



2022 Dover Energy Commission Report

Bill Baber, Chair

Otis Perry, Vice-Chair

Michael Behrmann

Quincy Devine

Walter King

Vincent Lyon

Susan Smith

Arcadia Lee - Alternate

Rebecca Ohler - Alternate

Deborah Thibodeaux, City Council Liaison

Jackson Kaspari, Staff Liaison

Energy Commission Mission Statement

The Dover Energy Commission shall advise the City through its boards and committees on ways to reduce energy use, develop alternative energy sources and increase economic security and energy independence. The goal of the Energy Commission is to promote and encourage energy conservation measures for Dover residents, businesses and municipal operations. The Commission will work with the City Council to review current energy efficiency practices and possible future actions. The Commission's work will be available to the Planning Board as a resource with respect to energy consideration in the next Master Plan Update.

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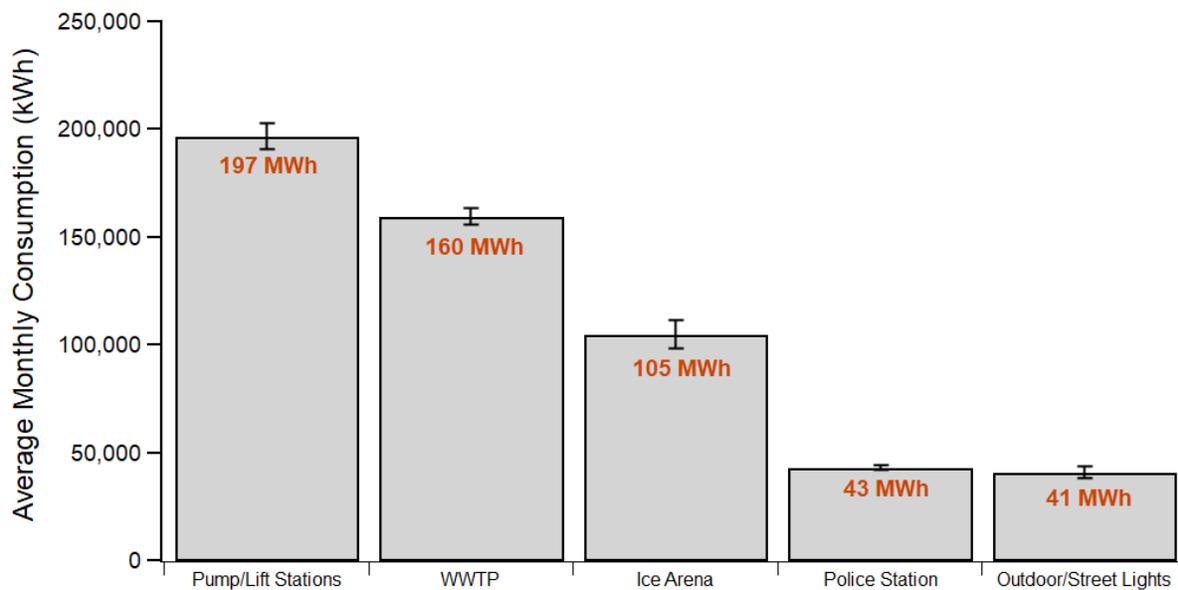
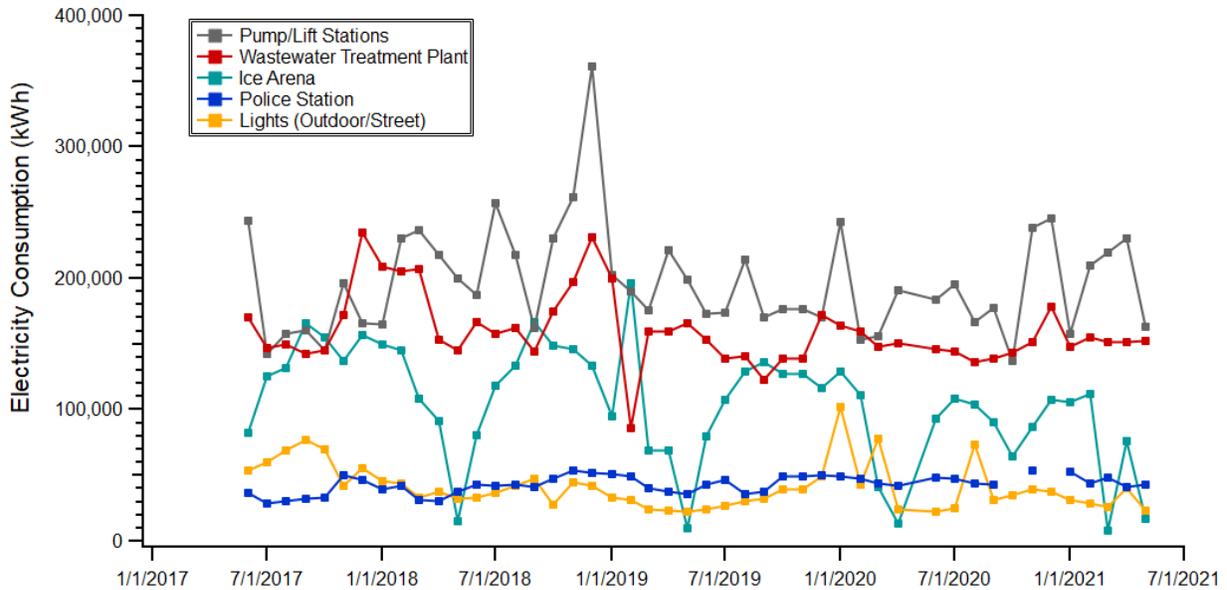
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Setting the Stage:

An overlook at Dover's recent history of municipal electric energy consumption

Analysis of the top five largest municipal electrical energy consumers has revealed negligible change in the monthly consumption rates or comparative ranking thereof. The Commission recommends that the City communicate their support for NH PUC Docket 19-197, "Development of a Statewide, Multi-Use Online Energy Data Platform", so that the City and residents have direct access to quality utility data.



Average monthly consumption 2017-2021

Appreciation for Action Taken:

The addition of the Resilience Coordinator position is proving a wise investment.

The Energy Commission wishes to thank the City Council and City Management for recognizing the lack of a dedicated individual to coordinate energy and sustainability planning. The new position, crafted by then Assistant City Manager Parker, carries the title Resilience Coordinator which we feel is spot on.

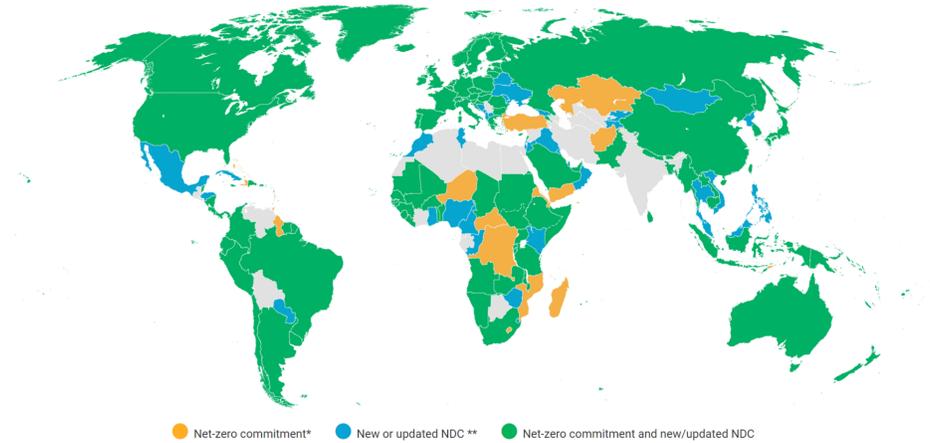
The position opening generated many applicants that brought excellent education and experience, so it is not a surprise that the person hired is proving to be exceptional. Jackson Kaspari, a UNH Ph.D. Candidate was already known to the City from his work with the Planning Office as a research fellow and through his service on the Planning Board.

Here are a few of the tasks taken on by Jackson since September of 2021:

- Began working on crafting a Resilience Chapter for the City's Master Plan.
- Worked with UNH Extension, Energy Commission, Conservation Commission, and the Planning Board to establish a committee on the creation of a Climate Forum Event and a workgroup to produce the content for the forum and website.
- Created a Climate Resources page for the City Website.
- Provided staff assistance for the organizing and facilitating the Energy Commission's EV Car Show.
- Is an Alternate Director representing Dover for the Community Power Coalition of NH where he serves on the Risk Management Committee and developed the vendor communication protocols.
- Assisted the Assistant City Manager with drafting a letter of support for HB549 to be sent to Dover House Representatives.
- Met with various organizations to solicit input on content for the Resilience Master Plan chapter.
- Assisted other Planning Office members working on adding conservation easements.
- Taking the lead on researching grant funding to add EV fast charging location(s) in Dover.
- Aided Purchasing Agent to develop RFP for EV charging stations for the City fleet and took the lead for the selection process.
- Examined the potential for adding network controls for the City's LED street lights.
- Contributed to the evaluation of the feasibility of adding solar powered lights at the new skateboard park.
- Submitted two reports to SELT to complete the City's annual reporting obligation for easement monitoring.
- Acquired and processed aggregate electricity load data for the community supplied by Eversource.

Making Dover Part of the Solution: Actions we can take to attain net-zero by 2050

More than 120 countries have now pledged to reach net zero in some shape or form around mid-century, consistent with the objectives of the Paris Agreement. They include China, the European Union, and the United States, the world's three largest greenhouse gas emitters.¹



October 2021 UN map of national net zero commitments²

Achieving that goal requires that global greenhouse gas emissions drop by half by 2030 and reach net-zero around mid-century. The United States bears a significant responsibility as the source of 13% of current global emission and more cumulative emission than any other country.³ The United States has committed to an ambitious and achievable goal to reduce net greenhouse gas (GHG) emissions 50-52% below 2005 levels in 2030.⁴

Are these goals achievable? Available technologies could allow the United States to achieve net-zero emissions by 2050. This would require rapid and widespread changes in policy and investment across many sectors of society and participation and commitment by government, industry, and individuals.⁵

Reaching these goals will require active, near-term engagement by not only nations, but also by all of us. The Energy Commission believes Dover can become one of the leaders in New Hampshire. Setting an aspirational goal would be a start, but it would be meaningless without a plan. Hiring of a Resilience Coordinator should be recognized as a foundational step toward the creation of such a plan. That effort will require the continued support of elected officials.

We need not await a formal plan to build upon actions the City has already taken. This report is a compendium of actions of proven value that we can take advantage of now.

¹ <https://www.nature.com/articles/s41558-021-01245-w>

² <https://www.un.org/en/climatechange/net-zero-coalition>

³ <https://www.wri.org/insights/5-reasons-us-should-cut-its-ghg-emissions-half-2030>

⁴ <https://www.wri.org/insights/5-reasons-us-should-cut-its-ghg-emissions-half-2030>

⁵ <https://www.nationalacademies.org/based-on-science/is-it-possible-to-achieve-net-zero-emissions>

Reducing Greenhouse Gas Emissions: Creating an Achievable Path Forward for Dover

The Energy Commission has long held the opinion that Dover should become part of the solution. To that end, we need an achievable plan and not simply an aspirational goal.

Developing an executable plan of such complexity where the scope spans beyond the brief of our commission is one reason we advocated so strongly for the creation of the new Resilience Coordinator position. A near-term goal of this position is the creation of a new Resilience Plan chapter for the City's Master Plan. A priority of the Commission is to support the Resilience Coordinator's work to ensure there is a foundation for the City to move forward with meaningful greenhouse gas reduction by the municipality and City as a whole.

To reliably track performance toward our climate goals, the City of Dover must:

- Set an emissions reporting boundary around buildings, vehicles, and electricity and be clear in our communications about how we define our goals. Reporting should include. Scope 1 direct emissions (e.g. stationary fuel use, municipal fleet), scope 2 indirect emissions (e.g. purchased electricity) and scope 3 indirect emissions (e.g. employee commutes, travel, computer servers, etc.)
- Develop a plan to collect and analyze energy use data and estimate emissions from municipal buildings, vehicles, and electricity.
- Create annual or 3-year emission reduction targets to evaluate performance. Interim targets are key to successful implementation, it's an opportunity to see what is working and what is not.
- Review GHG management framework on a 3-5 year basis. Emission tracking tools and methodologies are constantly evolving and this is an opportunity to improve on best practice.

To bring about a reduction in residential GHG emissions, Dover should consider a two-pronged approach: education and outreach programs.

- **Education:** eg. renewable energy educational series, including residential solar, waste reduction through composting, alternatives to plastics, adding content to the City of Dover Download and City website with tips, or one recommended energy efficiency action per month
- **Outreach programs:** eg. cost-effective residential weatherization programs, bike share, programs like Energize 360 "Solarize Dover" similar to "Solarize Hanover," which simplifies the solarization/weatherization process for residents (city partners with solar companies that have a track record in the area and offer a variety of installation models, and help plan for related technologies. The City could facilitate networking opportunities for residents to meet others who have gone solar to get advice and guidance.)

Increase Energy Efficiency and Conservation: Identify opportunities at the municipality and the community to invest

Over the last several years, Dover has completed several energy-efficiency programs focused on municipal operations including LED light conversions; smart street lights; EV municipal cars.

The City should explore expanding energy efficiency efforts to include:

- Community-wide initiatives that focus on GHG reduction, retrofitting older buildings, curtailing energy consumption and/or increasing the share of electricity generated from renewable sources with an eye towards equity-driven community engagement.
- Building policies that extend to private buildings, increasing transportation efficiency, and reducing traffic congestion, all which help reduce GHG emissions.
- Opportunities to conserve energy in municipal buildings (e.g. installing occupancy sensors on public use lights and sinks)
- Evaluate the City's capital planning process for improvements to upgrade efficiency of municipal buildings and transportation.
- Incorporate energy efficiency and conservation into City capital planning efforts (e.g. electrification, installing occupancy sensors on public use lights and sinks, etc.). Plans shall include electrical power supply upgrades where necessary to support increased use of high-performance electrical equipment such as EV charging stations, cold climate heat pumps, induction stoves, etc.
- Provide leadership to enlist the community in a city-wide effort to help Dover reach its energy efficiency goals. This should include community outreach and education as well as providing specific programs.
- Partner with other cities/counties to advocate for state and national climate policies and take collective action

To help us meet these goals, our City must work with state leadership to ensure low-carbon, efficient building solutions that meet local needs through local and regional partnerships. We must work with utilities, state agencies and organizations, such as Northeast Energy Efficiency Partnerships (NEEP).

Funding these investments may come from federal and state efficiency programs where available.

Update on Community Power:

Where Dover's engagement with Community Power Coalition of NH stands

Background: The City of Dover is one of the founding members of the Community Power Coalition of New Hampshire (CPCNH). Deputy City Manager Parker is Dover's current Director who sits on CPCNH's Board of Directors and the Coalitions Member Operations and Engagement Committee. Resilience Coordinator Kaspari serves as the Alternate Director and acts as the Clerk for the Coalition's Risk Management Committee.

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 18. In total these communities represent approximately 20% of New Hampshire's population and nearly 800,000 MWH/year of default provided electricity consumption. Interest to join the Coalition has been expressed by an additional 23 communities with a combined population of roughly 340,000 and an additional 1,100,000 per year in default service load.

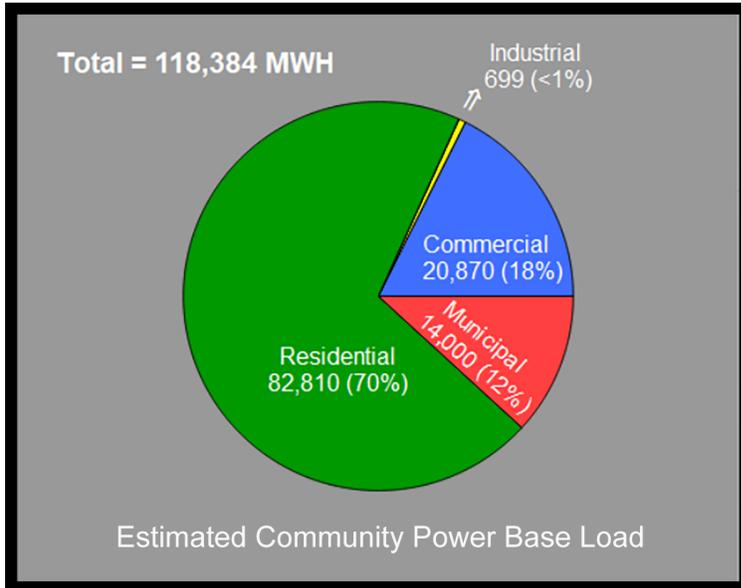
The New Hampshire Legislature enacted RSA 53-E which authorizes local governments to launch CPA programs that serve as an alternative to the default electricity supplier for residents and businesses. The City is currently developing a Dover Community Power (DCP) program, which is presented in more detail in Dover's Electric Aggregation Plan (EAP) which is being compiled by the Electric Aggregation Committee composed of members from the Energy Commission. Through this model customers that are on default supply will be automatically enrolled in the DCP 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.

Principal objectives of CPCNH as 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."

Dover’s Electrical Load: 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.



This chart highlights the breakdown of aggregate electricity usage from the current default supplier and contribution of municipal usage. Residential, commercial and municipal rate classes comprise essentially 100% of usage. The residential sector alone accounts for 70% of usage.

The table below 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 the table. Based on this analysis DCP would provide over 15,000 customers with cleaner electricity at a lower or comparable cost to the current default.

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

Next Steps for Dover: The following list identifies next steps Dover must take to launch Dover Community Power:

- Council Resolution designating the Energy Commission as Dover's EAC.
- Preparation of the EAP.
- EAC holds two public hearings for feedback on the EAP.
- City Council Adoption of the EAP.
- Acceptance of the EAP by the NH Public Utilities Commission.
- DCP launches parallel with other member communities' programs.

Next Steps for CPCNH: The following list identifies next steps CPCNH must take to be prepared for launch of member community power programs:

- Review of the Request for Information Responses
- Establish contracts with prospective CPCNH support staff
- Prepare and release of a Request for Proposals to prospective vendors
 - Informational Webinar
 - Respond to vendor questions
 - Evaluation of RFP responses using established criteria
 - Short list and conduct interviews
 - Negotiate and award contract(s)

Resources:

Main CPCNH Site: <https://www.cpcnh.org/>

Joint Powers Agreement:

https://www.cpcnh.org/files/ugd/202f2e_de53dea78f974a79bfb211b31e1b8d4d.pdf

Utilize Large Scale Solar Opportunities:

Energy Commission recommends taking prompt action to minimize future costs

At the time of this writing, the anticipated Federal solar investment tax credit extension has not happened and the prospects are not bright. This year the credit is 26%. Next year it will drop to 22% and for 2023 the credit goes down to 10%. We also are entering into a period of rising interest rates.

What does this mean for Dover? In brief, it means that the rates for power available through power purchase agreements (PPA) are going to rise, perhaps sharply, in order to attract investors. This means there is a near-term window of time when significant solar installations will be more attractive propositions.

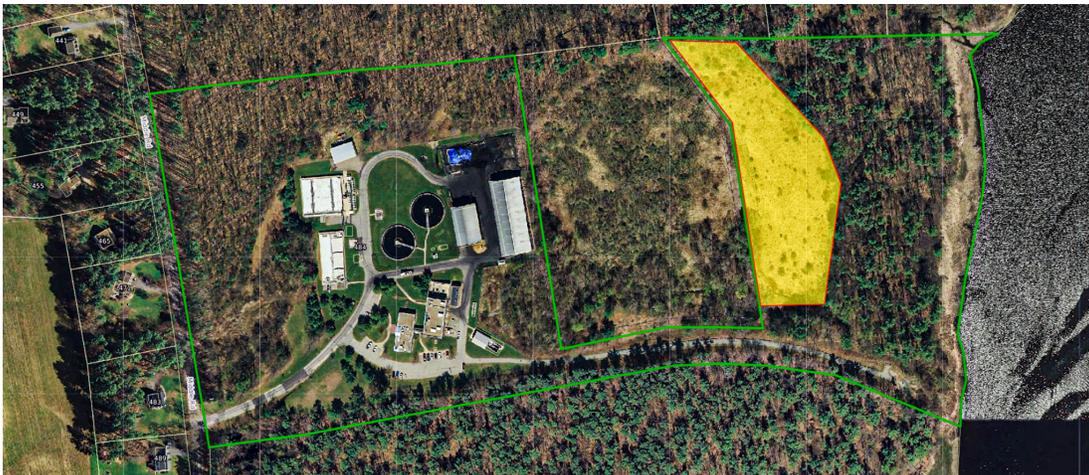
The Energy Commission encourages the City to explore solar options that could be executed in time to minimize the likely forthcoming power cost increases under PPAs. We are suggesting two sites that appear to be good candidates and suggest that the School District also consider options on their campuses.

Solar site suggestion No. 1 - Wastewater Treatment Facility: Why it is an attractive option.

- It has the largest consumption of electric power at a given site consuming nearly 2,000,000 kWh of power annually.
- There is an attached City owned parcel of land of sufficient size to host a solar array large enough to offset the power consumed onsite.
- Since the plant has a relatively flat daily consumption curve, much of the solar power generated can be consumed “behind the meter” which yields the best ROI.

Potential concerns at this location:

- The land identified in the image below is a landfill, perhaps from a tannery. There may be regulatory hurdles that will drive up costs or make the land totally unsuitable.
- This parcel is not immediately adjacent to the plant which will add some additional installation expenses.



The green line is the boundary of the treatment plant property. The highlighted area is a possible pole-mounted solar array location large enough to offset the plant's total consumption. MapGeo

Solar site suggestion No. 2 - Dover Ice Arena: Why it is an attractive option.

- The Ice Arena had the City's second largest power consumption at a single location consuming more than 1,000,000 kWh annually.
- The arena has pitched metal roofs with an unobstructed southeasterly orientation.
 - Rooftop installations are usually less expensive than pole-mounted arrays.
 - Since panels can be clipped directly to metal roofs, costs and weights are lower.
 - Pitched roofs have a better yield and snow shedding characteristics.
 - Orientation and freedom from obstructions are excellent for production efficiency.
- Roof mounted arrays would probably yield about half of the total consumed power. This means much of the power will be consumed "behind the meter."

Potential concerns at this location:

- It is currently unknown if the roofs, as built, will support the weight of a solar installation. Given that the design load for snow should be around 60 lb/sq/ft and panel installation weights come in around 3 lb/sq/ft, it is reasonable to assume this additional load will fall within requirements.



North up view of the Dover Ice Arena on Portland Avenue. Google Earth

Advances in Offshore Wind Power from the Gulf of Maine: Review of the process and recommendations for engagement

Background: The development of offshore wind power in the Gulf of Maine continues to move forward with interest and activity within the states of New Hampshire, Maine, and Massachusetts. The process entails a review of potential development areas. The areas of greater interest are outside of the three mile control of states within the federal jurisdiction overseen by the Bureau of Offshore Energy Management (BOEM) housed in the Department of the Interior. This federal water review process will take several years and requires convening of state and tribal officials in the area of review. In the Gulf of Maine's case, this involves a regional task force from elected representatives, or their designated representatives, from New Hampshire, Maine, and Massachusetts. To date there has only been one convening of the Gulf of Maine Intergovernmental Task Force. Once the task force determines the specific areas deemed to be appropriate for offshore wind development, an auction will be held to allow prospective developers to bid on leases. Only upon the completion of this process may construction of offshore wind resources commence.

An important Gulf of Maine distinction is the depth, or bathymetry, of the ocean in the Gulf. This has resulted in a slightly slower process than other regions. Because the water reaches relatively deep depths not too far offshore, the development of these waters will primarily require the use of floating offshore wind foundations. These types of foundations are quite novel in offshore development around the world and have tended to be more expensive than the traditional fixed bottom type of foundations. However, this technology is rapidly evolving making floating foundations more cost competitive, thus providing greater opportunity and interest in the development of this region. A measure of current investment interest in offshore wind development can be seen in BOEM bids for leases in the NY Bight that have topped \$3 billion.

Future Activities and Recommendations: State officials involved in the regional task force are anticipating the next task force meeting will occur sometime in the spring of this year, 2022. This meeting will advance activities necessary for the identification of the wind energy areas in the Gulf. The Commission recommends Dover engage representatives at the local, state, and federal level to indicate their support for this technology and the development of this industry. There are significant economic opportunities that can benefit the City of Dover, its workers, and businesses during the pre-construction, construction, and operation and maintenance stages of this industry.

Senator David Watters is heavily engaged and a leading voice in the development of the offshore wind industry in New Hampshire. The Commission recommends that the City Council provide a supportive statement acknowledging his efforts to bring the offshore wind industry to the state while ensuring appropriate consideration to other marine based interests such as commercial and recreational fishing, tourism, and the general blue economy. It is widely held that the Gulf of Maine will be developed with offshore wind. City Council's active support for offshore wind development in the Gulf will aid the prospects of the Seacoast becoming one of the vital support hubs for this development, as well as the recipient of this significant source of renewable energy.

Explore Alternative Low CO₂ Local Power Option: When electric energy from renewable sources is inappropriate, fuel cells are an option for consideration.

Issue: A solar installation, for example, requires several attributes to make it a viable candidate for development (e.g. adequate space on land or roofs, good year-round sun exposure, and ideally, the site's consumption would occur during peak generation times.)

When to consider an alternative solution: Locally-generated, renewable solution is not viable and/or a low carbon emission option is unavailable via community power if adopted.

What are fuel cells: The U.S. Department of Energy definition: *“Fuel cells work like batteries, but they do not run down or need recharging. They produce electricity and heat as long as fuel is supplied. A fuel cell consists of two electrodes—a negative electrode (or anode) and a positive electrode (or cathode)—sandwiched around an electrolyte. A fuel, such as hydrogen, is fed to the anode, and air is fed to the cathode. In a hydrogen fuel cell, a catalyst at the anode separates hydrogen molecules into protons and electrons, which take different paths to the cathode. The electrons go through an external circuit, creating a flow of electricity. The protons migrate through the electrolyte to the cathode, where they unite with oxygen and the electrons to produce water and heat.”* Natural gas is a common fuel source for fuel cells.

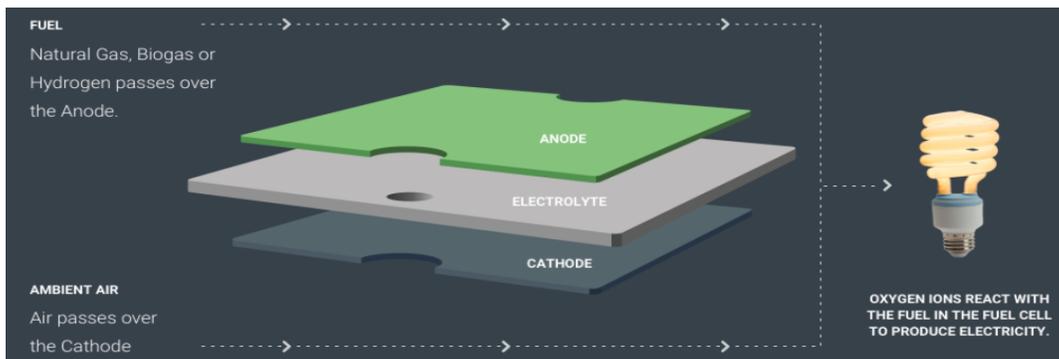


Image source: Bloom Energy

A theoretical example using Bloom Energy solid oxide fuel cells:

Example installation: A 250Kw Tier 1 sized Microgrid with a 15 year Power Purchase Agreement (PPA), would provide a no upfront cost option to the city with the vendor paying for the installation. It could return reductions in total greenhouse gas emissions, it may have a slight cost advantage, and it would lock in a known future power rate.

Considerations: A fairly large power consuming site would be needed to be cost effective; post PPA purchase, maintenance and decommissioning costs are unknown; fuel cell power is available 24/7.

Electrification of Transportation: Why, when, and how this will impact Dover

It is projected that by the end of this decade half of the vehicles produced will be EVs.

Why the rapid change?

- Strong incentives at the federal level and in many other states.
- Public acceptance and demand is growing.
- Technology and production advancements are driving down costs and increasing range.
- Lower total cost of ownership when factoring in lower fuel and maintenance costs and a longer vehicle lifespan than internal combustion powered vehicles. Some Teslas in commercial service have logged over a million miles.

When will we see the change? It is happening now:

- 2022 is seeing an explosion of new EV models with over 50 debuting this year.
- U.S. EV sales growth was 89% in 2021 with far steeper growth projected for 2022.
- Company's targeted EV production rates: Ford - 600,000 this year; GM - 1,000,000 by 2025; Tesla - 1,300,000 this year. New U.S. EV producers will include: Cadillac, BMW, GMC, Lordstown, Lucid, Polestar, Rivian, Volvo, and VW.
- 13 new EV battery production plants will be opening in the U.S. by 2025. These were announced prior to the DOE announcement of \$3 billion in new funding to support US EV battery manufacturing and recycling.
- Ernst and Young predict that by 2030 non-EVs will account for less than half of overall light vehicle registrations.
- The types of public vehicles are changing:
 - Electric scooter rentals are already impacting world city streets and sidewalks.
 - Autonomous shared-use vehicles are in wide-spread advanced testing.
 - Urban areas are seeing the introduction of intra city electric buses.

EV impacts to the community:

- Our air will become cleaner and noise levels will be reduced.
- There will be a significant increase in the demand for public EV charging stations.
- The addition of rapid charging stations (we currently have none, but there is a pending grant application) will be an important factor in attracting travelers to stop in Dover.
- The need for gasoline and diesel filling stations will be reduced.
- It is reasonable to assume EV owners will push to have better access to renewable charging power.

Recommend actions for the City:

- Lead by example by continuing to expand the City's utilization of EVs. The current state bid includes attractive EV options.
- Work to increase access to charging stations for residents and visitors, both through code and zoning requirements for multi-family dwellings and businesses, and by enabling and encouraging public fast-charging.

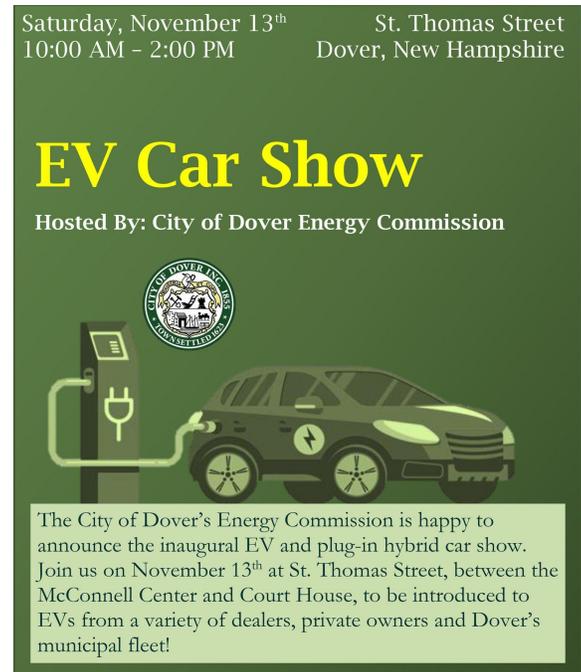
Electrification of Transportation: The Energy Commission EV Car Show 2021 & 2022

2021 - The Inaugural EV Car Show - Given the rapidly increasing availability of EVs, the Commission thought an EV car show would be an excellent way for more members of the community to see not only what is currently available, but also to provide the opportunity to speak directly with owners about their experiences. We believe it is important that the public is aware of the greater choices and more competitive pricing as more EVs on our roads will lead to a better quality of life for all residents.

The first show was a big success. Several participants said it was the best EV show they had ever attended in the state. More than 30 vehicles were available to experience. Most cars came with their proud owners, every dealer in the area with available inventory participated, and two of the City's own expanding fleet were front and center. Vehicles ranged from very exotic cars to pragmatic electrified bicycles designed for urban delivery service. Fortunately, most of the cars attending could be acquired at cost near to that of the average new car.

2022 - EV Car Show Joins Apple Harvest Day - We are pleased to share that the Greater Dover Chamber of Commerce has invited the Energy Commission to become part of Dover's largest, annual, public event. The car show will be held again on St. Thomas Street following the road race conclusion.

Given the positive feedback we received from the first show, and the goodwill it brought the City, a second show seems like a natural. Much was learned from the rapidly organized first show. With more time to organize, with more available vehicles, and holding it in concert with AHD, there is every reason to believe far more citizens will be able to enjoy their first hands-on introduction to the future of transportation.



Saturday, November 13th 10:00 AM - 2:00 PM St. Thomas Street
Dover, New Hampshire

EV Car Show

Hosted By: City of Dover Energy Commission



The City of Dover's Energy Commission is happy to announce the inaugural EV and plug-in hybrid car show. Join us on November 13th at St. Thomas Street, between the McConnell Center and Court House, to be introduced to EVs from a variety of dealers, private owners and Dover's municipal fleet!



Electrification of Transportation: Electric Vehicle (EV) Charging in Dover

There are many reasons to transition to electric transportation modes, including lower cost and environmental benefits. But if you decide to own an electric vehicle you will need a place to charge it. Where and how you charge will depend on several factors, but primarily on where you live, how far you drive on a typical day and the level of charge your EV can receive.

EV chargers come in three categories: Level 1, Level 2 and direct current fast charging (DCFC). One distinction between these three levels is the input voltage, Level 1 uses 110/120 volts, Level 2 uses 208/240 volts and DCFC uses between 200 and 600 volts.

Level 1 charging can provide 3-6 miles of range per hour of charging, is typically installed at homes, multi-unit dwelling residents, and workplaces, and can be a viable solution for those that typically travel 30-40 miles per day.

Level 2 charging is the most common charging solution for both residential and commercial/workplace settings and can be installed either in a garage or outdoors. Level 2 provides 15 to 35 miles of range per hour of charging. Public Level 2 chargers are typically networked to a service provider to enable payment for the charge received.

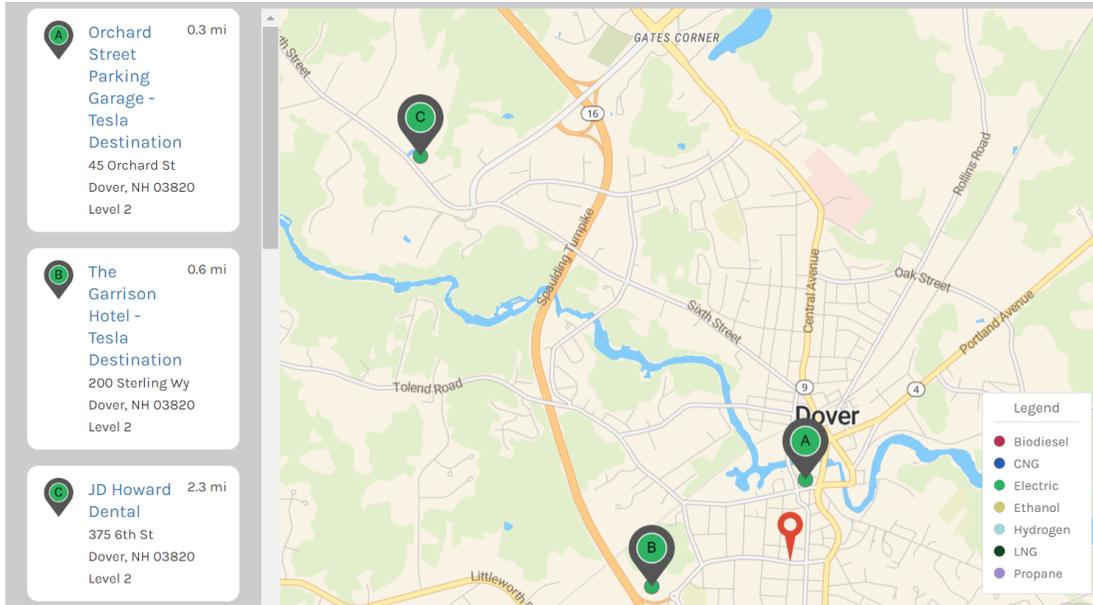
DCFC are commercial chargers that will deliver 100 to 300 miles of range in about 30 minutes depending on the vehicle and the charger. Not all EVs are equipped to charge via DCFC.

Though most vehicle manufacturers have adopted a common charging protocol for both Level 2 and DC fast charging, Tesla stands out for having their own proprietary charging connection. Tesla chargers, which are the most prevalent in NH due to investment by the company itself, cannot be utilized by any other vehicle brand.

Dover counts on visitors to support our local businesses. As EV adoption increases across the region, particularly in surrounding states and Quebec who are all vigorously supporting the transition to electric vehicles, those owners will seek destinations that support their transportation choice. A family who can charge their EV while visiting the Children's Museum, attending summer music, or dining in our downtown area are more likely to choose Dover as their destination. Such charging needs to be abundant, visible, accessible, and cost effective.

Dover businesses work to attract the next generation workforce. Availability of charging infrastructure, both public and at multi-unit dwelling locations, will help our businesses compete for this workforce.

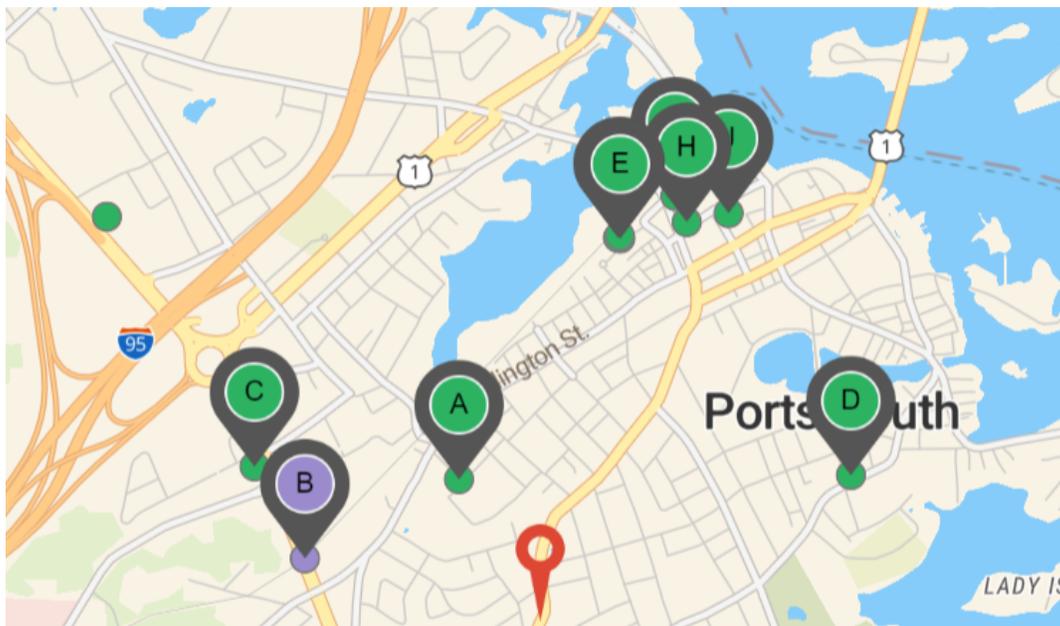
Steps such as requiring new construction to enable future EV charging infrastructure is an important first step, but more aggressive action is needed for Dover to become a leader in the region.



Dover currently has only three public charging stations

You can find available charging through several websites, including the Alternative Fuels Data Center (see above map) station locator and proprietary charger applications such as Plugshare.com and ChargePoint.com. While there are several publicly available non-Tesla Level 2 chargers in the seacoast region, including Level 2 chargers in the Dover Orchard Street parking garage, at Hilltop Chevrolet in Somersworth, Emery Farm on Route 4, and two locations in Durham, much more is needed for Dover to be recognized as an EV friendly community.

By contrast, Portsmouth currently has seven locations and is expanding.



Resource: <https://afdc.energy.gov/stations/#/find/nearest>

Appendix

The following links will aid readers gaining an enhanced understanding of the need, role, and actions cities can take.

Pledges and Progress: Steps toward greenhouse gas emissions reductions in the 100 largest cities across the United States - Brookings

https://www.brookings.edu/wp-content/uploads/2020/10/FP_20201022_ghg_pledges_exec_sum_v4.pdf

Seven Ways Cities Can Take Climate Action - United Nations

<https://unfccc.int/blog/seven-ways-cities-can-take-climate-action>

How urban planning is key to net zero: evidence from London - Centre for Cities

<https://www.centreforcities.org/blog/how-urban-planning-is-key-to-net-zero/>

How cities are going carbon neutral - BBC

<https://www.bbc.com/future/article/20211115-how-cities-are-going-carbon-neutral>

How to Reduce the Carbon Footprint of a City - Villanova University

<https://www.villanovau.com/resources/public-administration/reduce-carbon-footprint-city/>

Six impactful actions cities can take to reduce transport emissions - C40

https://www.c40knowledgehub.org/s/article/Six-impactful-actions-cities-can-take-to-reduce-transport-emissions?language=en_US

The Net-zero transition: What it would cost, what it could bring - McKinsey

<https://www.mckinsey.com/business-functions/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring>

Why the automotive future is electric - McKinsey

<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/why-the-automotive-future-is-electric>

Bureau of Ocean Energy Management New York Bight Leases

<https://www.boem.gov/renewable-energy/state-activities/new-york-bight>