ENERGY & CLIMATE COMMITTEE MEETING AGENDA

Wednesday, May 5, 2021, 8:00 AM Virtual Meeting (Zoom)

TO JOIN THE MEETING:
The public may join the meeting online by visiting www.zoom.us/join or by calling (888) 475-4499 (toll-free) and entering the Meeting ID: **860 6322 7039**. If you encounter any issues accessing this meeting, please call 603-209-4697 during the meeting. More info on how to access this meeting is available on the Energy and Climate Committee webpage at ci.keene.nh.us/energy-and-climate-committee.

Members:
Peter Hansel, Chair
Cary Gaunt, Vice Chair
Ken Dooley
Councilor Raleigh Ormerod
Jake Pipp
Jude Nuru
Paul Roth
Zach Luse
Suzanne Butcher
Bryan Lake
Andrew Dey
Clair Oursler, Alternate

Staff:
Rhett Lamb, ACM/Community Development Director & Mari Brunner, Planner

1. Call to Order and Roll Call
2. Approval of Minutes
    a. February 16, 2021 Meeting (ECC Retreat)
    b. April 7, 2021 Meeting
3. Presentation: Draft City of Keene EV Ready Guidelines & Solar Ready Guidelines – Julia Anselmo, KSC student intern
4. Energy Plan Work Groups
    a. Weatherization
    b. Home Energy Labeling
    c. Electric Vehicles
    d. Community Solar
5. Correspondence from Jessica Forrest re: Delay in PUC implementation of the 2021-2023 New Hampshire Statewide Energy Efficiency Plan
6. Legislative Updates
7. Keene Community Power
8. New Business
9. Next Meeting: Wednesday, June 2, 2021
10. Adjourn

Link to ECC Google Folder: https://drive.google.com/drive/folders/1O1WlR0fADTNijRt13v3DU7k2FxwXDcGs?usp=sharing

ENERGY & CLIMATE COMMITTEE MEETING MINUTES

Tuesday, February 16, 2021 3:00-5:00 PM Virtual Meeting (Zoom)

Members:
Peter Hansel, Chair
Cary Gaunt, Vice Chair
Ken Dooley
Jude Nuru
Paul Roth
Zach Luse
Andrew Dey
Clair Oursler, Alternate

Members not present:
Jake Pipp

Staff:
Mari Brunner, Planner

Chair Hansel called the meeting to order at 3:00 PM.

1. **Roll Call**
Chair Hansel read a prepared statement explaining how Emergency Order #12, issued by the Governor of the State of New Hampshire, pursuant to Executive Order #2020-04, gives authority for public meetings to be held remotely and shared information about how members of the public can listen and share comments. He then read the Zoom platform rules aloud and roll call was conducted.

2. **Introductions**
Dr. Jim Gruber introduced himself as retreat facilitator and asked members to introduce themselves and provide a bit of background of how and why they have come to participate in the committee. All members introduced themselves and described their various backgrounds.

Ms. Brunner announced that Dr. Ann Shedd, former Chair of ECC is in the attendee list, along with three prospective members of the committee, Mr. Chuck Weed, Ms. Denise Thomas and Ms. Suzanne Butcher.

3. **Review of ECC Purpose and Functions**
Chair Hansel provided an overview of the purpose of the Energy and Climate Committee (ECC). He said the wording was devised when they changed their title from the Cities for Climate Protection Committee to the Energy and Climate Committee. He read the purpose statement: "In order to protect Keene's public health, safety and welfare, as well as the economic vitality of the

community the ECC exists to monitor and advocate for the reduction of greenhouse gas emissions, promote energy conservation, as well as the use and production of renewable energy and increase awareness and resilience to the expected impacts of a changing climate."

Ms. Brunner provided an overview of how ECC functions as a committee. She included a list of functions on page three of the agenda packet. She listed some examples of activities the ECC has done in the past, for example the ECC has sponsored NH Saves Button Up workshops in the community, both as the lead organizer and more recently as a co-sponsor with the Clean Energy Team, which falls under the increased awareness of the committee's purpose. She stated that ECC has also requested the City Council to take a formal position of opposition on HB315. She said ECC can make recommendations to City Council which will be referred to one of three City Council committees based on the nature of the topic. She said that the public then has an opportunity to weigh in and it is referred back to City Council for a vote and the process takes a minimum of four weeks which has been a challenge in the past as legislation can be passed before the committee hearing takes place. Ms. Brunner said that ECC has also made recommendations for City Council to participate in a specific program, such as the SolSmart program, or recommend that the City participate in a specific policy. She stated that ECC can also apply for grant funding to help cover costs of programs and events which has not been done much in the recent past.

Mr. Weed noted that he has been in correspondence with the head of the Science and Technology committee of the New Hampshire House, and his concern is that people who are less able to bear the burden of the costs of such projects will not benefit. Chair Hansel emphasized that the ECC recognizes impacts on all strata of the community and that they are cognizant of how programs will impact all community members. Ms. Brunner stated that she put a link into the chat for members to enter information into a Google sheet. Dr. Gruber stated that the Google sheet is intended for members to enter their ideas on "how" to accomplish the functions of ECC. He said the sheet is set up to show "what" ECC wants to do and provides a space for members to offer their feedback on how those functions may be actually carried out.

Dr. Gruber reviewed the broad areas in which the ECC functions, and stated that the plan for today is for members to type in their thoughts into the space provided on the Google sheet for how to accomplish each function listed. Mr. Dey asked if the local action plan and the climate action plan are synonymous and Ms. Brunner said that they are. Members entered their feedback into the Google sheet. Ms. Brunner read aloud some of the examples provided by members on the "how" of each function listed.

4. **Sustainable Energy Plan Implementation**

a. Overview of Plan Vision and Implementation Pathways

Vice Chair Gaunt thanked Dr. Shedd for her leadership on the ECC, as well as Chair Hansel, Ms. Brunner and City staff. She stated that in January of 2019, the City Council adopted the Sustainable Energy Resolution which states "one hundred percent of the electricity consumed in the City of Keene will come from renewable sources by 2030 and one hundred percent of the energy used for transportation will come from renewable sources in 2050." She noted that the Sustainable Energy Plan is a roadmap on how to

achieve these goals. She stated that the vision for the Energy Plan that is that by 2050, Keene will be a "thriving and resilient community powered by affordable, clean and renewable energy. All electricity and energy used for heating, cooling and transportation will come from renewable energy sources." She said there was much discussion in previous retreats about the wording and language of the vision. They talked at great length to make sure that the wording is inclusive of all community members and that resiliency is built in and has staying power. She asked what that means in practice and noted that there are four pathways: (1) reduce energy use, (2) all City sectors will collaborate to generate and store renewable energy locally, (3) if they cannot fully cover energy generation locally, the idea is to switch remaining energy demand to renewable sources that come from beyond the community, and (4) conduct ongoing advocacy and information-sharing to both educate people and encourage their involvement. She said that ideally as this moves forward there will be more advocates for the plan to push it forward. And finally, how do we show that progress is being made through information-sharing.

b. Near-term Implementation Priorities

Dr. Gruber stated that for the coming year, there are five near-term implementation strategies in the Sustainable Energy Plan that ECC has identified. Ms. Brunner noted that those five strategies are included in the agenda packet. Dr. Gruber said these include Home energy labeling and weatherization programs, advocacy for public transportation, Heart Smart campaign and the advocacy for EV infrastructure. Chair Hansel noted that they added the home energy labeling under the ECC's purview, which is now listed as voluntary. Dr. Gruber stated that there are high level steps on how to proceed on these steps and to put together a working plan on how this can be achieved this year.

Dr. Gruber introduced the *Voluntary Home Energy labeling* program slide and asked members to enter their ideas on "how' this can be achieved and what partners should be involved. Chair Hansel proposed that they engage entities from other locations to discuss how they achieved their program, so as not 'reinvent the wheel" and receive guidance. Dr. Gruber agreed with that idea. Mr. Dey proposed that they do not limit their guidance to just NH and to invite expertise from other states as well. Vice Chair Gaunt suggested that they begin to develop what ECC thinks are the best options and based on that review discuss how to achieve the goal. Chair Hansel stated that there will be pushback on this goal, so they should encourage property owners to participate in the process. Mr. Nuru agreed and said they should also aim to include the utilities as they are likely to be a source of pushback on this program. Chair Hansel agreed. Mr. Luse added that some cities have done rebates as incentives and that may be appropriate here. Vice Chair Gaunt agreed that highlighting the benefits and rebates is key. Vice Chair Hansel said that multiple listings already have some information gathering they are already doing and perhaps they should find a way to incorporate that information into what they are doing as well. Vice Chair Gaunt added that at Keene State College (KSC), they want to develop a green rating system so that students can pick and choose where they may want to live off campus based on how much money would be spent on energy use. She said the idea was to have different tiers, for example, sustainable energy and well-being; they were developing a metric on how landlords can meet certain criteria, for example, free

recycling, renewable gas or natural gas. She said this is different than home energy labeling but can provide a pilot test. Mr. Roth added that they can look at KSC as a benchmark, as there is no way to evaluate best practices now as Energy Star is more business based and not residential.

Ms. Brunner added that benchmarking is a separate item that the City is going to pursue in the near-term for City buildings which will use a software like Energy Star. However, the home energy labeling is a label that compares the energy efficiency of homes to other homes to provide information to buyers or renters on how much it will cost to operate that home. Ms. Gaunt said it boils down to some people will want an energy labeling based on a soundbite. Chuck Weed stated that when he switched to solar though his provider, people informed him that he was subsidizing corporations from Texas, therefore it would be good to rate local renewables that would not be sending subsidies to Texas. Chair Hansel said that may be applicable to a separate part of the program and not home energy labeling, as the latter is mainly concerned with heating and air conditioning, and could also involve energy sources. Dr. Gruber said that in the interest of time, are there key partners that should be involved. Mr. Dey proposed that they tie this into the weatherization program and energy audit. This might make people more amenable if it is attached to that specific process. Chair Hansel said that metrics are also going to be a key part and how the City is going to gather that information is an important part of the goal. Dr. Gruber encouraged Chair Hansel to state that ECC should add a metric system into the program. Mr. Roth proposed that they should partner with the suppliers because more efficiency means less sale of their product, therefore it may be wise to include them in the process.

Dr. Gruber moved to the next slide on the *Weatherization program.* He asked how they should proceed with these high-level actions. Vice Chair Gaunt stated that reviving a team of KSC student volunteer energy auditors might be helpful. Chair Hansel stated that Eversource and Southwest Community Services (SCS) already have programs, and asked if there a way to find out how comprehensive they are and how many homes have they have already done. Mr. Luse agreed that he had to do a ton of his own research to acquire that information. Chair Hansel stated that they will also need a number of volunteers like the Clean Energy Team and others will have their own ideas and will want to support the effort. Mr. Nuru said that apart from the Clean Energy group, other mission-aligned organizations are likely to support these kinds of actions. Mr. Dey said that the Button Up Programs are also aligned with this work. Chair Hansel agreed and said that they were tied in with NH Saves and performed workshops for residents in Keene. Ms. Brunner stated that part of the strategy was to continue Button Up workshops, and other examples like Vital Communities in the Upper Valley, partnered with NH Saves and on a local level raised funds to hire a local person to serve as a resource for businesses and residents who wanted to use the NH Saves program to provide information and resources. She said that one idea is to have a person like this housed in Keene to support existing programs where they are at and help amplify their impact. Mr. Dey said that perhaps the way to have the biggest impact is to help people take advantage of existing programs, for example, Efficiency Vermont for a number of years had people that were called Energy Guides to help people navigate the programs. Mr. Luse noted that CDFA and BFA have

similar energy programs. Chair Hansel proposed that if they do another Button Up type workshop, they could have some actual people come in to talk about their experience and challenges. He said he has done four NH Saves buildings and his question is how they are going to measure success and is unsure of how NH Saves or any of the other groups will share that information. Mr. Roth and Mr. Dey suggested that they have testimonials and case studies on their websites.

Ms. Gaunt shared that she just had a big insulation project done on her house in Vermont, and the firm that did the work had their own expert that was connected with Efficiency Vermont but also an employee of the contracting firm, so perhaps having a program that trains staff on what is available and how to achieve this could be very beneficial. Chair Hansel added that Dr. Shedd has some ideas on this subject as well. Dr. Shedd stated that she recently verified with one of the efficiency folks at Eversource that there is a lot more money available for residential NH Saves work, up to 75% of the project cost up to $8,000, so pushing that information out is very important in getting more people to look into the program. She said that it is also up to $8,000 per unit in multiunit rental properties and that is good leverage for landlords to do weatherization work. The entry point is a site tool on the NH Saves website where you enter square footage and some data on energy usage for qualification purposes and there are some other programs if people do not qualify for that audit. She encouraged members to incorporate that into their weatherization program.

In terms of metrics tracking, Ms. Gaunt proposed that it would be helpful to establish more specific Simple, Measurable, Achievable, Realistic, and Time-bound (SMART) goals, for example, to state they would like "X" number of buildings per sector and then track those metrics. Dr. Gruber stated that it would be good to get Antioch University New England involved as well as they started Vital Communities years ago. Mr. Nuru stated that the City of Keene is one of the towns that has a tax exemption for renewable energy but many people are unaware of that so it is important to create awareness in the community that they can leverage tax exemption up to the full cost of the program. Chair Hansel agreed. Dr. Gruber suggested they move onto Advocacy.

Ms. Brunner stated that she started brainstorming a list of potential partners within the *Advocacy for Public Transportation and Active Transportation*. She said these are mostly housed within Southwest Region Planning Commission (SWRPC) which coordinates two different groups, one that is in alliance around active transportation called the Monadnock Alliance for Sustainable Transportation (MAST) and one around public transportation called the Monadnock Region Coordinating Council for Community Transportation (MRCC). There is also another group called the Granite State Clean Cities Coalition which is active around biodiesel and electronic vehicles (EVs). She stated that these are strong potential partners. Chair Hansel said he is active with MAST and they are a good partner to help with Advocacy. Dr. Gruber suggested that Pathways for Keene (PFK) is another potential partner.

Chair Hansel said they would need SWRPC to advise on what opportunities are available. Ms. Brunner said they are not an advocacy organization, but if something is happening on

a bigger scale, they would inform the City. She said MAST is probably more of the advocacy group. Chair Hansel proposed that they create liaisons with any of these partners to collaborate on any action that might need to be taken. Ms. Brunner said that the ECC can make recommendations to City Council. Vice Chair Gaunt said that KSC is concerned with creating a public transportation link between Brattleboro and Keene which has been researched extensively and she supports making a recommendation on that.

Mr. Nuru suggested that making transportation accessible to Concord or Manchester is also important and stated that he is speaking from personal experience. Chair Hansel added that has been a focus of MAST for years and it has been challenging but ECC should add their voices to others who have been advocating for that. Ms. Brunner added that these ideas have already been very well studied and the biggest roadblock is that there is such little funding in NH for public transportation although there is a lot of desire for it. Chair Hansel stated that he sees this item as a strategy they will not be able to measure very well and they may not have much impact, however, any opportunity they have to advocate for it they should take it. Dr. Gruber added that the plan for a bipartisan transportation bill will be on the table in the next year or two, and particularly with the energy and climate change, that is when they can seek grant funding. He emphasized that ECC needs to be connected with federal representatives so they can inform the committee on what is coming down the pike. Mr. Dey said there are probably metrics, such as vehicle miles traveled, that are relevant but ECC may not be responsible for tracking them. He said it would be helpful to bring experts and professionals into the City to discuss their successful transportation programs to explain what has worked well and what has not. Mr. Nuru stated that in terms of looking for funding, in other cities where public transportation is working, the City can explore how those cities funded those systems and maybe they can replicate that. Ms. Brunner said that it is mainly funded by tax dollars from the State and NH does not have any. Chair Hansel said Dartmouth University helps fund the systems in the Upper Valley.

Ms. Brunner stated that the *HeatSmart campaign* is aimed at encouraging the installation of renewable thermal technologies for space heating and cooling and for hot water heating through targeted local outreach efforts and bulk discount prices. She said this is a similar concept as the Solarize campaign but for renewable thermal technologies and they have some good local examples they can draw from like Northampton, MA. Vice Chair Gaunt said it would be beneficial to reach out to vendors that are selling renewable fuels for thermal, for example, at KSC they are using 100% refined used vegetable oil to replace their number 6 heating oil and the firm is called Life Cycle Renewables. She asked the firm if they would consider the residential sector, and they said they would if there was a critical mass, so bringing the entrepreneurs together with the need might be a good avenue to pursue. Chair Hansel agreed and added that there is a thermal energy manufacturer here in Keene and they are geared towards bigger buildings but they may be a good ally, as well as other organizations that sell heat pumps and mini splits. Ms. Brunner said when she spoke to Mr. Mason in Northampton, they had a lead volunteer who put in a lot of time and they had a grant to provide a stipend for that position. Any ideas on how they can create a team lead in Keene would be good. She said from start to

finish, it is about a year for the campaign. Members suggested AmeriCorps Volunteers or AUNE team Master's projects. Dr. Gruber said they decide one those projects in September and they do the CSIs in the spring and planning in the fall. Ms. Brunner said the timing of the CSI program might not work out with the timing of the HeatSmart campaign, which typically gears up throughout the summer and then runs in the fall. Dr. Gruber agreed and said this area is early in development. Chair Hansel agreed that there is more time to discuss steps on the thermal component. Vice Chair Gaunt suggested bringing stakeholders together to work on this solution.

Chair Hansel stated that there are some organizations working on Advocacy for EVs and Alternative Fuel Vehicles, for example, the Monadnock Sustainability Hub (MSH) that is planning another EV program. Ms. Brunner stated that MSH launched a "Fast Charge Monadnock" campaign that is trying to raise matching funds for grants to bring EV chargers to the region. They have run some events to increase consumer comfort levels for EVs in the community. She stated that they would be a great partner. Chair Hansel said the market is moving this way very rapidly, and General Motors (GM) has made the decision to go all EV by 2035, so fortunately other entities are doing a lot of good work, however, the ECC can create more awareness of this in the community. Mr. Luse pointed out that there is a lack of EV charging infrastructure in the region. Ms. Brunner added that the region is very behind, however, there may be some funding coming in from the Volkswagen settlement for EV charging infrastructure. Mr. Nuru said the federal tax credit for EV infrastructure has been reinstated and is at 30% and some of the local car dealers are interested in having charging stations available for customers. Chair Hansel asked if gas station franchises have bought into EV charging stations at their locations. Mr. Roth said it would make sense to have them with the minimart model gas stations. Mr. Nuru said it is happening in other states, for example, Maine has highway EV charging stations.

Ms. Brunner stated that it sounds like there is more interest in promoting EVs rather than advocacy and this item is more geared towards advocacy at the state and federal policy level; however, they can also aim to do work at the local level to promote EVs more directly as well. Chair Hansel said it could be added as a subcategory. Mr. Roth asked if there is anyone in the Technology and Science committee that would endorse legislation, because perhaps they should talk to local representatives and see if they will sponsor it. Chair Hansel stated that is a good point and Eversource should be invested in this and perhaps they can speak with them about sponsoring this. Mr. Roth added that electric bikes should be added to this as there is a lot of enthusiasm around them in the community.

c. <u>Next steps</u>
Dr. Gruber asked each member to identify their top two focus areas for this year. He proposed that each member should identify their number one and two and then Ms. Brunner can record their choices. Chair Hansel suggested that members raise their hands instead for a number one, or two. Ms. Gaunt suggested a roll call instead.

Chair Hansel ranked EV program as number one, and home energy as number two.

Mr. Roth ranked EV program as number one, and home energy labeling as number two.
Mr. Dey ranked home energy labeling as number one, and weatherization as number two.
Ms. Gaunt ranked home energy labeling as number one, and HeatSmart for number two.
Mr. Luse ranked home energy labeling as number one, and weatherization for number two.
Mr. Nuru ranked EV program as number one, and HeatSmart as number two.
Mr. Oursler ranked advocacy for public transportation as number one, and home energy labeling as number two.

Ms. Brunner stated that home energy labeling, weatherization and advocacy for EVs are the top three. Dr. Gruber stated that those are the areas that ECC should focus on.

5. **Request: Letter of Support for KSC Sustainability Initiatives**

Ms. Gaunt stated that KSC has very ambitious sustainability goals and have been making great progress, however, they are receiving some pushback from the University System of New Hampshire. She stated that she is asking for a letter of support from ECC that simply states that ECC supports KSC's commitment and that the ECC hopes that KSC will maintain its intended actions to achieve 100% renewable energy by 2030 and a fossil fuel free campus no later than 2050. She said that they are getting pushback from the system to purchase the cheapest type of power and not necessarily the type of power that they have laid out in their sustainable energy plan.

Ms. Brunner said that ECC can make a motion for the committee but not on behalf of the City.

Mr. Roth moved that Chair Hansel and members craft a letter to Keene State College (KSC) stating that the ECC is in support of KSC's commitment and that the ECC hopes that KSC will maintain its intended actions to achieve 100% renewable energy by 2030 and a fossil fuel free campus by 2050, Mr. Luse seconded and the motion was passed unanimously.

Mr. Gruber thanked the committee and Chair Hansel thanked Mr. Gruber for his facilitation.

6. **Next Meeting: Wednesday, March 3, 2021**

7. **Adjourn**

Chair Hansel adjourned the meeting at 5:05 PM.

Respectfully submitted by,
Ayshah Kassamali-Fox, Minute-Taker

Reviewed and edited by Mari Brunner, Planner

ENERGY & CLIMATE COMMITTEE MEETING MINUTES

Wednesday, April 7, 2021 8:00 AM Virtual Meeting (Zoom)

Members:
Peter Hansel, Chair
Councilor Raleigh Ormerod
Jake Pipp
Jude Nuru
Paul Roth
Zach Luse
Suzanne Butcher
Andrew Dey
Clair Oursler, Alternate

Guests present:
Gordon Tuttle, Eversource
Mark Wrona, Work Energy Efficiency Services

Staff:
Rhett Lamb, ACM/Community Development Director
Mari Brunner, Planner

Members not present:
Cary Gaunt, Vice Chair
Ken Dooley

Chair Hansel called the meeting to order at 8:00 AM.

1. **Roll Call**

Chair Hansel read a prepared statement explaining how Emergency Order #12, issued by the Governor of the State of New Hampshire, pursuant to Executive Order #2020-04, gives authority for public meetings to be held remotely and shared information about how members of the public can listen and share comments. He then read the Zoom platform rules aloud and roll call was conducted.

2. **Approval of March 3, 2021 Meeting Minutes**

Mr. Luse moved to accept the March 3, 2021 meeting minutes, Mr. Roth seconded, and the motion was passed by unanimous vote.

3. **Presentation on NHSaves Program: Gordon Tuttle and Frank Melanson (Eversource)**

Mr. Gordon Tuttle began a brief presentation of the offerings of the NHSaves program for residential customers. He said they have a variety of programs and their funding levels have increased over the last few years. He stated that they are currently waiting for the New

Hampshire Public Utilities Commission to approve the three-year plan; therefore, they are currently operating at the 2020 program levels. Mr. Tuttle explained that they have programs for lighting and appliances, refrigerator recycling, heating and cooling systems, whole house energy efficiency and income eligible programs. He said that they provide instant rebates for Energy Star LED bulbs and appliances which can account for up to 13% of household energy use. Rebates are also available for clothes washers, dryers, refrigerators, air conditioners, room air purifiers, dehumidifiers and pool pumps. Mr. Tuttle stated that customers can submit their rebates online with a copy of their invoice or mail in rebates. He said rebates are typically processed within 4-5 weeks. He stated that NHSaves offers free haul-away for refrigerators with a $30 incentive. He explained that new heat pump technologies are increasingly popular among customers in both new construction and existing homes as they offer superior efficiency in moving heat rather than creating it. However, rebates are only available while funding lasts and additional details can be found at www.nhsaves.com/heatingcooling.

Mr. Tuttle stated that he manages the Home Performance with Energy Star program, which is a whole house energy audit program. Customers must qualify for the program based on their home energy use. He said that qualification is determined by assessing the square footage of the home and its conditions, the number of gallons of oil or propane, cords of wood or tons of pellets. He said they have increased the rebates from 50% of the measures to 75%; and an increase of $4,000 per home to $8,000 per home which allows customers to take advantage of a whole house energy weatherization approach. Mr. Tuttle stated that low interest financing is also available for customers paying the copay portion of their projects. For example, if a total project is costs $10,000, the program would pay for $7,500, the customer would be responsible for $2,500 and financing options are available for those who do not want to pay their portion up front.

Mr. Tuttle reviewed a slide with the information that is requested on the Home Energy Performance with Energy Star online form. He said customers must provide their annual electricity usage, two sources of fuel, and if customers have a third source of fuel such as wood or pellets, they must contact the program to convert the third source into the other two sources to determine eligibility for the program. Once customers are qualified based on the Home Heat Initiative (HHI) score, they must complete and submit the online enrollment form. He explained that homes that score in the range of 8 and up are qualified as needing help from the program. Mr. Tuttle stated that rebates for new construction are up to $4,000 and a Home Energy Rating System (HERS) professional will visit the home to perform an analysis; the home must also pass an audit to be rated an energy star efficient home. Mr. Tuttle stated that they also have a low-income program which has experienced an increase in the amount of funding and use and is currently at the $21,000 level. If customers qualify based on their income through their local community action program (CAP) agency, such as Southwestern Community Services (SCS), they can receive funding for new heating systems as well.

Mr. Ormerod asked Mr. Tuttle what criteria the program uses to define a home. Mr. Tuttle replied that single family homes qualify for the Home Performance with Energy Star program, but they will also consider homes with up to four units or less. He said the low-income program includes multi-units as well. He said if the home is a duplex, residents can be afforded up to $16,000 per duplex. Mr. Luse noted that there is a ten-year waitlist with Southwestern Community Services and asked why a backlog is there. Mr. Tuttle replied that the backlog is

primarily due to a lack of resources through the CAP programs. He explained that Eversource administers the program, however, the CAP programs perform the audits, and they may be experiencing a lack of people in the field and difficulty in getting installers and energy auditors. Mr. Luse asked if Eversource supports the CAPs with funding or administration of the program. Mr. Tuttle replied that Eversource has helped support training of energy auditors to assist with that need. Chair Hansel added that there is only one contractor available to do the work which is a drawback and he proposed that the City and Eversource collaborate on providing certification to additional contractors through Eversource to increase the number of auditors and installers available. Mr. Tuttle stated that they added a couple of contractors to the Home Energy Performance program in the past few years. Chair Hansel asked what type of outreach Eversource performs to the public to create awareness of these programs. Mr. Tuttle replied that Eversource performs ButtonUp workshops, energy committee shows around the state and speaks to businesses and employee groups, as well as advertises programs on their social media platforms.

Mr. Mark Wrona introduced himself and said he is with World Energy Efficiency Services based out of Worcester; however, he grew up in Wilton, New Hampshire. He stated that his company has done several buildings in the Keene area and are focused on commercial lighting specifically, such as retrofitting old fluorescent lighting to new LED lighting. He said there are a few different pathways based on customer needs and affordability. Typically, Eversource pays for 40-80% of projects and they aim for a two-year payback for a commercial project. He said there are a few other measures that do not fall into the 40-80% rebates, called prescriptive rebates, for example, a variable frequency drive that is installed on a rooftop unit to assist in efficiency. He said many municipal buildings, like schools, use this to capture a lot of energy usage. However, their primary focus is lighting as it is often the number one energy use in these buildings. Mr. Wrona stated that they worked on number of projects in Keene, including the Monadnock Humane Society and Fast Friends, as well as Cheshire Children's Museum, where they replaced all of the lights and Eversource paid for most of the project. They received the contract two years ago and did not have local electricians on board at that time, however, they are now contracted with local electricians.

Mr. Ormerod asked if Eversource's contribution would be diminished with the availability of new grants and other funding sources. Mr. Wrona replied that he does not work with those grant programs and that would be something the customer does on their own. He can provide Eversource's contribution for a project, however, customers have in the past had their share of the project paid for with grants. He said they work with commercial buildings and not residential; however, if there is a housing complex, they will work on outdoor lighting. He said they have done several homeless shelters in the Boston area and often he is able to get the full 80% on those projects. Mr. Roth added that Cheshire Medical Center recently replaced a thousand fixtures with LED panels at zero cost to the hospital. Mr. Wrona said they also partnered with Hamblet Electric and will be working on the Marlborough School. Hamblet will be the installer on that project. Chair Hansel stated that his company Filtrine received rebates through Eversource in 2009 and they may need to create awareness about these rebate programs in the community. He said that he agrees that grants are separate incentives from the Eversource rebates.

Mr. Pipp asked Mr. Wrona if they work with businesses that rent spaces as opposed to owning. Mr. Wrona said he typically asks the customer who pays the electric bill, and if they are paying, then it is in their best interest to participate with the project. He always recommends that renters speak with their landlords before starting any lighting project. However, once the lights are paid for the savings begin within 1.5 to 2 years. He noted that landlords typically do not want to place new lighting in a facility as they are not paying the electricity bills so more than likely the cost will fall on the tenant.

4. **Energy Plan Work Groups**

a. Weatherization

Mr. Luse reported that Ms. Gillard and Ms. Jones from the Clean Energy Team attended the weatherization work group, and they had a great discussion around assessing the challenges and needs for existing weatherization programs through NHSaves, SCS, CDFA, as well as Vital Communities. He said they are performing some outreach with these groups to assess how they can support and amplify existing programs. They plan to regroup to discuss how they can have the most impact through promotion and education and other avenues. He said he spoke with CDFA and they are interested in doing a webinar on what is available and sharing success stories of mid to small sized businesses. Mr. Luse said a particularly good idea that came up was the concept of creating a Habitat for Humanity type model for weatherization and augmenting the workforce for auditing. Chair Hansel thanked Mr. Luse and emphasized that there needs to be more contractors available for getting this work done.

b. Home Energy Labeling

Mr. Dey shared that they also had a great meeting and are in the preliminary stages of figuring out how to best develop this home energy labeling program. They identified some organizations to reach out to and agreed that starting a pilot program at first is best to demonstrate success which can then provide a solid foundation for expansion. He said the process will require a lot of research and the next steps will include reviewing policies and ordinances from other communities and speaking with potential partners, as well as conducting a landscape assessment of what the housing situation is within the community to see how best to approach home energy labeling. Chair Hansel asked Mr. Tuttle if Eversource has dealt with NEEP before and has any experience with home energy labeling and if he has a comment. Mr. Tuttle said that Mr. Melanson with the Eversource NHSaves program is more familiar with home energy labeling. They have been watching the programs; however, the closest thing they have is the HERS rating and Energy Star programs. They are keeping their eye on what is available. Mr. Dey asked Mr. Tuttle if the working group was interested in learning more about collaboration and the possibility of working with the HELIX systems, would they need to reach out to Mr. Melanson. Mr. Tuttle agreed that Mr. Melanson is the key person for those conversations.

c. Electric Vehicles

Mr. Nuru reported that the working group met and brainstormed strategies, for example, to contact the Transportation and Climate initiative and the Clean Energy NH Team, as well as participation in seminars and workshops that are undertaking these projects in the

region. He said the most important issue that was raised was installation of a charging station in the community to demonstrate the importance of EV. They scheduled another meeting at the end of the month after speaking with some of the entities they identified and plan to bring that information back to the group. He emphasized that they identified action as the most important element. Mr. Nuru asked Mr. Tuttle what role Eversource would play in terms of programs if entities decide to put up an EV charging system at their facility. Mr. Tuttle replied that corporate has been in support of EV charging stations around NH, CT and MA. Mr. Nuru asked if a car dealership wanted to install a system at their facility, would Eversource provide a cost reduction incentive. Mr. Tuttle said he can acquire that information and send it back to Ms. Brunner.

Ms. Butcher asked about the status of the Volkswagen (VW) settlement. Mr. Roth noted that he was able to get some pints of contact at Eversource, including Ms. Rebecca Collins and Mr. James Cater. He said they are working with the State and planning on the distribution of the funds from the VW settlement, however, that has not been finalized yet.

Mr. Nuru left the meeting.

Chair Hansel stated that he gathered details about the Drive Electric event which will take place virtually on April 22 through the Monadnock Sustainability Hub. He said he will also contact the City of Keene to find out if there are electrical standards for people who purchase electric vehicles and want to install a charging station in their home. Ms. Brunner was able to gather that information and they should aim to put that information on the Energy and Climate Commission website. He proposed that Mr. Tuttle consider that Eversource consider providing a rebate for customers who want to install a charging station in their homes.

d. Possible new work group: Community Solar

Chair Hansel stated that Mr. Nuru, Ms. Brunner and Mr. Lamb attended a meeting to discuss if there is a place for installing community solar locations around Keene. They developed an idea of what potential there is for small, community solar groups in Keene. He said it raised enough questions that it might be worth having a work group devoted to community solar that can identify sites as small as a half an acre to place enough solar panels to power twenty homes. It may require access to three phase wiring but not necessarily and there are many questions that need to be addressed. He encouraged members to consider serving on a community solar group.

Ms. Brunner noted that prior to this meeting, she was not aware that virtual net metering was available in NH. She explained that virtual net metering is a bill crediting system that requires a minimum of five members for each project and provides an option for customers who may not be able to install solar on their own homes for various reasons. She explained that it allows these customers to still benefit from solar by purchasing a share of a solar garden or farm and receive credit on their bill for their percentage of the excess energy generation of that installation. She said NH did have group net metering prior to this, but did not provide on bill crediting which created many logistical hurdles.

She said there is also a low-income adder for projects that primarily benefit low and moderate income individuals that can provide a higher return on investment of projects. Ms. Brunner stated that the Mayor has expressed interest in the possibility of a pilot community solar installation at the neighborhood level in East Keene where there is a lot of three phase power and a high percentage of renters. She stated that the biggest question is if there is enough interest on the committee to take on another work group. Mr. Dey stated that he is very excited about the idea but cannot commit in addition to the home energy labeling group, however, he would like to see this idea gain traction. Councilor Ormerod stated that he is very interested in solar PV and does not want Keene to fall behind on this opportunity and expressed interest in participating on the community solar working group. Ms. Butcher said she would be interested in the weatherization as well as the community solar. Mr. Luse said he could devote some time to the working group. Chair Hansel volunteered himself for the community solar working group as well. Mr. Bruce Norlund, an attendee, shared that he owns an electric vehicle and lives in Keene and wants to keep abreast of the work of the community solar working group.

5. **NHSaves Virtual Button Up Workshop – Tuesday, May 4, 2021**

Ms. Gillard announced that the Clean Energy Team has a virtual Button Up Workshop scheduled for Tuesday, May 4th from 7:00-8:30 PM, following the Earth Day events. She said she will forward the flyers to Ms. Brunner to share with ECC for promotion. She said the event is being held virtually and will be co-presented by Mr. Andy Dunkin and Mr. Ted Stiles. Ms. Gillard said they are coordinating with the Earth Day events and will be promoting it heavily within different neighborhood groups. She said she is excited to hear that more local contractors are available as there has been a lack of local contractors. She mentioned that Mr. Stiles has worked with the Conval School District and the Harris Center teaching students how to do the blower-door test and audits for weatherization. She said she would be excited to see the Keene School District do more work in that area. Ms. Gillard stated that the Button Up workshops in the past three years have been very successful and there are nine other communities in the state that are signed up as well. She said Mr. Tuttle may be able to speak to the amount of available funding through Eversource. Mr. Tuttle replied that he anticipates that the program will be funded and open for this year.

6. **Community Power Update**

Ms. Brunner stated that on March 30, the Community Power Committee held two public hearings on the draft Community Power Plan. She said the committee did receive a lot of interest and comments from the community at the meeting and in written comments so they met again on April 2 to discuss those comments and there may be some tweaks made to the plan to address comments from the public. The next meeting is tomorrow at 8 am to discuss the draft plan and if the committee is ready, they will be voting on the plan tomorrow morning with the new changes. She said if members are interested in attending, the agenda is posted online and the agenda packet includes a redline version of the plan and a clean copy of the plan and a memo that explains those changes. She said members can also visit www.KeeneCommunityPower.com and all information will be posted there. Chair Hansel stated that there was an article in the paper after the public meetings with a headline that was misleading and led to community members

writing a letter to the editor and others castigating the committee. He encouraged members to not get too discouraged about the negative publicity as they have time to get the right information out into the community.

7. **Upcoming Dates of Interest**

a. Earth Day Electric Vehicle Expo – Thursday, April 22
b. Monadnock Earth Day Film Festival – April 22-24
c. Green Up Keene – Saturday, April 24

Ms. Brunner stated that the City was determined to do this event this year in a COVID-safe way and physically-distanced. She provided the link and encouraged members who would like to sponsor an area to contact the Public Works department at 603-352-6550. Ms. Brunner stated that they are also working with the Public Works department on a music video to promote the event and are looking for volunteers to dance to the tune of Jailhouse Rock in a promo video. Chair Hansel said that event can be safely done during the pandemic.

8. **Committee Membership**

Chair Hansel stated that there are one or two spots that are being filled and are in the works. However, they can still use one or two more nominations and members can send the names of potential new members to Ms. Brunner or himself.

9. **New Business**

N/A

10. **Next Meeting: Wednesday, May 5, 2021**

11. **Adjourn**

Chair Hansel adjourned the meeting at 9:15 AM.

Respectfully submitted by,

Ayshah Kassamali-Fox, Minute-Taker

Reviewed and edited by Mari Brunner, Planner

City of Keene
New Hampshire

EV-Ready Guidelines

DRAFT

Table of Contents

Introduction

How to Use this Document

This document is intended to help residents, businesses, and others in Keene who are interested in using or promoting electric vehicles to make their home or business "Electric Vehicle Ready," or "EV-Ready." By making an investment in EV-Ready infrastructure during construction or major renovation projects, many of the costs of installing Electric Vehicle Charging Infrastructure (EVCS) can be minimized or avoided altogether. Since costs may be a barrier, this document promotes the best ways to achieve an EV-Ready property at the lowest cost, with the help of guidelines, checklists and flow charts in order to make the best decision for each project.

City of Keene's Energy Commitment

The City of Keene has formally recognized the challenges that derive from climate change since 2000, when the City became a member of ICLEI - Local Governments for Sustainability and began working on its first greenhouse gas (GHG) emissions inventory.[i] Keene was one of the first communities in New Hampshire to adopt a Climate Action Plan in 2004, and it was also one of the first in the nation to adopt a Climate Adaptation Plan in 2007.[ii] Over the years, the City has worked on a wide range of energy efficiency, renewable energy, and GHG reduction projects, resulting in a decrease in GHG emissions from local government operations of 25 percent between 1995 and 2015.[iii]

In 2019, the City adopted Resolution R-2018-36, which set a goal to transition Keene to 100 percent renewable electricity by 2030 and 100 percent renewable energy for heating, cooling, and transportation energy use by 2050.[iv] As stated in the "Keene, NH Sustainable Energy Plan," the most cost-effective way to reach these goals is to drive down overall fossil fuel demand by prioritizing and promoting energy efficiency. Electric vehicles contribute to a more energy efficient future, as they are almost 4 times more efficient than a gasoline motor. Gas powered vehicles only convert around 20% of the energy inputs into power, while EV's can convert around 77% of the energy into power.[v] Although the city of Keene does not currently require new development to be EV-Ready, it will be highly encouraged.

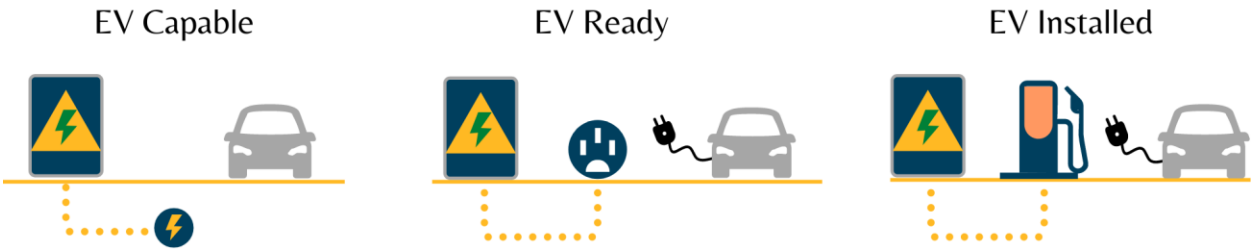
Benefits of Electric Vehicles

Electric vehicle sales are growing rapidly throughout the United States as new makes and models continue to come to the market globally and costs come down. The International Energy Agency (IEA) states that in 2010, there were only about 17,000 EVs on the road, globally. As of 2019, that number has swelled to 17.2 million.[vi] As the number of EVs on the road increases, the demand for electric vehicle charging stations (EVCS) will grow as well.[vii]

There are many environmental and economic benefits that EVs offer over gasoline-powered vehicles. Shifting away from fossil fuels and integrating renewable energy into transportation is key for sustainable advancement. EVs reduce harmful GHG and other air pollutants such as nitrous oxide and carbon dioxide that are emitted from the combustion of gasoline engines.[viii] An all-electric vehicle has the potential to reduce noise pollution, improving the quality of life in residential areas and for animals. As the Granite State Clean Cities Coalition notes, any new car is an initial investment, but an EV consumer will find that it is cheaper to power and maintain in the long run as compared to gasoline-powered vehicles.

The transportation sector has been named the highest contributor to GHG emissions in the US.[ix] This is due to both the fuel used to power motorized vehicles, which predominantly comes from fossil fuels, as well as the high number of vehicle miles driven per capita. While reducing overall vehicle miles traveled is important, it is likely that our dependence on automobiles will continue into the future, especially in more rural areas where there are fewer alternative transportation options available. Therefore, electrifying transportation will significantly help the transition into a 100% clean energy future. Electricity is considered an alternative fuel that can be powered by a variety of energy sources, making it easier to create electricity through renewable sources, such as wind or solar.

What is EV-Ready?



Becoming “electric vehicle ready” or “EV-Ready” involves planning for new electric vehicle charging infrastructure at the time of new development or major renovation projects. By adopting an “EV-Ready” mentality during the planning and design stage of new construction, unnecessary costs and disruptions will be avoided if the decision to install an electric vehicle charging station (EVCS) comes later in the process.

Becoming “EV-Ready” means that “residential and commercial developments have energized electrical outlets installed at the time of construction that are capable of charging an EV when a charging station is installed in the future” -- City of Victoria, BC.[x]

When Should I Become EV-Ready?

Since cities such as Keene are mostly developed, new construction isn’t as prevalent. There are other options when considering EV-readiness other than new development. Major renovation and redevelopment projects are opportunities to improve sustainable efforts and retrofit the building to fulfill these needs. According to Southwest Energy Efficiency Project (SWEEP), being EV-Ready is 4-6 times less expensive when the infrastructure is included during the initial construction phase as opposed to a complete retrofit.[xi] **Therefore, it is important and highly encouraged to consider becoming EV-Ready during any construction phase of a new project, while it is the most inexpensive and direct route to becoming EV-Ready.**

Cost Considerations

There are two types of costs a site host needs to understand when considering a deployment of charging infrastructure: capital costs and maintenance costs.[xii] Capital costs include the initial costs for installing the equipment and hardware, while the ongoing operation costs are considered maintenance costs for the remaining lifetime of each EVCS.

Capital Costs

EVCS capital costs are primarily comprised of hardware, permitting costs, and installation costs. Total costs will vary according to charging level, EVCS features, and site characteristics. Prices have an immense range and are all dependent on each installation project. Some key factors that affect capital costs include location, electrical needs, and technological features.[6]

- **Location**: The distance between the charging station and electrical panel will influence the installation costs because contractors will have to bore longer distances to lay electrical supply conduit. More material = higher costs.
- **Electrical needs**: Charging stations need a sufficient amount of electrical capacity, usually dedicating a circuit for each station. If the existing electrical supply does not meet the demands, upgrades are required for re-organization or new transformers. Pedestal mounts (free standing) cost more than wall mounted units.
- **Technological features**: ECVS units provide a charging port and electricity but adding more amenities and features will lead to additional costs. Installing data collection services, usage monitoring and billing options are examples of upgrading from simple hardware.
- **ADA compliance**: The Americans with Disabilities Act regulates commercial businesses and may require accessible options for this demographic, affecting the overall design and cost.

Hardware

The costs of an EVCS and hardware will remain constant and only range based on the type of the charger. A level 1 usually doesn't come with an initial price since it can be plugged into a typical 3 prong household outlet. While a level 2 charging station can cost $350-$900, a DC fast charger is much more expensive, costing between $10,000-$40,000 per station.[xiii]

Permitting Costs

In the City of Keene, permitting costs vary on the size and type of each project. The fee schedule can be found on the Community Development page on the City of Keene's website.[xiv] The minimum cost of a permit fee is $100 and increases by $8.00 per thousand (residential) or $10.00 per thousand (commercial) of the project value when over $5,000. Incentives for single-family homeowners are given through discounts when a licensed electrician is involved in the process.

Installation

The installation costs vary significantly depending on site characteristics. One factor that influences the costs of installation is whether the site is EV-Ready or needs to be completely renovated.

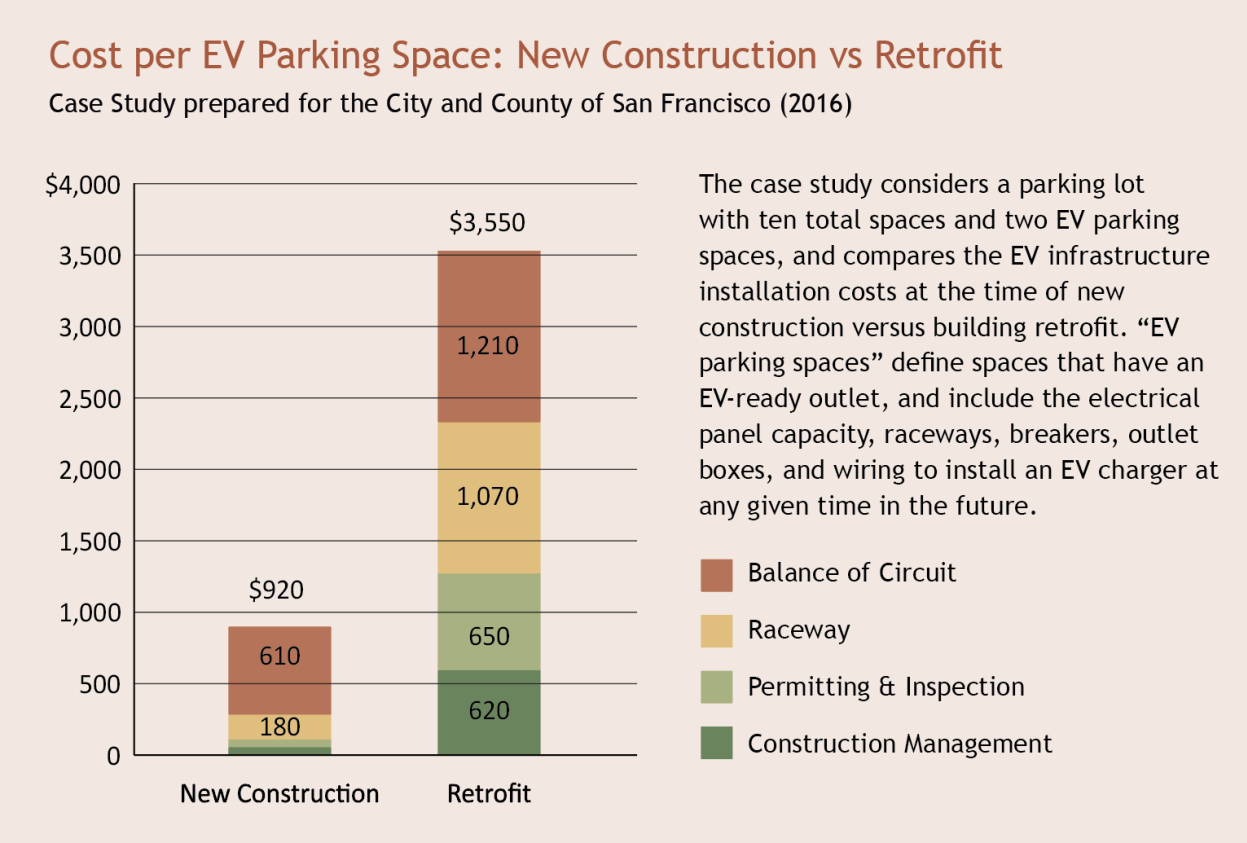


Figure 1. EV charging infrastructure new construction versus retrofit.[xv]

According to a case study that was conducted in 2016 for the City of San Francisco, the cost of a retrofit charging station is nearly 4 times the cost of new construction. In Figure 1, information from this case study compares the cost of installing two EV charging stations in a parking lot with ten spaces during new construction and during retrofit. If taking inflation under consideration, 2021 dollars calls for new construction of 2 EVCS installations would just be over $1,000, while a retrofit would be $3,900. It is clear that EV-Readiness should be highly considered during new construction or renovation projects that involve the parking area. This will be the most cost-considerate decision.

Operating and Maintenance Costs

Operating and maintenance costs vary depending on the type and quantity of EVCS, who utilizes the EVCS, frequency of use, and additional features of the station. Ongoing costs are typically due to electricity rates, station management and networking fees.[6]

- **Electricity rates**: EVCS owners pay for the electricity supply and are comprised of consumption and demand charges.
- **Maintenance:** Maintenance and repairs also vary on the equipment deployed. Fortunately, basic Level 1 and 2 units do not require regular maintenance and any

malfunctioning components can be replaced separately rather than replacing the entire unit. Units with advanced features will require more periodic maintenance. Depending on the ownership structure, networked stations may include maintenance and extended warranties upon their agreements.

- **Networking Fees**: If the EV charger is networked, owners will have to pay fees that cover communication fees. Networked chargers are connected remotely to a larger grid of chargers through a networking infrastructure system. This allows operators to access online management tools through an online portal known as, EVSE network.

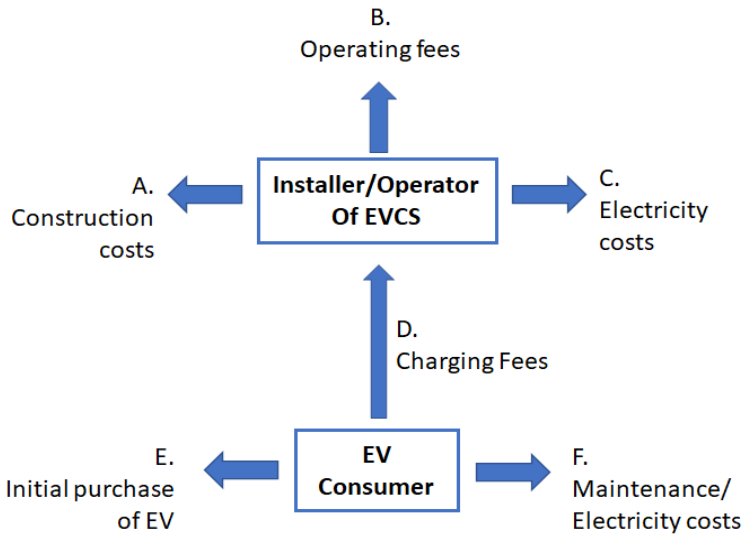


Figure 2. Cost flow between an EVCS operator and consumer.

A. Construction costs consist of the capital costs such as installation and hardware. These prices range tremendously, based on if the property is EV-Ready, level of charger and number of charging ports.

B. Operating costs can vary slightly, but an EVCS operator should estimate maintenance costs to be around $400 annually, per level 2 charger, while a DC fast charger will accumulate more costs for maintenance.[xvi]

C. Electricity costs include the supply (kWh) and delivery of the electricity. Demand charges can be accrued when the EVCS is used during peak demand, noting that DC fast chargers are more likely to trigger demand charges.

D. Charging fees can be collected if the site host wants to recover the costs of the charging infrastructure, although this isn't always the case. The Alternative Fuels Data Center estimates that 50 percent of public chargers are free of use. Common pricing structures include by kWh, session, length of time, or through a subscription with the site host.

E. The initial purchase of an EV will be the majority of the costs for the consumer. These vehicles can range from $29,000 to over $150,000, when bought brand new from a dealership. Fortunately, tax credits for EV are becoming more prevalent and act as an incentive for consumers buying a new car.

F. EV's do not require nearly as much maintenance as gas-powered vehicles, since they do not need oil changes or air filter replacements. If maintained accordingly, EVs cost an average of 30% less than gas-powered vehicles. With an average of 15,000 miles driven annually, an EV costs around $500 for electricity, while the amount of gas required to drive this distance will cost around $1,255.[xvii]

EV-Ready Guidelines for Homeowners

More than 80% of plug-in electric vehicle drivers charge at home due to its convenience and inexpensive costs. [xviii] An EV-Ready home makes it more feasible and convenient to purchase an EV in the future by providing safe access to a charging option that takes advantage of low and stable residential electricity rates. Whether you are considering buying an EV now or in the future, or you are making an investment in your home for a future homeowner, making your home EV Ready during construction or major renovation is a smart choice that could save you hundreds of dollars later.

Siting Considerations

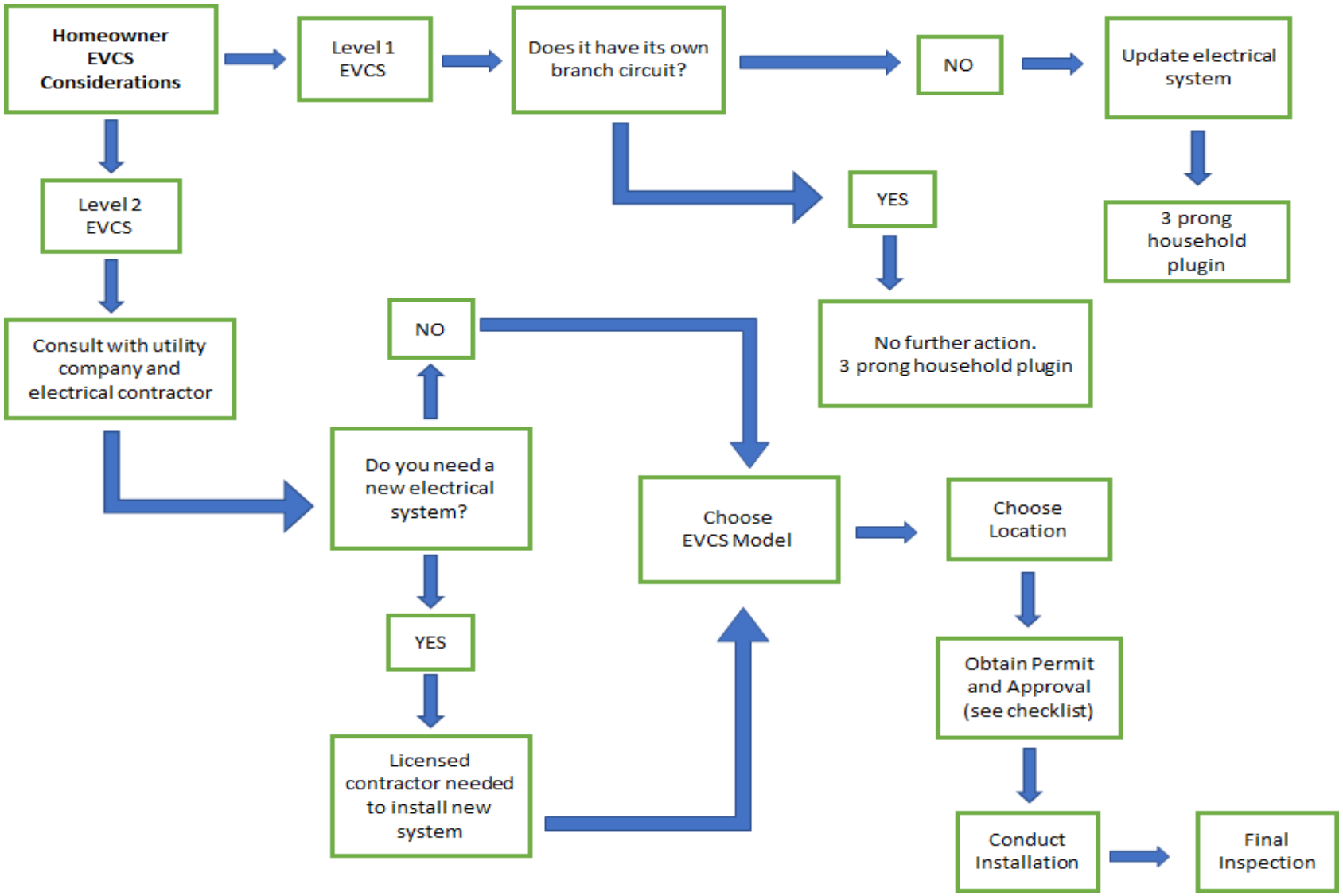
It is important to go over your options for installing EV equipment at your home. There are a few considerations that may influence your decision, such as costs, electrical system barriers, and level of EVCS.

Level 1 or Level 2?

Home charging can use a simple Level 1 EVCS, or upgrade to a slightly more complex Level 2 EVCS, which makes charging more efficient. A Level 1 charger uses an average 3 prong household plug, but requires its own branch circuit to avoid a blown circuit breaker. Nearly all EV's come with a portable Level 1 cord set so additional expenses are not common. A level 1 charger is best for indoor use, away from weather, animals, and other environmental stressors. Therefore, a homeowner without a garage should highly consider installing a level 2 charger for their EV. Once a level 2 charger is plugged into an EV, it forms an airtight seal, ensuring a reliable and safe charge.[xix] Designed resistance for fire and water makes a level 2 charger practical for indoor and outdoor use.

Although a Level 2 charger is more expensive due to special equipment, it is much more convenient and reliable for people who drive more. It is recommended to check with your utility company and electrical contractor to get cost estimates before installing a new EVCS or modifying your electrical system.**Error! Bookmark not defined.** The costs typically ranges between $500-$2000 before installation and will remain fairly inexpensive if an electrical service upgrade isn't required. If your pre-existing electrical system cannot accommodate up to 100 amps, a licensed contractor will have to comply with local and state inspections and permitting regulations in order to install a new system.

Homeowners EVCS Considerations Flow Chart



Location Considerations

The risks and safety hazards of installing and using an EVCS are relatively low and can be compared to the risks of other large appliances like a clothes dryer. EVCS installations are usually found within garages, but homeowners can also purchase outdoor-rated equipment built to withstand weathering. The power cords are also built to withstand stress and abuse, although owners should always be considerate of putting the cord back in a safe place after use. Positioning the EVCS wall unit close to the vehicle's electrical inlet or installing an overhead support will minimize the hazards of tripping over the power cord.**Error! Bookmark not defined.** A wheel-stop will protect the wall unit from any contact with the vehicle.

There are a variety of options for Level 2 EVCS and your EV manufacturer can help you find residential charging infrastructure that will align best with your vehicle. Models range from simple to complex, allowing for the addition of different features with smartphone connections, charging timers and keypads.

If a house does not have room to accommodate charging indoors, a common solution includes installing a level 2 charger indoors and investing in a customizable cord that extends to your parking spot.

Residential Permitting Checklist and Application

City of Keene, NH
Electric Vehicle Charging Station (EVCS) Residential Permit Application Checklist

This permit application checklist is for residential (1 & 2 family) electric vehicle charging station installations. A complete building permit application is required for plan review. Applications will be processed in the order of receipt. Complete applications typically take 2-3 business days to review; however, they may take up to 10 business days. If you have any questions, please call the Community Development Department at (603) 352-5440 or email PermitTech@ci.keene.nh.us.

- ☐ Building permit application. Electronic submissions are encouraged.
  - Link to online permit application: https://talktomycity.com/create
  - Link to paper application: https://ci.keene.nh.us/sites/default/files/2018-07/Permit_application.pdf
  - Permit Type: Electrical
  - Building Use: One Family OR Multi-Family (specify two units)
  - Work Type: Renovation
  - Application must be signed by a licensed electrician. If you are the owner of a single-family home and you are not working with a licensed electrician, a signed homeowner affidavit is required.

- ☐ Application fee (see online fee schedule).
  - Note: For single family owner-occupied homes, there is a 10% discount for using a licensed electrician.
  - Application fee is not accepted until after the application is reviewed and approved.

- ☐ Manufacturer's installation instructions or EVCS manual (1 copy)

- ☐ Plans (2 copies required for paper submissions):
  - If the proposed installation will be outside (not inside a structure), please submit a plot plan or photograph with dimensions provided to show the proposed EVCS location. Note: the City's online assessing map (www.axisgis.com/keenenh) may be used to generate a plot plan.
  - If the proposed installation will be inside a structure (such as a garage), please submit a floor plan.
  - If you are not working with a licensed electrician, electrical plans are required.

- ☐ If located in the Downtown Historic District, the proposed installation must comply with Historic District Commission (HDC) requirements. To check to see if you are located in the Historic District or if any HDC requirements would apply, please contact Mari Brunner at mbrunner@ci.keene.nh.us or 603-352-54400.

- ☐ If located in the 100-year floodplain or floodway, the proposed installation must comply with the City of Keene Floodplain ordinance (Ch. 54). To check to see if you are located in the floodplain or if any floodplain requirements would apply, please contact Mike Hagan at mhagan@ci.keene.nh.us or 603-352-54400.

Notes:
- Additional information required by the Building Official may be necessary for the issuance of the permit.
- Multiple inspections will be required, including rough electrical, underground electrical, and final electrical inspections.

EV-Ready Guidelines for Commercial and Multifamily Properties

EVCS considerations for commercial and multifamily (3 or more units) buildings differ from those of a residential installation. Becoming EV-Ready for developing commercial properties can eliminate a large percentage of future installation costs. Preparing a site with proper conduit and electrical outlets will promote the future possibility of installing charging stations. This decision to become EV-Ready will be beneficial to many businesses or multifamily complexes, as the market for EVs increases. People will be more cautious and considerate of their parking arrangements when they get an EV and need to be able to charge it. It is important to be progressive and supportive during this time of energy transitions. In the EV-Ready planning flowchart below, it has a step by step guide for commercial considerations.

Determining Chargers and Costs

Incorporating EV-Readiness into an initial design can be planned according to estimates of the number of vehicles using the charger, average of miles traveled and whether it's for public or private use. This will aid in the decision of the level and number of chargers needed for this property. A level two charger is best suited for most medium and heavy duty vehicles that sit parked for 5+ hours at a time, while a DC fast charger is better suited for drivers with a longer traveling time and shorter time parked in the lot to charge. When deciding between installing a level 2 or a dc fast charger, the location is an important influence. A level two charger delivers electricity at an average rate of 5-20 miles per hour, depending on the vehicle. On average, the station alone can cost $350-$900, while installation costs between $400-$1,700.[xx] This type of charger can be used in both residential and commercial settings, such as restaurants or malls. Although a DC fast charger is much more expensive, costing between $10,000-$40,000 per station and upwards of $10,000-$50,000 for installation, these chargers are optimal for long distance commutes and travelers. They are ideal for settings such as gas stations, highways, and rest stops. Therefore, it is imperative to understand the type of consumers planning to use these chargers. The prices for these chargers have a significant variance due to the brand of charger and whether the property is EV-Ready. Other considerations include improving the efficiency of future charging with smart charging, onsite power generation with renewable energy sources and onsite battery storage.[xxi] After reviewing costs and benefits of each type, this information should help decide the site host what is the best option for their property.

Commercial EV-Ready Planning Flowchart

Step 1. Access Needs

Who Will Be Using These Chargers?
- Number of vehicles
- Average miles traveled daily
- Public or private use

→

Determine Charging Arrangements
- Charging location
- Charging capabilities

Step 2. Planning EV Infrastructure

Incorporate EV-Readiness
- Property layout
- Building characteristics
- Power needs

→

Engage with Electrical Utility Company
- Inform them of your plan
- Discuss electrical loads management, power supply, rates, power amount and charging times/cycles

→

Consider Efficiency
- Improve your sites' efficiency:
  - On-site battery storage
  - On-site electricity generation (renewable energy sources)
  - Smart charging

Step 3. Finalize and Permit

Estimate Peak Load Requirements

→

Permitting
- **Ensure project meets NH electrical codes**
- **Apply for electrical permit**

Work Cited:
https://www.chicago.gov/content/dam/city/progs/env/MDHDCommercialEVReadiness.pdf

Siting Considerations

Arranging parking spaces to accommodate EVCS infrastructure is crucial for the potential of future charging capabilities. Understanding the properties layout and building characteristics will ensure best EV-Ready practices. This will help build a proper electrical plan that aligns with the power needs of the building and the EVCS equipment. Experienced installers recommend not exceeding 25 feet of conduit from panel to EVCS site.[xxii] Therefore installing or preparing for the charger in close proximity to the building is ideal. Evaluating load management and power supply with your electric utility contractor will determine supply rates and other estimates. Elements such as landscaping, walkways, curb cuts and other structural elements outside of the building should be considered in an EVCS site plan to avoid barriers or costly renovations later on. All these considerations should be consciously thought out before beginning the permitting process.

Commercial EVCS Permitting Checklist and Application

City of Keene, NH
Electric Vehicle Charging Station (EVCS) Commercial Permit Application Checklist

This permit application checklist is for electric vehicle charging station installations on commercial and multi-family properties (3+ units). A complete building permit application is required for plan review. Applications will be processed in the order of receipt. If you have any questions, please call the Community Development Department at (603) 352-5440 or email PermitTech@ci.keene.nh.us.

- ☐ Permit application. TWO (2) copies required for paper submissions. Digital copy required.
  - Link to online permit application: https://talktomycity.com/create
  - Link to paper application: https://ci.keene.nh.us/sites/default/files/2018-07/Permit_application.pdf
  - Permit Type: Electrical
  - Building Use: Commercial OR Multi-Family (3+ units)
  - Work Type: Renovation OR New
  - Application must be signed by a licensed electrician

- ☐ Application fee (see online fee schedule). Please note that the application fee will not be accepted until after the application is reviewed and approved.

- ☐ A copy of the manufacturer's installation instructions or EVCS manual. ONE (1) copy for paper submissions. Digital copy required.

- ☐ Plans, drawn to scale and legible. TWO (2) copies for paper submissions. Digital copy required.
  - If the proposed location will be outside (not inside a structure), a detailed plot plan that shows the location of existing structures, proposed EVCS, and all property lines indicating length, metes, and bounds, building lines, easements, and north arrow.
  - If the proposed installation will be inside a structure, a detailed floor plan.
  - Electrical plans with single-line drawings showing power and connection points, service load calculations and wiring methods.

- ☐ If located in the Downtown Historic District, the proposed installation must comply with Historic District Commission (HDC) requirements. To check to see if you are located in the Historic District or if any HDC requirements would apply, please contact Mari Brunner at mbrunner@ci.keene.nh.us or 603-352-54400.

- ☐ If located in the 100-year floodplain or floodway, the proposed installation must comply with the City of Keene Floodplain Ordinance (Ch. 54). To check to see if you are located in the floodplain or if any floodplain requirements would apply, please contact Mike Hagan at mhagan@ci.keene.nh.us or 603-352-54400.

Notes:
- Additional information required by the Building Official may be necessary for the issuance of the permit.
- Multiple inspections will be required, including: rough electrical, underground electrical, and final electrical inspections.

EV Basics

Definitions[xxiii]

- Alternating Current (AC) - type of electrical current, in which the flow of electrons switches back and forth regularly.
- Battery Electric Vehicle (BEV) - operate on electricity alone using batteries charged by an outside electric power source.
- Direct Current (DC) - type of electrical current that only flows in one direction.
- Electric Vehicle (EV) - all or part of their power is derived from electricity
- EV-Ready - developments must have energized electrical outlets installed at the time of construction that are capable of charging an EV, with intention to install an EVCS in the future.
- Electric Vehicle Charging Station (EVCS) - also known as EVSE (electric vehicle supply equipment), infrastructure that supplies power to charge batteries for electric vehicles. There are three types of chargers: level 1, level 2, and DC fast chargers.
- Fuel Cell Electric Vehicle (FCEV) - powered by hydrogen and emit only water vapor and warm air
- Hybrid Electric Vehicle (HEV) -powered by an internal combustion engine and an electric motor, batteries are not charged by an outside electric power source.
- Kilowatt (kW) - a measure of 1,000 watts of electrical power.
- Kilowatt-hour (kWh) - a measure of electric power consumption of 1,000 watts per hour.
- Plug-In Hybrid Electric Vehicle (PHEV) - a hybrid vehicle that has a combination of an electric battery which can be recharged, as well as a gasoline engine. Batteries can be charged by an outside electric power source.

Charging Levels

Level 1

A level one plug in delivers the same amount of electricity as a standard outlet and is mainly used in residential settings. It is the slowest way to charge an EV, only charging around 5 miles per hour. This amounts to around 1,000 watts of power or 1 kWh. This can be utilized for maximum benefit as an overnight charger. This charger is optimal for drivers who have short commutes during the day and easy access to an average 3 prong, 120V outlet. The owner must make sure this outlet has its own circuit branch or else and electrical upgrade is necessary.

Level 2

A level two charger requires different equipment and delivers electricity at an average rate of 5-20 miles per hour, depending on the vehicle. With a 240V outlet, electricity is delivered at a rate

of 2-20 kWh and amounts to 2,000-20,000 watts of power. This type of charger can be used in both residential and commercial settings, such as restaurants or malls.

DC Fast Charger

The DC fast chargers are specialized for commercial use and long-distance travel and require a much higher voltage. They can charge up to 80% of a BEV in less than 30 minutes, delivering 25-120 kWh, or 25,000-120,000 watts of power. There are three different outlets for a fast charger, for these plugs are based on the vehicle manufacturers; SAE, CHAdeMO, and Tesla.[xxiv] These chargers are optimal for travelers and ideal for settings such as gas stations, highways, and rest stops.

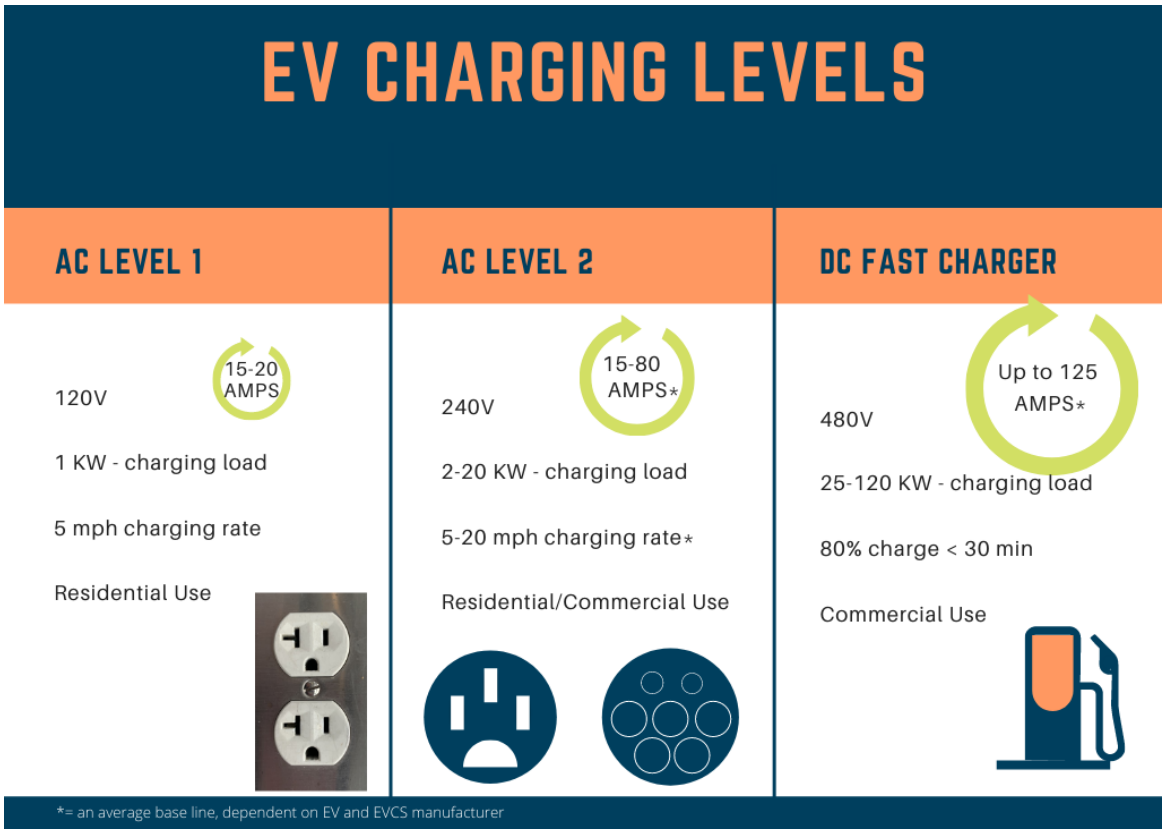


Figure 2. There are three different levels of charging stations for electric vehicles: level one, level two, and DC fast chargers.

EVCS Map of Keene, NH

EV Chargers near Keene, NH. 03431
https://www.google.com/maps/search/EV%20Chargers%20Keene,%20NH%2003431/@42.940189,-72.3384708,12.1z
Find local businesses and parking lots that have Electric Vehicle Charging Stations, in and around Keene.

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Draft Outline: City of Keene Solar Ready Guidelines

April 28, 2021

Title Page

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Introduction

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- Benefits of Solar
- How Solar Works

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Solar Ready Guidelines for Homeowners

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Definitions

Resources

From: Jessica Forrest
To: Mari Brunner
Subject: Fwd: PUC Delay in approving the Triennial Energy Efficiency Plan
Date: Tuesday, April 20, 2021 9:04:20 AM
Attachments: Weatherize_Logo.png
Letter to PUC 4-8-2021.pdf

Mari,

Joshua Singer from Clean Energy NH suggested that I reach out to you. I'm not sure if Keene has been troubled by the delay of the NH PUC in approving the Triennial Energy Efficiency Plan and Budget. It has certainly affected Concord, particularly our efforts to engage the public this year in undertaking home & business energy efficiency improvements. This is a central component of Weatherize Concord campaign and an essential step towards our 100% renewable energy goal.

We wrote a letter to the PUC stating our concerns, and Joshua suggested it may be more powerful if other concerned communities also reach out. I have attached a copy of our comment letter on Docket DE 20-092 here. I'm wondering if you'd be interested in submitting a comment on behalf of Keene? I am similarly reaching out to the communities of Hanover, Nashua and Lebanon. Perhaps letters from several communities will collectively make a difference to speed things along.

This is a good article on the issues if you haven't seen it already:
https://newhampshirebulletin.com/2021/04/14/future-of-states-expanded-energy-efficiency-efforts-in-jeopardy/

Thank you for considering this - and let me know if you'd like to discuss more.

thanks,
Jessica Forrest
Concord Energy and Environment Advisory Committee (CEEAC)
Weatherize Concord
phone: (603) 731-4527
web: www.WeatherizeConcord.org

Weatherize_Logo.png

April 8, 2021

Debra A. Howland
Executive Director
Public Utilities Commission
21 S. Fruit Street, Suite 10
Concord, NH 03301
Via Electronic Mail Only

Re: DE 20-092, Electric and Gas Utilities, 2021-2023 Triennial Energy Efficiency Plan

Dear Ms. Howland:

Please file this letter as a public comment in DE 20-092.

As representatives of the City of Concord and the Weatherize Concord initiative, we urge you to finalize approval of the New Hampshire Triennial Energy Efficiency Plan and Budgets (2021-2023). The delay in this approval is negatively affecting New Hampshire citizens.

Weatherizing buildings has many benefits to residents and business owners. These include improving the comfort, health and safety of our aging housing stock, substantial decreases in energy costs, and decreased carbon emissions. Improving building energy efficiency is a cost effective strategy for achieving greenhouse gas emissions targets to avoid the worst effects of climate change.

Weatherize Concord was conceptualized to encourage homeowners and businesses to weatherize their homes while raising awareness about the NH Saves program. Our goal is to double the number of Concord participants in NH Saves, with the target of 80 homes and businesses in 2021. The campaign was launched on March 16, 2021 with a panel discussion and website, as well as a downtown banner (www.WeatherizeConcord.org).

In response to delay in the approval of the proposed budgets and programs, Concord now has 32 residential natural gas customers that have applied and are eligible for NH Saves but may see work on their homes put off until at least 2022, or who may not participate at all. We know there is additional need in the community and we have developed outreach campaign infrastructure to reach these home and business owners. The failure of the Commission to issue an Order with regard to the Energy Efficiency Plan has forced us to halt our outreach activities. We find this delay untenable given the climate change emergency that we are in, the savings that could be realized by customers, and the excitement about doing something with multiple benefits as described above.

The demand for weatherization work in the city of Concord mirrors statewide demand. We understand that across the state there are 166 Liberty Gas customers alone that are awaiting weatherization improvements but affected by the PUC budget approval delay. We understand this demand is reflected across all utilities in the state of New Hampshire.

Thank you for your consideration of this time sensitive issue affecting a great number of our state's citizens. We look forward to your swift action to approve the pending settlement proposal, which we understand reflects the agreement of all parties in the docket.

Sincerely,

Robert Werner

Concord Energy and Environment Advisory Committee (CEEAC) Chair & City Councilor
City of Concord
41 Green Street
Concord, NH 03301