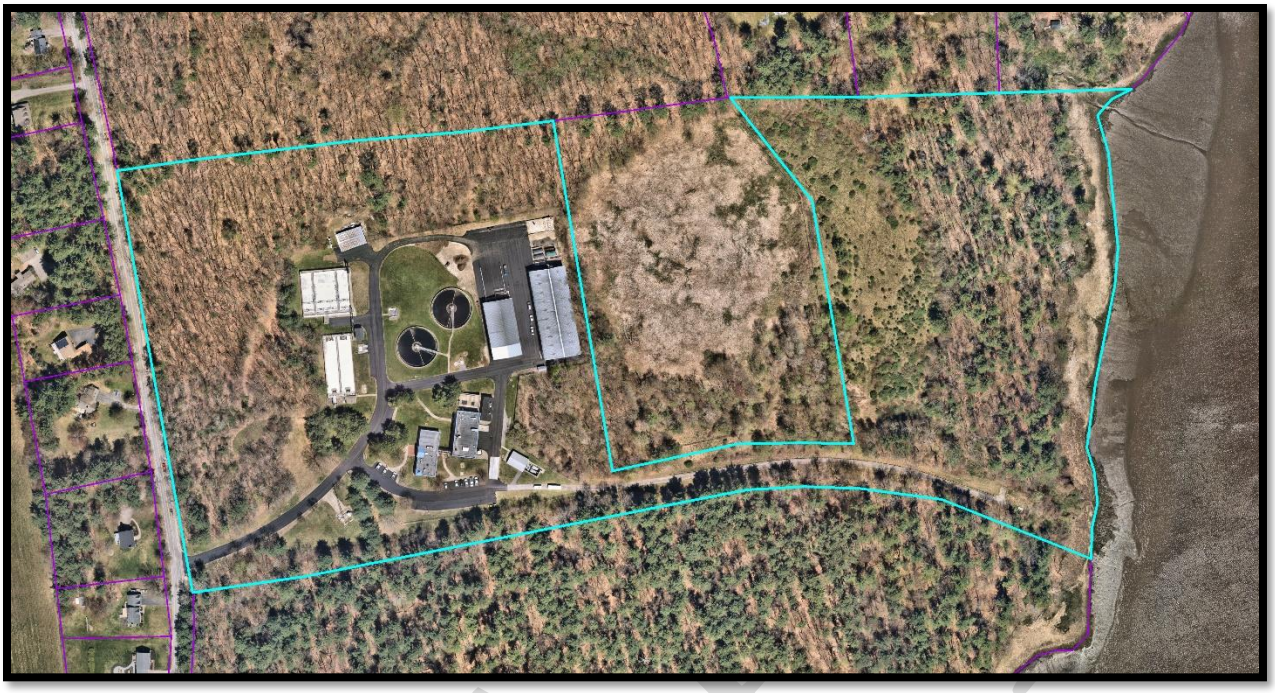
Federal investment is a key aspect of solar project viability. The passing of the 2022 Inflation Reduction Act restored the available tax credit for solar projects to 30% through 2034 and extended the credit out to qualified battery storage technologies. This means that rates secured through power purchase agreements (PPA) should be very competitive through the coming years. Additionally, if the City proceeds with the Dover Community Power Program through CPCNH, there may be opportunities to utilize excess program reserves for the development of solar arrays.

Potential feasible locations for new solar developments are presented below:

Wastewater Treatment Facility

Site Characteristics

Dover's Wastewater Treatment Facility (WWTF) is situated on Assessor's Map M Lot 57A located at 284 Middle Road. Of the parcel's 35.86 acres, approximately 12 are developed. The WWTF handles on average 2.5 million gallons per day (MGD) and is designed for up to 4.7 MGD. Due to the energy intensive nature of wastewater treatment operations, it's not surprising that the facility as whole is the City's largest electricity consumer using approximately 2,000,000 kWh or 2 GWh annually.



High Level Analysis

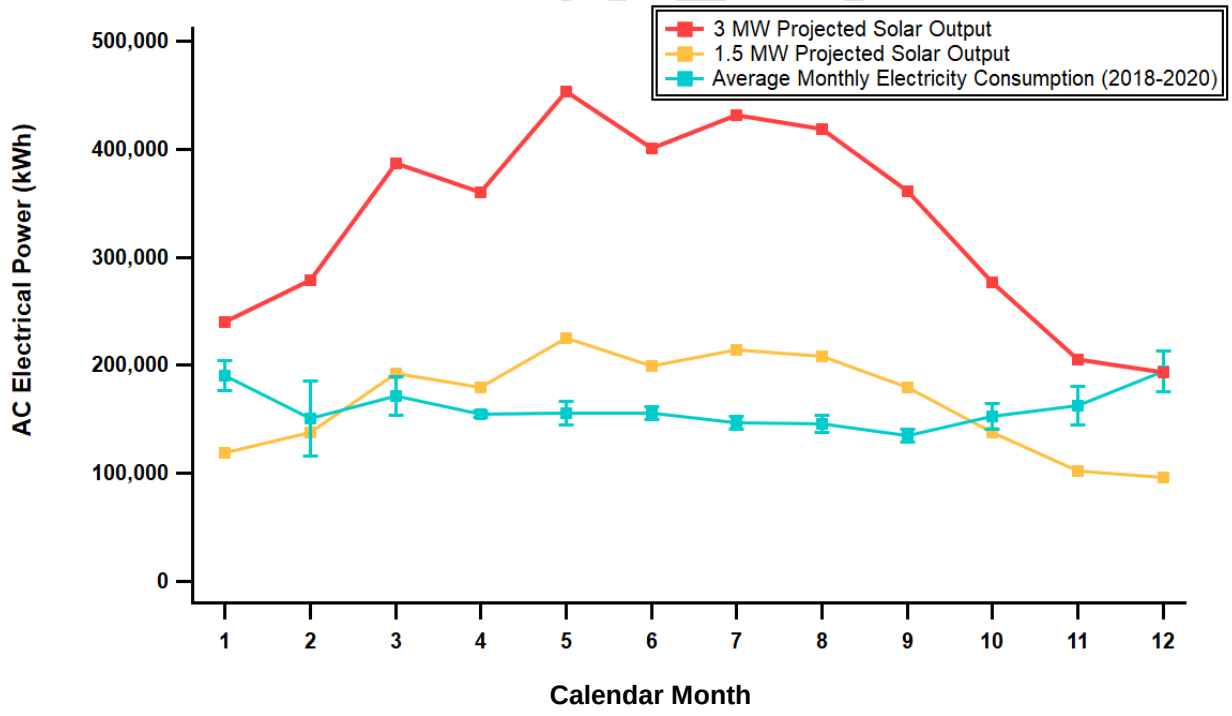


Figure 10. Projected theoretical 3 MW and 1.5 MW solar array electricity outputs contrasted with three-year averaged electricity consumption data for the WWTF.

The US Department of Energy - National Renewable Energy Laboratory's PVWatts calculator tool was utilized to contrast projected alternating current (AC) electricity outputs of a 1.5 MW and 3 MW theoretical arrays with three-year averaged electricity consumption for the WWTF (Figure 10). Assuming 14% system losses, a 1.5 MW fixed rack array could potentially meet the electricity demand of the WWTF seven to nine months of the year if coupled with battery storage. As is expected, solar system outputs decline in the late fall and early winter and in these months supplemental grid electricity would be a necessity. If a 3 MW array was constructed, that array would provide excess electricity in every month except December where it would meet the anticipated demand of the WWTF. At this size, the array is below the 5 MW state net metering cap and thus would be able to provide excess electricity back to the grid for revenue. A forthcoming WWTF Energy Audit will provide much more in-depth information on the solar potential at this site and should be consulted if the City chooses to release a request for proposals.

Ice Arena

Site Characteristics

Dover's Ice Arena is part of a larger recreation campus situated on Assessor's Map 26 Lot 2 located at 140 Portland Avenue. This is a twin sheet ice arena which is utilized by many hockey and figure skating programs and is a great economic asset to the City. However, with maintaining ice sheets comes large electric demand and as such the Ice Arena is the second largest consumer at over 1,000,000 kWh or 1 GWh annually. As was identified in the 2022 Energy Commission Report, the pitched metal roofs on the arena make it a great candidate for solar, however the physical attributes of the roofs should be evaluated to ensure they are structurally sufficient to handle additional loading from solar panels.

High Level Analysis

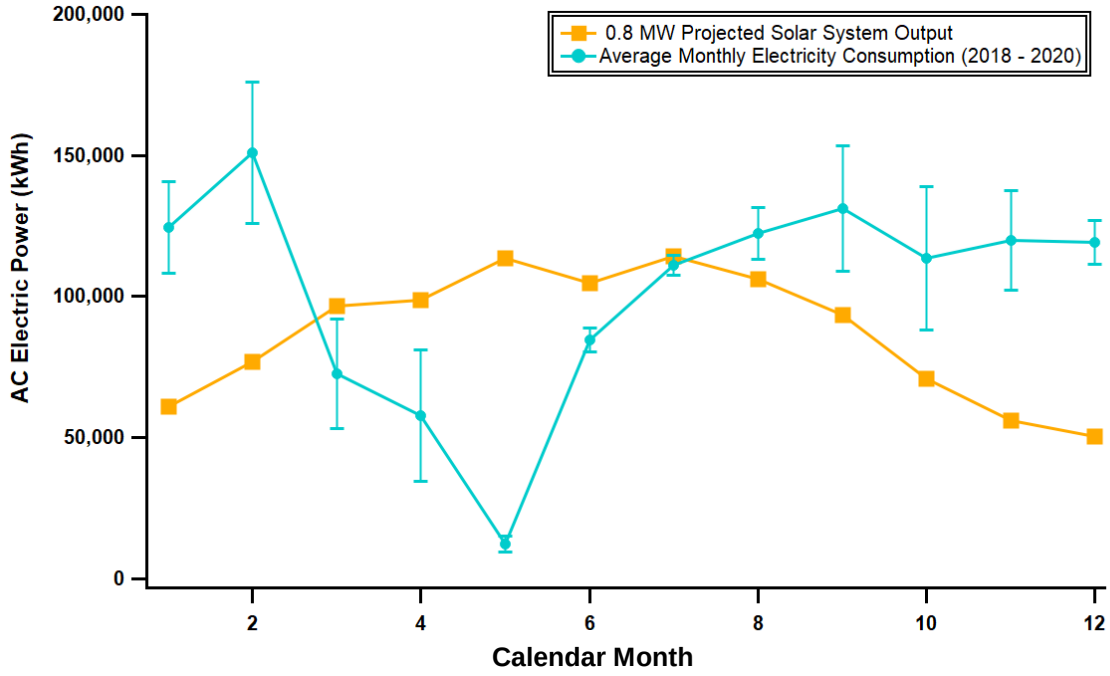


Figure 11. Projected theoretical 0.8 MW rooftop solar array electricity output contrasted with three-year averaged electricity consumption data for the WWTF.

AC electrical power consumption averaged over three years is compared with the projected 0.8 MW rooftop solar array output as functions of calendar month (Figure 11). Assuming 14% system losses, a 0.8 MW rooftop mounted array could potentially meet or exceed the electricity demand of the Ice Arena five months of the year if coupled with battery storage.

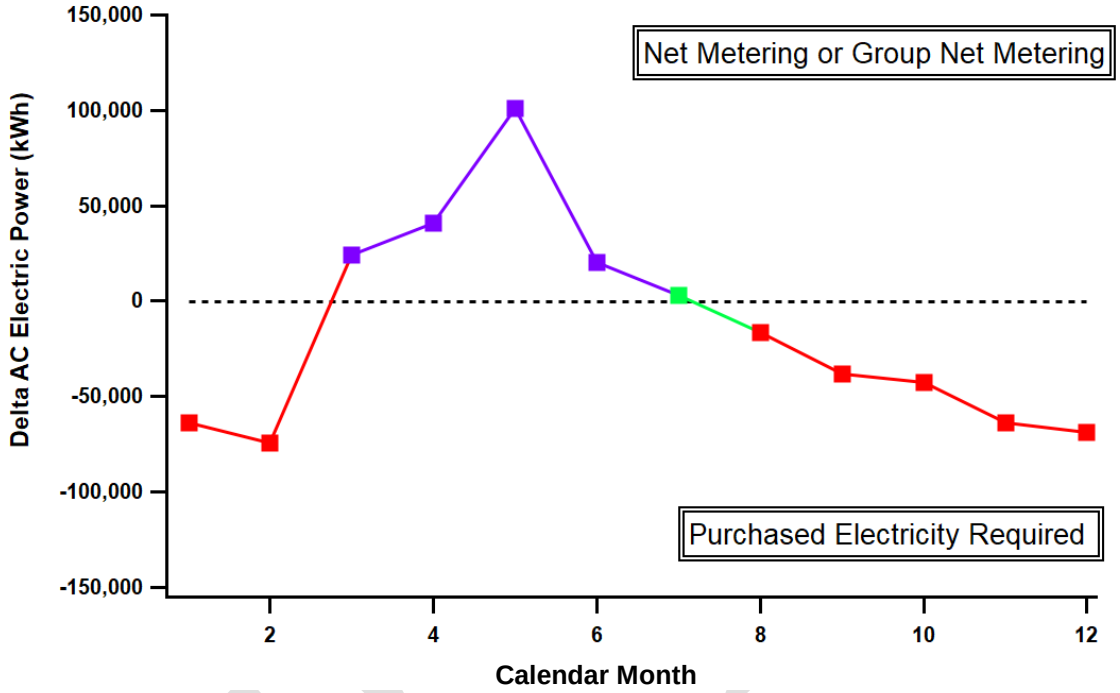


Figure 12. The difference in AC power between historical consumption and projected solar output. A positive delta (purple) indicates excess monthly production. A negative delta highlights when historically averaged consumption exceeds projected generation.

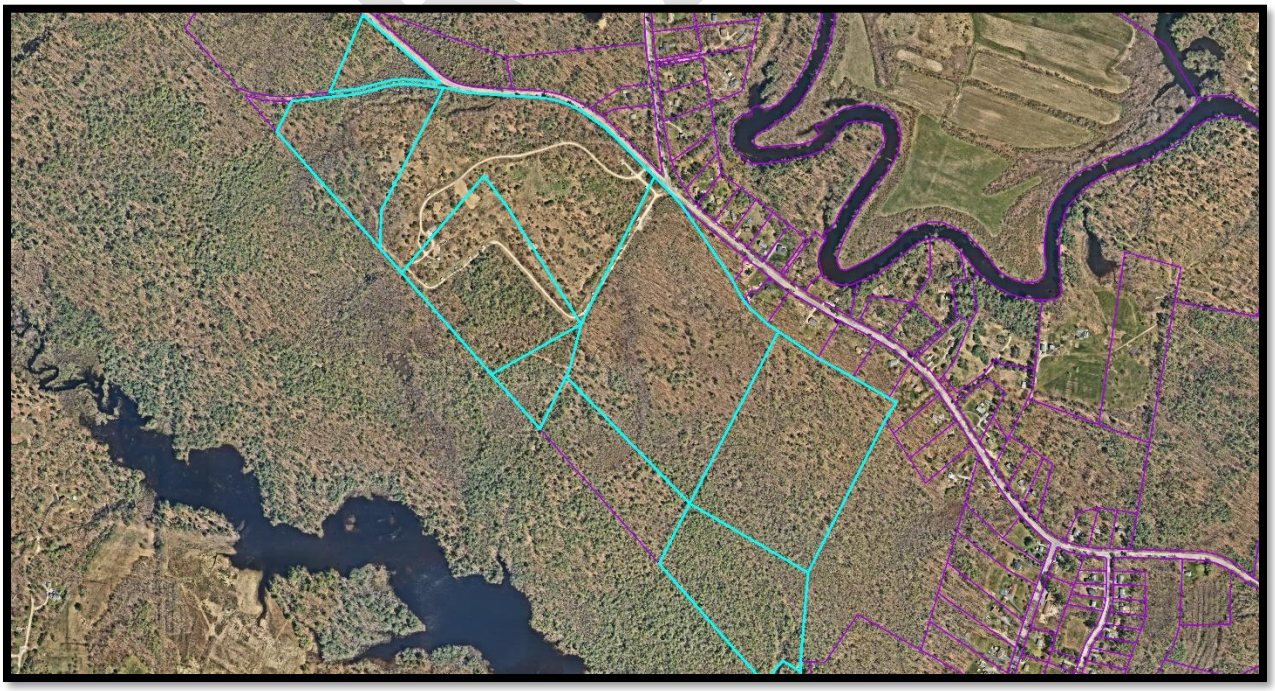
To further probe the potential for rooftop solar generation a delta analysis is presented (Figure 12). Months where the delta is positive, highlighted by purple, projected solar generation exceeds historical consumption. During these months group net metering or traditional net metering would likely be utilized. The largest positive delta occurs in May when the older ice sheet is removed, greatly reducing the facility's energy requirements. In all months, the need for purchased electricity is either non-existent or greatly reduced by the addition of an 0.8 MW array.

Tolend Road Landfill Area

Site Characteristics

The former municipal landfill is situated off of Tolend Road and is bordered by City owned parcels that are undeveloped woodlands and forested wetlands. The approximately 47 acres landfill is topographically flat and has had time to settle since the closing in 1979. Groundwater and surface water sampling in 1981 and 1982 identified site related contamination causing the EPA to add the Site to the Superfund's National Priority List in 1983. At present the Site remains in active remediation, and additional remediation steps were identified in the EPA's Five Year Review issued in September, 2022. The EPAs Remedial Project Manager for the site was contacted by the City's Resilience Manager regarding the potential for a large-scale solar development. The Remediation Project Manager advised that due to the findings in the Five Year Review that the landfill is not currently a good candidate for solar. However, the EPA is open to further discussion about solar development at the Site. Another complicating factor at this location is the distance from major transmission lines which limit the economic feasibility of a utility scale array. Even with these factors, the landfill has gained attention from prospective solar developers. The City, with the advice of consultant Dean Peschel, should continue to discuss the possibility of solar with the EPA.

A high-level analysis was not performed for this location as there is too much uncertainty regarding the size of a prospective array.



EVSE Expansion (Municipal and Public)

With the growing adoption of electric vehicles (EVs) driven by factors such as a need to address climate change, advanced vehicle technology, government incentives, and manufactured commitments, there is a great need and opportunity for Dover to expand its' electric vehicle supply equipment (EVSE) infrastructure. As identified in the 2022 Energy Commission Report adoption is occurring now and communities like Dover will see considerable benefits to local air quality through reductions in exhaust emissions, especially in the Central Business District. The Energy Commission recommends that the City work to increase access to EVSE for residents and visitors. An increase in public EVSE will have a multimodal effect. First it will allow residents, especially renters without access to at home charging the option to drive an EV. Second, Level 2 charging, sometimes known as destination charging, will draw in EV drivers from outside of Dover leading to increased economic activity. When making decisions regarding EVSE the City will be able to utilize resources such as the New Hampshire EV Toolkit which received input from a wide variety of stakeholders from throughout New Hampshire including Dover. Final decisions regarding the locations of EVSE will require engagement from the City's Parking Commission, Energy Commission and City Council with support from City Staff.

At present the City has four public level II charging stations in the Orchard Street Parking Garage. A flat rate is applied for these stations that is currently $1/hr for parking and $2/hr to cover the cost of electricity. The utilization of these has increased recently, however, with the COVID-19 pandemic it's hard to compare current use with use during the height of the pandemic when travel was limited. While this payment method works for a garage setting it's recommended that future public EVSE have a metered payment system where the driver is charged proportionately for the electricity drawn by the vehicle's battery. Additionally, the City should consider and third party own and operate model for public EVSE. The biggest advantage for this model is that the City would not be responsible to maintain the EVSE and thus would not increase the workload and expertise required by current City Staff. The City would also not need to worry about setting rates for the stations.

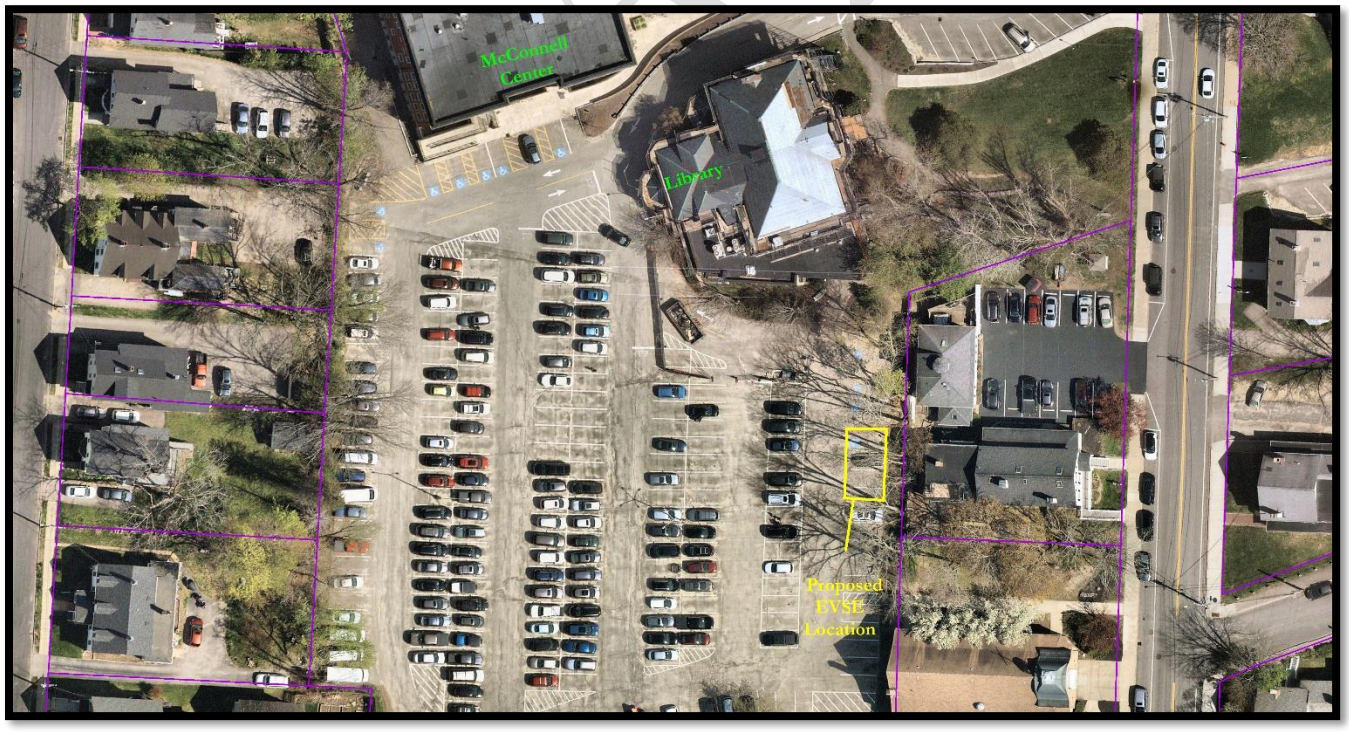
Several factors contribute to the feasibility of a charging location such as:

access to required electricity infrastructure and any corresponding upgrades, availability of non-designated parking, proximity to services and/or recreation opportunities. In the following pages characteristics are presented for a series of four proposed public EVSE locations:

1) **The Library and McConnell Center Lot**

Table 7. Site characteristic table for the Library and McConnell Center parking lot.

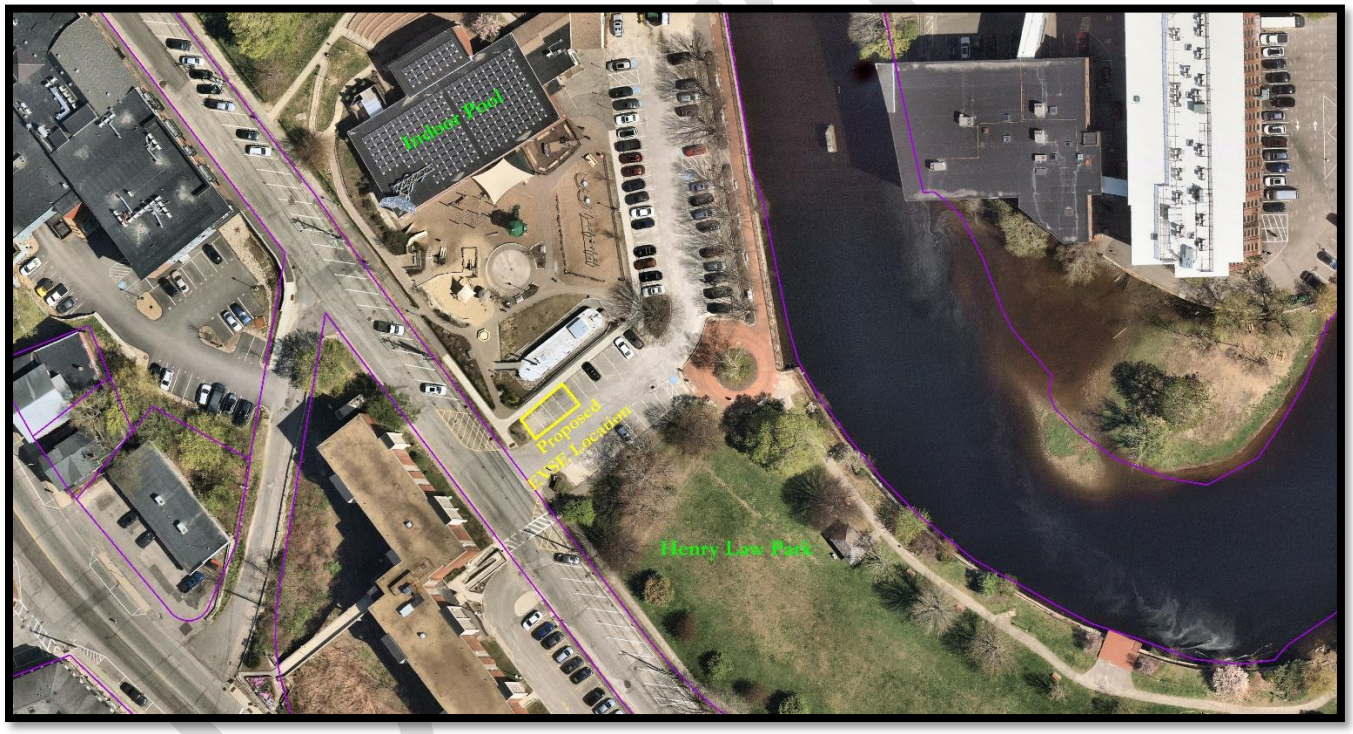
Category	Site Characteristics
Location	Map 9 Lot 57 | 61 – 73 Locust Street
Availability of Parking + Utilization	Enough spaces and high utilization by public and municipal employees.
Onsite Restrooms	Public restrooms available in McConnell Center and Library.
Utility Infrastructure	There is electricity nearby but capacity is likely low and may require upgrades to current infrastructure.
Proximity to Major Travel Corridor	Site is located within 1 mile of NH Route 16.
Proximity to Businesses	Is located within walking distance however the lot is only designated for visitors to the McConnell Center and Library as well as City employees.
Proximity to Recreation	Recreation activities within McConnell Center.



2) Henry Law Parking Area

Table 8. Site characteristics for the Henry Law parking area.

Category	Site Characteristics
Location	Map 23 Lot 15 | 6 Washington Street
Availability of Parking + Utilization	Ample parking with angled street spots and moderate utilization.
Onsite Facilities (Restrooms)	Public restrooms available in Indoor Pool area.
Utility Infrastructure	Electrical capacity needs evaluation.
Proximity to Major Travel Corridor	Site is located approximately half a mile from Route 4.
Proximity to Businesses	Is located within walking distance of high density of businesses.
Proximity to Recreation	Near Indoor Pool, outdoor play area, Henry Law Park, and Children's Museum of New Hampshire.



3) Dover Ice Arena | Jenny Thompson Pool | Skate Park

Table 9. Site characteristics for the Ice Arena, Jenny Thompson Pool and to skate park.

Category	Site Characteristics
Location	Map 26, Lot 2 | 100 – 150 Portland Ave
Availability of Parking + Utilization	Ample parking between the various lots and seasonal utilization.
Onsite Facilities (Restrooms)	Public restrooms available in Ice Arena.
Utility Infrastructure	Electrical capacity likely there but requires evaluation.
Proximity to Major Travel Corridor	Site is located right off Route 4.
Proximity to Businesses	Is located within walking distance of businesses.
Proximity to Recreation	Ice Arena, Jenny Thompson Pool and Skate Park (under construction).

4) Waterfront Development

Table 10. Site characteristics for the parking area to be constructed as part of the Waterfront Development.

Category	Site Characteristics
Location	Map 22 Lot 1 | River Street
Availability of Parking + Utilization	20 space lot to be constructed and can accommodate EVSE.
Onsite Facilities (Restrooms)	No restrooms directly adjacent to the area.
Utility Infrastructure	Not existing but will be developed.
Proximity to Major Travel Corridor	Site is located close to Route 4.
Proximity to Businesses	Is located within walking distance of businesses.
Proximity to Recreation	3.4-acre public riverfront park and associated docks.

Another recommendation from the Energy Commission is for the City to continue to lead by example through the expansion of EVs within the municipal fleet and associated EVSE. The City currently has one level II station at City Hall used for the IT Department's Chevy Bolt, and two-level II stations at the Community Services Building located at 271 Mast Rd. The EVSE includes a dashboard that allows for remote monitoring of the EVSE electricity use, number of individual drivers, etc. The City currently has two more level II stations on hand and ready to be installed at another suitable location. As the fleet continues to electrify additional EVSE will be needed. In the future the municipality could be able to utilize electric vehicles as grid resources via a transactive electricity model. Under this scenario the municipality would work with the utility, whether a third party or CPCNH to draw from the EVSE at low use times like overnight and supply electricity to the grid during periods of high demand such as dinnertime. By putting electricity on the grid, the municipality would be able to recoup a portion of the cost of electricity to operate the EVs New Hampshire Electric Coop is currently running a pilot for this in conjunction with Plymouth State University (King & Kreis, 2022)

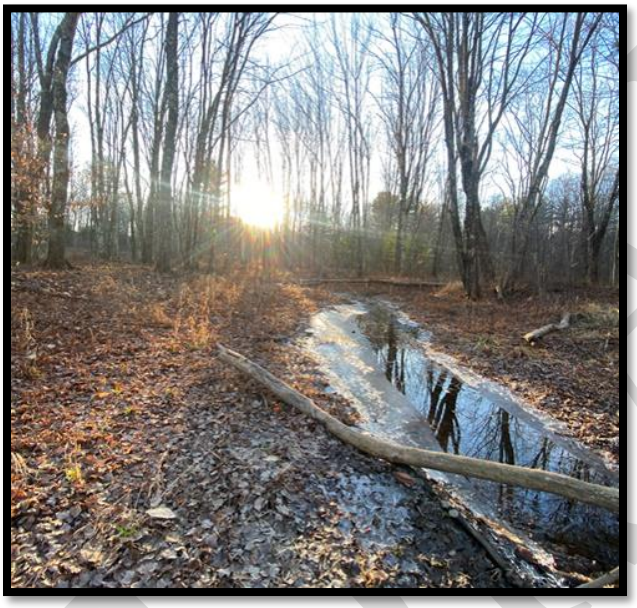
https://pv-magazine-usa.com/2022/01/05/isun-wins-29-million-solar-canopy-order-for-ev-charging-stations/

Dover could also consider integrating EVSE with solar panels like has been done by use of solar carports in parking areas. This may be a viable option for future municipal EVSE and would provide a clean microgrid for EVs further reducing the City's carbon footprint.

Forest and Ecosystem Management

While proper management and development of the built environment are key aspects of resiliency, another major component involves the protection and management of the various diverse forests and ecosystems throughout Dover. Dover has taken numerous strides in that regard through land monitoring and protection efforts, the development of specific plans such as the CBD Street Tree Plan, creation of a Forest Management Subcommittee of the Conservation Commission and so on. This section discusses the importance of the work done to date and offers some recommendations for the City to continue and evolve these efforts going forward.

Land Conservation Acquisition and Monitoring



In Dover there are land areas that have substantial conservation features that include ground water recharge zones, wetlands, wildlife habitat, farmland, scenic viewsheds and so on. These lands offer significant value to the ecological, environmental and human health within Dover and beyond. Since 2000 the Dover Open Lands Committee (OLC) has helped advise Dover's Conservation Commission and City Council with the permanent protection of over 860 acres of lands with a variety of conservation features either through conservation easements, which place portions of or entire parcels under restrictions, or fee simple purchases/donations where the City then owns the land outright. To date 91% of the acres protected through the OLC are under conservation easements where the City, generally through the Conservation Commission, holds interest in the development rights but the property is still owned by a third party. The OLC's major focus is the acquisition of new conservation tracts and monitoring of existing tracts. Easement or land acquisition is a complex and delicate process that involves many steps and thus projects may take years to come to close. As such the OLC generally has multiple ongoing projects in various stages, all with their own intricacies. The OLC rigorously evaluates all potential acquisitions prior to making any recommendations to the Conservation Commission and/or City Council. The is includes scoring all projects using a quantitative point

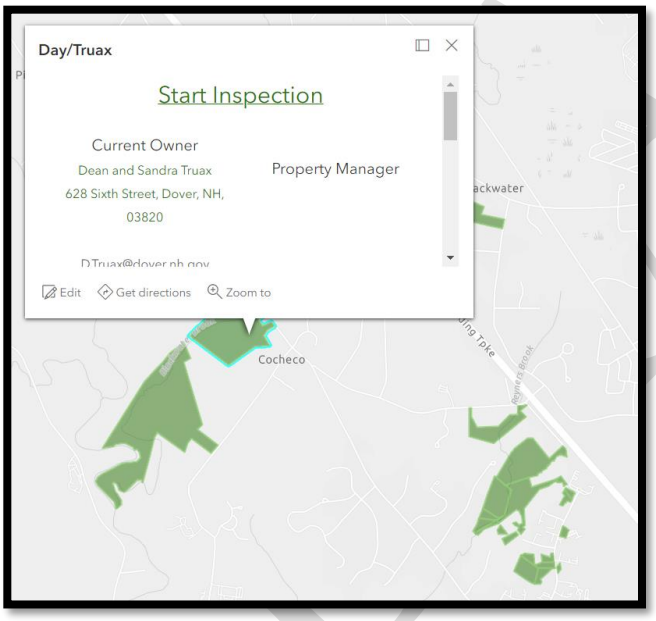
system that relies upon GIS data, existing regional plans, landowner plans, proximity to other conservation tracts etc. as well as one or multiple site visits. As the Conservation Fund balance is limited, protection priority is given to lands that scores higher at the end of the evaluation process. The OLC should continue to utilize this methodology and adapt it overtime as more data and local resources become available to aid in the evaluation.

Historically the Conservation Fund received cashflow from land use change tax (LUCT), which is applied when a landowner takes land out of current use. While effective an additional funding mechanism was established in 2018 through Transfer of Development Rights (TDR). TDR balances development with land protection by allowing for higher density development in areas that are well suited and providing funding for use by the OLC and Conservation Commission. The City should continue to monitor the success of TDR with the Planning Board, who has the authority to grant additional density, and update cost metrics as land protection costs will likely rise over time. Since 2018 TDR has raised approximately $2,000,000 for the Conservation Fund.

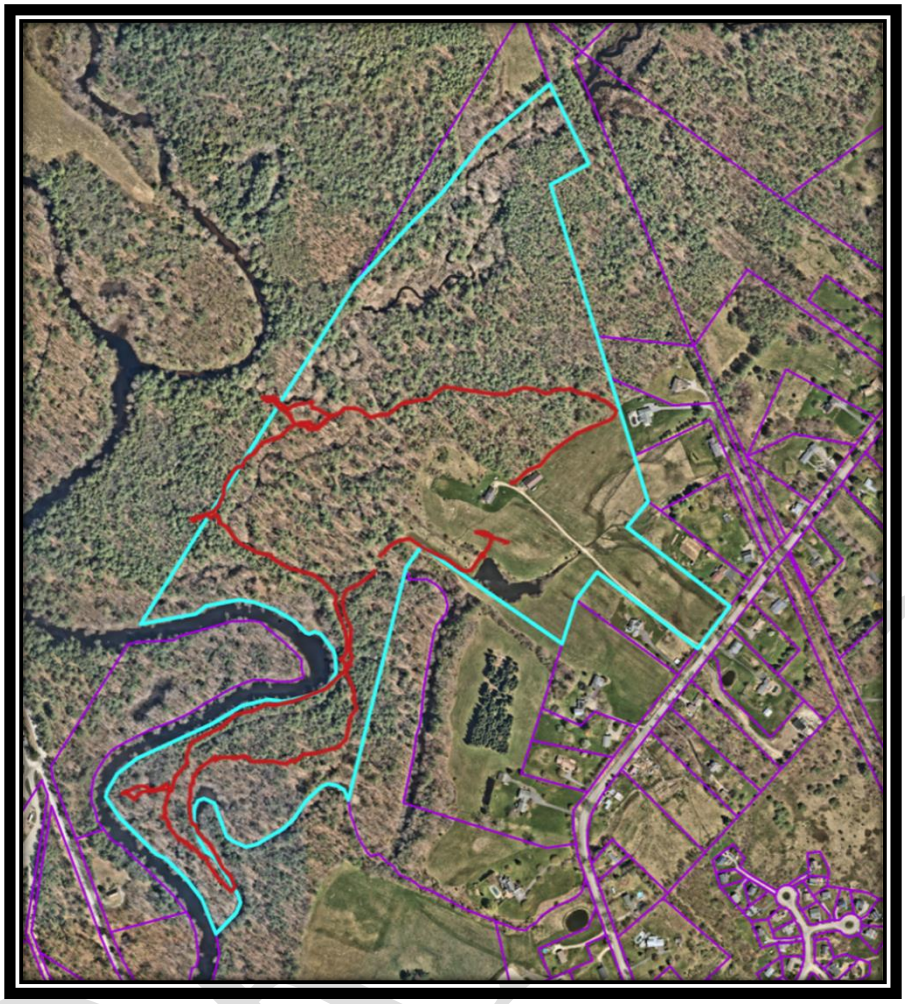
While land protection efforts are vitally important, the status of those protected tracts is equally critical. If the intent of the easement or municipally owned land is not being upheld, this could jeopardize the conservation features that made the land worth protecting. Currently, the OLC with support from the City's Resilience Manager, stewards the conservation lands. Monitoring activities include reviewing easement deeds and maps, walking the property with a GPS tracking device, photographing conditions and preparing written reports. Protection efforts that involved third party funding may have executory interest holders, these are entities that have vested interest. The City is obligated to submit monitoring reports for the properties listed in Table 11 to the corresponding agencies such as the NH Department of Environmental Services (DES), the Southeast Land Trust (SELT), the Land Conservation and Heritage Investment Program (LCHIP), and the NH Department of Transportation (NHDOT). The City should continue to train OLC Members in best practices for monitoring and recruit additional volunteers to expand the extent of monitored properties in a given year.

Table 11. Conservation lands monitored in 2022 by the Dover Open Lands Committee.

2022 Priority Monitoring List				
Property Name	**Location**	**Acres**	**Date of Last Monitoring**	**Reporting Agency**
Browne/Welsh	Blackwater Road	23.0	9/30/2022	Annual report to DES & SELT
Frazer/Keith	Blackwater Road	22.5	9/30/2022	Annual report to DES
Gabriel/Bagdon	County Farm Cross Road	85.3	11/9/2022	Annual Report to LCHIP
New Meadows	Lilac Lane	27.0	11/22/2022	Annual Report to SELT
Garland	Long Hill Road	5.9	12/5/2022	Annual Report to SELT
Estes/Moll	Long Hill Road/Sandy Lane	19.5	12/5/2022	Annual Report to SELT
Day/Truax	Sixth Street	39.95	9/29/2022	Annual Report to NHDOT
Williams/Dill	Varney Road	18.6	9/29/2022	Annual report to DES & SELT
Enterprise Park	Venture Drive	25.2	11/17/2022	Annual Report to SELT
Cassily-East	Hillside Drive	8.5	5/25/2022	Annual Report to LCHIP
Cassily-West	Whittier Street	15.4	5/25/2022	Annual Report to LCHIP



For the 2022 monitoring season the City launched the use of a new digital monitoring system leveraging existing ArcGIS licenses with the assistance of the Information Technology Department. The ArcGIS Conservation Easement Monitoring Suite links a list of survey questions and input responses that can be entered using a tablet in the field to a cloud-based dashboard that allows City employees to track the monitoring status of properties and ensure any identified concerns are appropriately addressed. Pictures can also be submitted directly to the dashboard which improves the efficiency of monitoring report preparation. One disadvantage of the tool is that it does not actively track the path of the monitoring team. The City should explore the use of an additional application or alternate tracking device that allows for active path monitoring for volunteers. At present the City's Resilience Manager has a personal GPS tracking device that is utilized in conjunction with the ArcGIS applications. A monitoring path map example is shown below which was submitted as part of the 2022 Gabriel/Bagdon Monitoring Report to LCHIP.



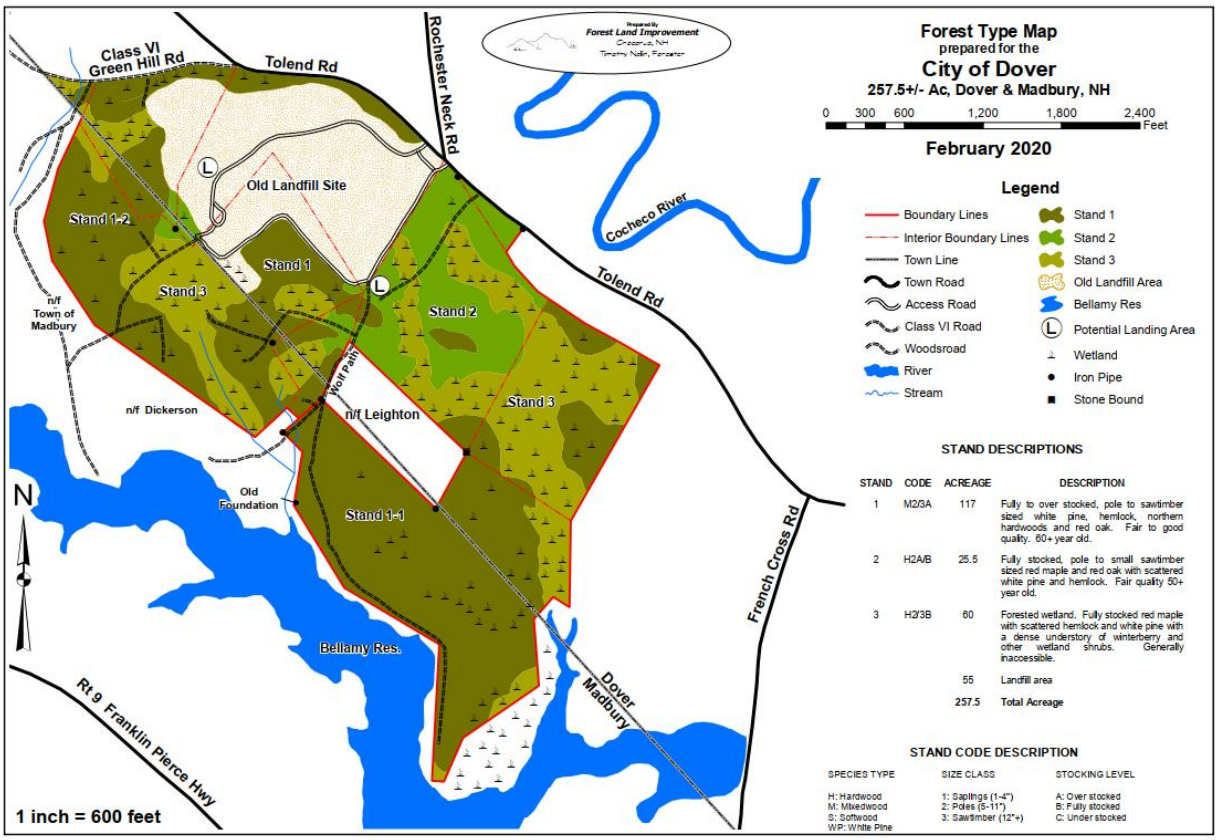
Forest Management

The Forest Management Subcommittee of the Conversation Commission was established in 2019 to advise the City regarding a variety of subjects including potential timber harvests and urban tree management. In 2020 through the request of the Dover Planning Department and Conversation Commission a Forest Stewardship Plan was prepared for the 257.5 acres of City owned property in the old Tolend Rd. Landfill area by NH Licensed Forester Timothy Nolin. The management goals for the property as stated in the plan are listed below:

- The maintenance and enhancement of the wildlife habitat offered by the property.
- The protection of the surface and subsurface water quality as it could have significant impact on the Bellamy Reservoir.

- The improvement of the timber resources.
- The protection of extensive wetland areas.
- If possible/practical, providing open space for passive recreational activities.
- Protect the integrity of the monitoring wells that are part of the remediation efforts on the Superfund site.

The plan contains a wealth of useful information such as detailed descriptions of the woodlot, forest resources, other resource such as wildlife, wetlands etc., and associated recommendations. The Forest Type Map from the Plan is shown below:



Unfortunately, due to COVID-19 the Subcommittee has only recently revisited the Forest Stewardship Plan. The Subcommittee is now at the stage of working with City Staff to implement the identified priorities with continued advice from Tim Nolin (Table 12).

Table 12. Major recommendations and associated goals identified in the Forest Stewardship Plan.

Stands	Recommendation	Goal
	Contact the Leighton family to see about acquiring the property.	Cleaning up ownership and access issues.
	Contact an invasive vegetation management expert to get their opinion about potential remediation efforts on the old landfill site.	Combat the extensive invasive species problems on the site.
	Contact NH Fish and Game regarding Cottontail habitat management on the old landfill site.	Potentially promote habitat for threatened species.
Stand 1-1 Stand 2	Plan and implement timber harvest per recommendations as well as associated access improvements.	Timber growth/stocking improvement, and wildlife habitat work.
Stand 1-2	Plan and implement timber harvest per recommendation as well as associated access improvements.	Timber growth/stocking improvement, and wildlife habitat work.

In addition to the property mentioned above, there may be additional City owned parcels that could benefit from managed forestry. One such parcel is the Smith Well Lot located off of Smith Well Road. This approximately 45-acre parcel was identified by Nolin as a good candidate for a managed timber harvest due to the variety of trees present and sufficient existing access to the site. However, this location is slated for the construction of a water tank beginning in spring 2023 with work expecting to conclude the following spring in 2024. The City and Forest Management Subcommittee should start preparing to initiate management activities upon the conclusion of the water tank project to avoid potential interference.

Section 4: Council Objectives & Implementation Strategy

Relation to Council Goals

At a March 2022, Goal Setting session the City Council developed a series of goals to progress the City's Vision which were formally adopted on April 27th, 2022. The Goals are intended to provide a framework for the Council and Management staff to develop action plans. The contents within Sections 2 and 3 of this Plan are relevant to and will help achieve five of the seven Goals. Table 13 highlights how each subsection within Sections 2 and 3 can be linked to one or more of Goals.

Table 13. Connection between core subsections of the Plan and the 2022 - 2023 City Council Goals. The "X" indicates a connection between the content and the corresponding Goal number.

Subsection	2022 – 2023 Dover City Council Goal Numbers						
	#1	#2	#3	#4	#5	#6	#7
Resilient Dover Outreach	X	X			X	X	
Potential of Dover Community Power	X	X			X	X	
Commercial Property Assessed Clean Energy						X	X
Resilient Food Systems						X	
Overview of Municipal Energy Use					X	X	
Energy Efficiency and Conservation		X			X	X	X
Integration of Heat Pumps						X	
Municipal Solar Expansion		X				X	
EVSE Expansion	X	X				X	X
Forest and Ecosystem Management		X				X	X

Goal #1: Our City is Inclusive and Welcoming

Goal #2: Our City Volunteers are Engaged

Goal #3: Our Waterfront is Developed

Goal #4: Our City's Budget is Collaboratively Created

Goal #5: Our City's Residents are Engaged

Goal #6: Our City is Resilient

Goal #7: Our City is Diverse and Attainable

Summary of Next Steps

This section captures the next steps identified throughout the Plan:

Resilient Dover Outreach

- Continue to periodically devote Dover Download Podcast Episodes to Resiliency Topics.
- Update the Resilient Dover Webpage as initiatives advance.
- Create new "Green Tip" sheets for additional subjects.
- Generate videos like "What is Community Power" for other pending programs.

Potential of Dover Community Power

- If the Council enacts the EAP it then requires submission and approval from the NH Public Utilities Commission.
- The CPCNH Board of Directors has approved a Cost-Sharing Agreement. This governs how costs will be allocated equitably between operating programs through the Coalition. This Agreement requires review and adoption by the City Council before taking effect for DCP.
- Through the recommendation from the CPCNH Risk Management Committee, the Board of Directors adopted the Energy Portfolio Risk Management Policy, Retail Rates Policy, and the Financial Reserves Policy. These policies will also require adoption by the City Council to take effect for DCP.
- Even with Council adoption of the items mentioned above there is no financial commitment. That commitment however is enacted for a three-year term once the Complete Services Bundle is executed by the City Manager. This is the last step prior to CPCNH providing DCP with community power services.

Commercial Property Assessed Clean Energy

- Explore with CPCNH if PACE could integrate with the proposed Dover Community Power Program.
- Connect with MassDevelopment to monitor projects developed through PACE Massachusetts and identify any barriers for implementation in NH.

Resilient Food Systems

- Expand public outreach regarding composting opportunities.
- Prioritize local farm land preservation through the work of the Open Lands Committee and Conservation Commission.
- Consult the Local Regulation of Agriculture Toolkit and identify potential improvements to the Zoning Code.
- Consider implementing some or all of the action items in Table 3.

Overview of Municipal Energy Use

- Encourage and develop local generation projects that increase resiliency to shifts in the global energy markets.
- Conduct an updated GHG-E inventory after recommendations from the Plan are implemented to gauge progress since the 2018 baseline inventory.

Energy Efficiency and Conservation

- Take advantage of and support the continuation of NHSaves.
- Promote opportunities through NHSaves to the community by means of electronic and print outreach efforts.
- Review energy audit results for the WWTF and support the Facility Staff with implementation efforts.
- Consult the Energy Commission and City Council regarding the use of the Energy Efficiency and Conservation Block Grant Program funding.

Integration of Heat Pumps

- Utilize the Community Facilities and Utilities Master Plan Chapter and CIP to identify suitable buildings for ASHP integration.
- Consult NEEP Version 4.0 Specification Sheets when considering cold climate rated heat pump installations.

Municipal Solar Expansion

- Consult the WWTF Energy Audit for details on solar integration at the WWTF.
- Evaluate the Ice Arena rooftop loading capacity to determine if the roofs are suitable for solar panels.
- Track Superfund remediation activities at the Tolend Landfill site and continue to collaborate with the Dover Landfill Group and EPA regarding the potential for a large-scale solar development.

EVSE Expansion

- Review proposed locations with the Parking Commission and Energy Commission.
- Approach Eversource for electric capacity technical assessments as applicable.
- Release an RFP for the identified spaces to select a vendor to deploy and maintain level II EVSE.
- Track statewide progress regarding transactive EV use to supply electricity to the grid in high demand scenarios for payment.

Forest and Ecosystem Management

- Monitor the progression of TDR projects and compare the increase in housing density with conservation land and/or conservation easement acquisition.
- Explore improvements to active GPS path tracking in conjunction with the ArcGIS Conservation Easement Monitoring solution.
- Continue to support the Forest Management Subcommittee with implementing recommendations from the Forest Stewardship Plan.

Implementation Table

To Be Inserted

List of References:

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