



ENERGY & CLIMATE COMMITTEE MEETING AGENDA

Wednesday, March 6, 2018, 8:00 AM

2nd Floor Conference Room, City Hall

Members:

Dr. Ann Shedd, Chair
Peter Hansel, Vice Chair
Terry Clark, Councilor
Chris Brehme
Jess Baum
Jake Pipp
Ken Dooley
Larry Dachowski, Alternate
Aperr Naadzenga, Alternate
Cary Gaunt, Alternate

Staff:

Rhett Lamb, ACM/Planning Director
Mari Brunner, Acting Planner

1. Call To Order and Roll Call
2. Approval of January 24, 2019 Retreat Minutes
3. Approval of February 5, 2019 Meeting Minutes
4. ECC Meeting Schedule
5. Working Group Updates
 - a. Communications
 - b. Energy Plan/Data Collection
6. ECC Energy Vision & Values Statements
7. Staff Updates – Hanover and Concord approaches to Energy Plan
8. Upcoming Dates of Interest
 - a. NH Saves Button Up Workshop – Tuesday, March 26, 2019
 - b. Monadnock Earth Festival – Saturday, April 20, 2019
 - c. Radically Rural – September 19 & 20, 2019
9. Legislative Updates
 - a. SB 122 “Relative to expenditures from the energy efficiency fund”
 - b. HB 365 “Relative to net energy metering limits for customer generators”
10. Communication from Fred Ward regarding clean energy
11. New Business
12. Next Meeting: Wednesday, April 3, 2019

City of Keene
New Hampshire

ENERGY & CLIMATE COMMITTEE RETREAT MINUTES

Thursday, January 24, 2018 4:00 PM
Railroad Square Senior Housing Conference Room

Members:

Dr. Ann Shedd, Chair
Peter Hansel, Vice Chair
Terry Clark, Councilor
Jessica Baum, Member
Chris Brehme, Member
Jake Pipp, Member
Ken Dooley, Member
Apper Naadzenga, Alternate
Larry Dachowski, Alternate

Staff:

Mari Brunner, Acting Planner

Guests Present:

JB Mack, Southwest Region Planning Commission
Cary Gaunt, Keene State College

1. Call to order and roll call

Dr. Shedd called meeting to order at 4:05 pm. She announced that the Resolution passed with a 14:1 vote and shared a letter of support from Councilor Jones. She said they also received letters of support from the Mayor and Councilors. Dr. Shedd stated that the Council kept the amended due date of December 2020, instead of April 2020 and hopefully they can make things happen before then.

2. Introduction

Mr. Mack introduced himself as facilitator for today's Retreat and Principal Planner at Southwest Regional Planning Commission in Keene. He asked members to introduce themselves and offer an "eco-fession."

Dr. Shedd stated that she is Chair of ECC, and her "eco-fession" is that she has not yet switched over her household's electrical supplier to one of the competitive energy suppliers who will provide 100% renewable as it is hard to sort out how "green" the offerings actually are. Councilor Clark introduced himself as Councilor liaison of ECC, and echoed what Dr. Shedd said about sorting out the offerings for renewable energy, as he has contacted some of suppliers and they told him they were not offering renewable electricity in his area yet. Councilor Clark also stated that he has not installed solar panels on his home yet either. Mr. Dachowski introduced himself as Keene citizen for the past 18 years, and former science college professor at Keene State College's CALL Program for people over the age of 50. His "eco-fession" is that he

heats his old, pretty well-insulated house with an oil-fired steam heat system and as he has gotten older and colder, he turns up the thermostat and burns huge quantities of oil. Mr. Dooley introduced himself as the Director of Building and Grounds for the Keene School District and he does not have an “eco-fession”, but shared that the School District has made some huge strides in energy conservation in the last seven years. Mr. Naadzenga introduced himself as a student at Antioch University in the Environmental Studies department. He said he is working on a Climate Action Plan for the campus and the pace has been slow, as they are focusing on many things. However, he would like to implement a green bikes program on campus in the summer. Ms. Kassamali-Fox introduced herself as the Minute-Taker for ECC and offered her “eco-fession” of long, hot showers. Ms. Brunner introduced herself as Staff person at the City and Acting Planner and said her “eco-fession” is not composting, although she hopes to begin in the spring. Mr. Pipp introduced himself as an ECC member, his “eco-fession” is that he does not walk and bike as much as he would like to as he lives on Winchester Street and the road conditions are not safe. Ms. Baum introduced herself as Sustainability Manager at W.S. Badger and a member of ECC, and her “eco-fession” is using disposable, compostable tea packets and being a “human in 2019.” Mr. Brehme introduced himself as Associate Professor in the Department of Outdoor Recreation and Planning, said he has lived in Keene for ten-years, and has been a member of ECC for 1-2 years, and his “eco-fession” is that he has a hot tub; however, it does not work. Ms. Gaunt introduced herself as the Director of Sustainability at Keene State College and her “eco-fession” is going from a net-zero house to a condo in Keene where she cannot get solar. Mr. Mack offered his “eco-fession” as not biking and walking as much as he should, and the dilemma of having to drive his teenage daughter to a charter school in Alstead.

3. Sustainable Energy Plan

Mr. Mack said they would begin discussing the Energy Plan by developing a vision/value statement. He asked if members had looked at the Hanover Energy Plan example as he found it to be a good model for Keene’s Sustainable Energy Plan. He suggested that they boil down what their objectives and efforts are while addressing the Why, When, Who, Where and How questions.

Mr. Mack suggested that the “Where” represents Keene, and perhaps the larger region. He said the “Who” is also an important piece, as this is a big challenge and it appears that ECC is not the “Who” that is going to make the Plan happen, and perhaps the vision statement should include the government and private sectors. Mr. Mack said the “What” and “Why” may include some value statements about what is important to ECC, as well as the “How” that describes what approach they will take to get there. He encouraged members to define and develop the main purpose and priorities of the Plan and turn those components into a value or vision statement for the Plan. He said they can achieve that by having members make comments on the Hanover statement, or alternatively come up with their own ideas. Ms. Brunner stated that she can scribe throughout the meeting to capture ideas as they arise.

Mr. Brehme suggested that there should be a clear emphasis on equity and inclusiveness of those who may not have the means and the resources to pay their heating bill, never mind invest in renewable energy. He said it is important to include that segment of the community. Mr. Pipp added that acquiring support from the landlords of rental properties is equally important. He said

there are many renters in Keene and landlords tend to lack incentives to weatherize or make changes to rental properties and renters do not always have the means or are legally unable to make those changes.

Mr. Mack asked other members to indulge him with the Who, What, Why, When framework, like Mr. Brehme and Mr. Pipp started to do.

Councilor Clark stated that the biggest similarity between Hanover and Keene is that they are both economic centers of the region and because of the population base and centralized location; therefore, it is easier to get the utilities involved, which in turn may help involve those who otherwise would find it difficult to become involved. He said the utilities can perhaps adopt many of the initiatives they are talking about and in turn be able to include more people. Dr. Shedd added that the current fuel providers are part of a cluster of stakeholders who should also be enlisted to participate.

Mr. Mack encouraged suggestions across all sectors of stakeholders, such as the energy sector, property owners, etc.

Councilor Clark suggested considering Keene State College and Dartmouth-Hitchcock Hospital. Mr. Mack agreed and stated that the Hanover example included Dartmouth Hospital as a huge stakeholder. Ms. Baum suggested advocating for any legislators who can influence State policies to take down barriers around some of this work. For example, in terms of REGI funding; New Hampshire has spent over 80% of REGI funds as rebates to taxpayers instead of putting those funds towards energy efficiency. She highlighted the importance of engaging with other community stakeholders, for example, Hanover, as their combined sphere of influence may be greater in affecting legislative change than for Keene alone. Ms. Brunner added that Keene is part of a couple of different municipal networks that are engaged in advocacy; one is called New England Municipal Sustainability (NEMS) network and another is a NH-specific network organized by the Conservation Law Foundation. She said there is also another group that is starting up. Dr. Shedd said that group is related to the Sierra Club which promoted the *Ready for 100* campaign, and they do a monthly conference call for communities that have adopted the *Ready for 100* goals or are actively working towards them. She said the monthly call took place last night and was led by the City Manager who spoke for them. She said the “Who” is not just Keene, but includes surrounding communities with shared goals who are eager for multiple-way collaboration. Ms. Brunner said some of those communities are also thinking of community choice aggregation opt-in solutions and she is looking forward to hearing more about that.

a. Values statement

Mr. Naadzena recommended that the Plan be composed of deliberately open ideas which are fluid and flexible. Mr. Mack asked a member to state what the Resolution calls for. Ms. Brunner said the Resolution that was adopted by City Council calls for Keene to become 100% renewable in the electricity sector by 2030, and that includes the municipal and community sectors, and by 2050 for the thermal and transportation sectors. She said the second part of the Resolution calls for ECC and the City to work together to come up with a Plan by December 2020 to achieve those goals. Mr. Mack emphasized that the objectives and dates of those goals are fixed, but how

they arrive there can be flexible and adaptive. Mr. Pipp added the Hospital, the School District, Keene State College and the business sector as all important stakeholders to include. Mr. Dachowski shared the immortal classic of the Frog Prince as a way to illustrate that they need more frogs! He said this endeavor is viewed too much as a small group of people doing this work, for example, the Hanover Resolution was passed in a town meeting and the ECC is comprised of nine people, and the Resolution passed 14:1. However, he said what is really happening is that a large subset of people in the community wanted Keene to take this position, for example, the Monadnock Progressive Alliance, the Sierra Club, and members of the public were all involved and these stakeholders should remain involved to foster even more community involvement, for example, for greater publicity and recruitment of volunteers for sub-tasks for development of the Plan.

Dr. Shedd added that for the “Who” and the “How”, she envisions using some of ECC’s regular monthly meeting time for focus groups or clusters of different sectors, for example, she sees a cluster around the institutional sector that would include perhaps Keene State College-School District-Antioch University- Medical Center, another cluster around low-to-middle income, a cluster around commercial-industrial, etc. She said this could help focus what energy-related issues are endemic to different sectors and what representatives of those sectors might already be envisioning for energy sustainability. Mr. Mack asked Dr. Shedd if she is referring to the development of the Plan and she replied yes. He said there are two concurrent themes: the development of the Plan and the sustainability of the Plan.

Ms. Baum stated that ECC has discussed community engagement and buy-in as an important component of the development of the Plan to create ownership over the Plan. She said she has been hearing a lot of community excitement over the Plan, but very few people are actually connected to ECC or involved in the process. Ms. Brunner added community engagement as a big piece of the Plan’s development. Ms. Baum suggested that the CONNECT event they have in the fall which attracts hundreds of people serve as a stakeholder plug-in for Keene’s energy future and buy-in for the Plan. Dr. Shedd said the CONNECT event has shifted to Radically Rural and there are several people working on a Renewable Energy track this year. Ms. Gaunt asked for clarification on their process and asked if they are contributing brad-brushed statements for the value and vision statement, as they may be getting into the weeds with their idea-generation right now and maybe should be focusing on the general vision for the community.

Mr. Mack agreed and said that he does think this idea-generation process is helpful for determining what the priorities are. Mr. Mack asked members what they are trying to achieve. Councilor Clark replied they are trying to get people involved. Ms. Brunner suggested mentioning climate change in the statement and Dr. Shedd suggested mentioning energy resilience. Mr. Mack stated that they were expecting to have a discussion about renewable energy and defining what that actually means. He asked as ECC is the body that advises City Council, what direction do they want to take. Mr. Mack asked if they would like to reference Professor Webler’s email which brought up a number of interesting considerations for defining renewable energy. He asked where members’ values lie and what is consistent with the Resolution. Ms. Gaunt stated that the Resolution uses the term “renewable” without definition and at KSC they define “renewable” as without greenhouse gas emissions and carbon neutral.

Councilor Clark said the goal is to have non-fossil fuels run the community, however, the way to get there may not be that easy as there are oil contractors in place in the community and that is currently how people live. Ms. Brunner said non-fossil can include hydro or nuclear and asked members to be clear about what type of energy they are talking about. Ms. Baum stated that there are preexisting relationships, but she feels that any new development should meet the standard of not causing further harm, as well as helping to reverse damage that has already been caused and supporting or reversing climate change. She said large scale hydro-projects do not feel like an option that is helping to support the resilience of aquatic ecosystems. Dr. Shedd suggested considering the life cycle analysis of energy sources, locally and globally, for example, biofuels sourced from Indonesian palm oil associated with rain forest destruction may not be a fuel they prioritize. She encouraged recognizing that as a value as well. Ms. Baum said they should also not be limited to life cycle analysis of individual products, but also put attention towards the interplay with ecosystems and ways in which they can contribute locally to a healthier, more robust natural world.

Mr. Naadzenga said he attended a webinar about the aspirations of the city of Portland, Oregon which discussed *deconstruction* in the context of making things easier for residents of the city to contribute to sustainability. He suggested thinking of what the values of the city are and making it easy for people to align with sustainable options by doing away with the terminologies and their connotations. He suggested relating these concepts to people's everyday lives so each individual feels empowered to do something. Mr. Mack said that concept goes along with simplicity, and the idea that the vision should be broad and focus on community buy-in and have people feel good about participating.

Ms. Brunner said this is an important point because they cannot force people to anything and all they can really do is make it easy for people to participate and encourage them to want to do this for themselves. Mr. Mack asked how this impacts individual people and how this will make people's lives better. Mr. Naadzenga replied that is all about effective communication. Mr. Mack stated that the Hanover example includes a statement about helping the community thrive. Ms. Gaunt highlighted that at Keene State College they are advocating for energy sources and an energy future that will promote well-being of our human and nonhuman communities; however, she feels they have not communicated that concept well enough yet. She encouraged cradle to cradle thinking and narrowing their energy options, for example, solar. She said the idea of flourishing is something they can help sell, as well as affordability of energy options and that is something she hopes to work with the City on.

Dr. Shedd stated that the vision of healthy communities, strong citizenship and buy-in were developed out of a community engagement process so that we can provide a foundation to tying their ideas to the vision of the Master Plan. Mr. Mack said they have a good start and it is a real challenge to create a vision statement. He said the likelihood is that this brainstorming session will culminate in a couple of people funneling these great ideas and crafting a larger statement that they will bring to the group. Mr. Mack asked Mr. Dooley what his thoughts are. Mr. Dooley replied that he believes they will need to financially incentivize a certain demographic of people to get their buy-in. Ms. Baum added that there is some great new research about the costs of climate change, for example, a recent study demonstrated that by 2080 it will cost the economy 10% of the GDP, another study highlighted a large number of deaths that can be expected due to

climate change, and another study showed that about 72% of Americans think climate change is an important issue that needs to be addressed. She stated that involving the schools in their long-term vision for 2050 is highly important, as there are people in our community that will not be around then and people not yet born that will be, and they need to focus on the intergenerational aspect of the issue.

Councilor Clark added that appealing to people's immediate budgets, for example, their winter heating costs is equally important. He said he advocated with Council on the economic benefits of energy transitions, for example, encouraging HVAC companies to diversify their product lines and training their technicians on how to install solar or wind. He said the beauty of all of this is that a whole new system will need to be developed and that in and of itself will bring new jobs and economic prosperity, however, people will mostly understand things in terms of their paychecks as the larger picture is too big.

Mr. Mack said he understands the need for a sustainable energy plan in Keene can be seen in terms of severe storms and flooding events and an element of the vision can be aimed at protecting the community and the region which is susceptible to economic losses from these events. Dr. Shedd added that making it clear that resilient action costs way less than dealing with the aftermath is also important.

Mr. Mack suggested thinking about the energy environment of the future of Keene, for example, what will transportation look like? Councilor Clark said a lot of the transportation issues are being addressed by automobile manufacturers who are committing to out phasing combustion engines. He said they have to prepare the Keene infrastructure, for example, converting gas stations to charging stations and establishing more car and bike share companies. Dr. Shedd added that public transportation within and between cities is also important as much of the workforce comes from outside of Keene. Ms. Baum said there are two stakeholder groups that they have not mentioned: farmers who rely on fossil fuel-run machinery that may be poised to offer space for solar on their large tracts of land, and inclusion of diversity and marginalized populations is also lacking and that can be addressed perhaps by creating more shelters that are renewably-run in the face of increasing storms.

Mr. Mack said they have come up with a lot of great ideas on the visioning aspect but they have not quite defined what "renewable energy" means to Keene. Dr. Shedd recommended that they have follow-up discussions on defining "sustainable energy" with Professor Webler as he would like to assist ECC with the energy plan process and perhaps he can be of assistance at one of ECC's meetings. Mr. Mack stated that it is unclear how municipal government will be of help as much of the process is still so amorphous. Councilor Clark said the overarching word for him in defining "renewable" is "safe": safe for humans and their environments. Dr. Shedd stated that another aspect to address whether or not Keene wants to continue investment in fossil fuels.

Mr. Mack asked Ms. Brunner and Dr. Shedd how they feel about the idea progress so far. Dr. Shedd and Ms. Brunner stated that this exercise has been very helpful for the committee and Ms. Brunner will take the ideas and boil them down into something she can present to the committee at the February meeting.

b. Plan outline-

Mr. Mack said the draft outline for Hanover starts with an Executive Summary and Table of Contents. He said right now there does not seem to be a consultant or a budget for Keene's Energy Plan. Ms. Brunner said there may be a budget to hire a consultant for small portions of the Plan. She said they are members of Clean Energy New Hampshire, however, she is not sure if they will help actually write the Plan or if they will just provide resources and help with understanding energy policy. Ms. Baum stated that creating this Plan without a full-time Sustainability Coordinator position within the City feels overwhelming, as they have tasked ECC with such a huge endeavor. Councilor Clark said he is reintroducing the position to Council. She said hiring a Sustainability Coordinator would be cheaper for the City than spending exponential amounts of money on a consultant for sections of the Plan and they would maintain the institutional knowledge within the City as well.

Mr. Mack said Dr. Shedd would like to see certain elements included in the Plan. He said the next twenty minutes will be dedicated to talking about the structure of the Plan, as well as kick-off the discussion of items that should be included. Dr. Shedd encouraged other members to chime in as well.

Dr. Shedd stated that she has looked at plans from other communities and come up with a few important cross-sector elements, for example:

Energy purchasing options: Dr. Shedd said Hanover is actively developing an energy purchasing co-op for vetting the competitive energy suppliers who are offering hundred percent renewables and once they put that together they may be available in other parts of the State. She said that could move them quickly towards a higher percentage renewable electricity, however, it would not have benefits for local sourcing.

Exploring financing options: Dr. Shedd said Connecticut has a green bank that helps to finance energy efficiency and renewable energy projects. She said Vermont has Efficiency-VT which is the country's first efficiency utility company. She said the City has started to look at space funding, however, that stalled out as mortgagers wanted the mortgage to be primary to clean energy products but they may re-open that investigation. She said Green Revolving Loan Funds is an on-bill financing opportunity which allows consumers to not have to pay up front and instead the utility works a gradual pay-off into the bill. Mr. Mack said it is not unusual for energy plans to have a chapter on financing. Dr. Shedd agreed and stated that she hopes knowledgeable people will work on developing that section.

Ms. Brunner asked if the sector approach is still something people would like to pursue, or would they want to structure the framework differently, perhaps more similar to the Greenhouse Gas Emissions inventory. She said the institutional sector is not really included in the GGE plan nor is the school district or college, and they can probably gather more specific data from those entities and break them out separately. Mr. Mack added that he was in a meeting with Vice Chair Hansel and they were discussing this, and he is also a member of the Keene Housing Board who has their own renewable energy goals, and they agreed that this effort is going to need champions, high-profile people and places that are achieving these feats that can help keep the

momentum going. Dr. Shedd said the Chamber of Commerce might be willing to publish success stories in the region.

Ms. Baum suggested creating a planned website that is accessible and graphically-rich, which breaks things down into digestible pieces and looks at it from different perspectives. She suggested leaving the structure as it is in the Plan itself but then present cross-cuts of the different sectors, for example, the best buildings across the board in a website. She said they can make beautiful websites with Wix which are very easy and inexpensive. Ms. Gaunt shared that when she worked with the Green Commission in Boston, they wanted to take an iconic perspective and due to the inherent competition within sectors, they wanted to highlight best building practices that helped others to show up. Ms. Brunner restated that members would like a sector framework further broken out by buildings and other perspectives, like a matrix.

Ms. Baum suggested having a section around outcomes or impacts specifically around economic development and deliverables that the Plan offers to the City that are very clear is very important. For example, highlighting the ways in which the Plan would encourage job growth, reduction in energy costs, and even increases in ecotourism should be tangible to citizens. Ms. Gaunt recommended a section on definitions as well, and a section on why the Plan matters and what is in it for the average citizen. Dr. Shedd also suggested to add context for the big picture and what the regulatory context is for the city, state and country. Ms. Baum asked if there is a one megawatt cap on projects. Dr. Shedd said the bill is back again and the House heard it on Tuesday, so it will be moving through the channels again

Policy needs at City, State and Federal level- Dr. Shedd stated if the City is committed to this goal, should the City be advocating for legislation that will enable them to reach their goals. For example, she said the megawatt cap affects Keene as implementing a PV system at the wastewater treatment plant will need to be more than one megawatt.

Community Solar-

Carbon fee and dividend- Dr. Shedd said Mr. Naadzenga had included some information about carbon fee and dividend and that is a big topic they will address soon, but if there were an all over price on carbon, not just power plant carbon which is what REGI provides for, it would make life more predictable for businesses. She said there is a multistate coalition going on, like REGI, but for transportation fuels which does not include New Hampshire.

Microgrids for critical facilities- Dr. Shedd asked how they would incorporate energy storage within the Plan. Ms. Brunner said she would include that into the strategy section of the plan. She said right now she is looking for more guidance on the format of the plan as that will help inform the content.

Mr. Mack asked who the audience of the Plan will be, for example, homeowners, CEOs, etc. and how they aim to design a plan that speaks to the individual. Ms. Brunner stated that having different sections on a website and is user-friendly, easy to navigate and avoids the traditional plan structure for the public. Ms. Baum said the Plan is still quite academic and there is an added value to in addition to an Executive Summary, having a summary of each section at the

beginning of each section, so that individuals can look at the Plan through a big picture lens without having to jump into the weeds with the granular details. She suggested summarizing the entire plan into a large display that can be placed around town, for example, a large sign. Mr. Brehme agreed that infographics and artistic display would be effective. Mr. Dachowski suggested creating bumper stickers. Mr. Brehme added having K-12 class and/or take-home activities as well. He also suggested creating interactive GIS pieces of Keene. Ms. Brunner suggested a low-budget story map. Mr. Dachowski emphasized including the faith sectors as well. He said various Protestant denominations have taken positions in regard to divesting from fossil fuel corporations. Councilor Clark added including the YMCA and other clubs as well.

Ms. Brunner said she is hearing that the Plan should include text and bite-sized, accessible pieces accompanied by graphics, visuals and web access. Councilor Clark asked if there is a way to have a spreadsheet that can be drawn from, for example, real-time pulling of data for different parts of the Plan, perhaps through the IT department. Ms. Brunner agreed they can find out if IT is capable of doing that. Councilor Clark used the example of being a homeowner who is interested in installing solar panels, he would like to learn the steps, drawing from the data on the excel layers. Mr. Brehme agreed that the graphic design people at KSC could create a living resource, or data repository, rather than a static plan. Dr. Shedd said they should also consider ways to update the information without knowledge of what technologies will be around in the future. Mr. Mack said they should keep things simple and prioritize what they want to do to make updates easier in the future. Ms. Baum stated that it is also important to have an inspirational component with some beauty and order to it. Mr. Mack suggested having pages dedicated towards success stories would be good source of inspiration as well. Ms. Baum said if there is an interactive website, they can also have an “ask a question” section to provide community engagement opportunities as well.

Ms. Brunner recommended that ECC consider researching and applying for grants to hire someone for graphics. Ms. Baum said there are many high school and college students that have that level of technical expertise that can assist with graphics development as well. Dr. Shedd stated these are important details to consider; however, they need to focus on the content first. Ms. Gaunt added that having a section dedicated to tracking and measuring progress, as well as including a methodology section on baselines is also important. Mr. Naadzenga agreed and said Portland, Oregon performs two-year interim targets to report on what has changed and to maintain a true living document. Ms. Brunner said the City learned from the GHG inventories that it is not realistic to update data-heavy documents and reports on a regular basis; there is too much data to collect and it has taken much longer to complete in the past than what was originally expected. If the metrics are going to be updated on a frequent basis, she suggested keeping things simple is the best way to update reports simply and more effectively.

c. ECC role and next steps

Councilor Clark asked when the starting point is for the Plan and Mr. Mack replied it is in January. Ms. Brunner said their deadline is December 2020. Councilor Clark asked if they should revamp the timeline to reflect where they are now. Mr. Mack said they have two years. Dr. Shedd said she hopes it can be adopted by December 2020 and Ms. Brunner said the draft

timeline built in four months for adoption. Ms. Baum suggested August 2020 as that is the dream goal.

Ms. Brunner asked about what the committee's role will be in the Plan and development, their level of commitment and specific tasks. Councilor Clark suggested having a task or two every month to complete and check in each month. Ms. Brunner said in order for that to happen they would need to work in between meetings. Councilor Clark said they can do the focus groups approach again. Dr. Shedd said that community engagement is a high priority for the committee, so perhaps they can start with a Communication group. Ms. Baum said they used to have hour long meetings and now they are an hour and a half, however, these two hour retreats are so much more invigorating, so why not have an hour-long meeting monthly and a two-hour retreat quarterly. Ms. Baum said the two-hour meetings could provide a block of working time. Dr. Shedd said that would double their time and Councilor Clark replied that he could do that.

Dr. Shedd stated if they pulled focus groups into the meetings, they could have representatives of the educational and institutional sectors at the meetings and that is something they can add to the agenda to start. Ms. Gaunt shared that she worked for the Chesapeake Bay program which is a highly successful model of stakeholder engagement, and one of the things they did very well that was cross-sector is they created stakeholder committees that represented all different sectors, and ask employers to donate paid staff time. She said maybe the two co-chairs can reach out to representatives across the critical sectors and ask if they have a staff person that can participate in this effort and be paid for X amount of hours per month for their participation. She said that might be the first level of engagement for co-chairs to seek out role models.

Ms. Brunner said maybe she can reach out to Antioch University again and see if there is a student who is interested in an internship or a student project to help with organizing these focus groups as that is very time-consuming work. She said the student can be invited to regular meetings or meet outside of meetings, but there can be no more than three members present otherwise it must be a publically posted meeting. Ms. Baum said there used to be a class on Program Evaluation at Antioch at one point and Ms. Brunner said she will reach out to the Internship Coordinator at Antioch again to find out who might be interested.

Dr. Shedd asked what people think about Ms. Baum's suggestion about changing the meeting times. Mr. Brehme said he is in agreement as he is not a morning person. Dr. Shedd encouraged everyone to think about the time they can allocate to ECC by their next meeting on February 6. Ms. Baum said a 2-4 pm time slot would work better for her. Mr. Naadzenga said the organization of the meeting this evening was very effective and the time was well spent.

Dr. Shedd asked if SWRPC could also get involved. Mr. Mack replied that unfortunately they do not have a funding source to participate on a regular basis but he may be able to help with the transportation sector.

5. Next meeting: Wednesday, February, 6 2019

Dr. Shedd adjourned the meeting at 6:02 pm.

Respectfully submitted by,
Ayshah Kassamali-Fox, Minute Taker

Reviewed and edited by Corinne Marcou, Administrative Assistant

CITY OF KEENE
Keene, New Hampshire

ENERGY AND CLIMATE COMMITTEE MEETING MINUTES

Wednesday, February 6, 2018, 8:00 AM 2nd Floor Committee Conference Room, City Hall

Members:

Members:

Chair Ann Shedd, Chair

Peter Hansel, Vice Chair

Terry Clark, Councilor

Chris Brehme, Member

Jess Baum, Member

Jake Pipp, Member

Ken Dooley, Member

Larry Dachowski, Alternate

Aperr Naadzenga, Alternate

Staff present:

Staff:

Mari Brunner, Acting Planner

Rhett Lamb, ACM/Community Development
Director

Guests present:

Charles Daloz

Dee Robbins

Shaylin Salas

Fred Ward

1. Call to Order and Roll Call-

Chair Shedd called the meeting to order at 8:04 AM and roll call was conducted.

2. Approval of December 5, 2018 Meeting Minutes-

Councilor Clark moved to accept minutes December 5, 2018 minutes with revisions, Mr. Naadzenga seconded and motion passed unanimously.

Revisions as follows:

First paragraph, page 9, change: “Solarized” to “Solarize.”

Mr. Brehme stated he was listed as present at the November 9 meeting, however, he was not present and it probably was Vice Chair Hansel’s voice instead. Change “Mr. Brehme” to “Vice Chair Hansel.”

3. ECC Retreat Debrief

Chair Shedd asked if there are any thoughts on process and content. Mr. Naadzenga stated the Retreat was well presented and planned and set good targets for their discussion.

4. Draft Vision & Values Statement

Ms. Brunner said she took the many ideas solicited during the Retreat, summarized them, and crafted draft vision and value statements. The summary notes and draft vision and values statements were included them in the packet for members to review ahead of the meeting. She asked for committee feedback.

Chair Shedd said some of what they talked about at the Retreat reflected the values they wanted included in the process of developing the Plan, and others were about what values they want incorporated in the end product of the Plan itself. She said Ms. Brunner's notes break those two pieces out into a split vision and values statement in the packet. Chair Shedd said this will be helpful as they hone the vision and values further. She suggested the committee wait at least one more month to digest the vision and value statements as members have not had much time to think them through, however, today they can go through the eight statements on the second page of the document.

Vision – What we are trying to achieve:

“We envision a future where our homes, transportation system and economy are powered by renewable, clean and affordable energy sources which support the well-being of both human and nonhuman life.”

Ms. Baum said the word “*nonhuman*” sounds awkward. Councilor Clark suggested using the term “flora and fauna” instead. Chair Shedd suggested that does not include microbial or fungal species and maybe the term “ecosystem health” is better. Mr. Brehme suggested using the words “health and well-being.” Ms. Brunner said the phrase “*human and nonhuman*” was thrown out several times during the Retreat and she did not want to miss or mischaracterize major ideas shared so she used the terms she heard. She also suggested stopping at “health and well-being.” Ms. Baum said that language can be misconstrued as only applying to humans. Councilor Clark suggested “life on earth.”

Chair Shedd asked for thoughts on the second part of the statement of the vision stated as:

“The production and distribution of energy for electricity, heating and transportation is safe and meets the needs of all business, residents and visitors and as a result the local economy will flourish.”

Vice Chair Hansel said the word “*safe*” is not necessarily the best word as it is not guaranteed that all renewable energy is safe. Mr. Naadzenga suggested the word “sustainable.” Ms. Brunner said she was trying to capture the value that all energy sources be “*safe*”, for example, in context of nuclear energy or energies that are known to be inherently unsafe. Chair Shedd suggested the wording “minimizes impact” instead as it considers the broad impact of any of the modalities. Ms. Baum suggested the wording “does not disrupt the balance of life” as it pertains to balanced ecosystems. Mr. Pipp added that there are wood-stove air quality issues in Keene that are not necessarily safe but are small scale energy sources. Vice Chair Hansel said “minimizing” is the best wording. Chair Shedd stated that “all energy sources impact somebody somewhere” so making it relative, instead of safe and absolute is important, and they should keep wordsmithing

that statement to convey the message that all energy sources have some impact but they are trying to minimize the broader, negative impacts.

Chair Shedd asked for thoughts on the statement:

“Everyone, including marginalized and vulnerable populations have access to affordable and clean, renewable energy that meets their everyday needs.”

Vice Chair Hansel said he is fine with that statement but it broadens their scope and goes into the social services realm which they do not have much control over. Councilor Clark said the Resolution talks about the everyday impacts on the most vulnerable people so maybe they should include everyone and not just marginalized and vulnerable people. Vice Chair Hansel said they should omit the part *“that meets their everyday needs”* as that is outside the scope of what they are doing. Councilor Clark suggested omitting the *“marginalized and vulnerable”* because it should include everyone. Chair Shedd said the marginalized and vulnerable populations have more access issues so she would be inclined to keep that part in there, but she agrees that maybe they can take out *“everyday needs.”*

Mr. Naadzenga stated that the vision should be ambitious so long as it remains within the confines of their scope. He suggested working towards a tall order and keeping a large vision that can expand out over the years. Vice Chair Hansel agreed that visions should be stretched. Mr. Naadzenga agreed that visions are meant to be that way. Ms. Baum said she is in agreement with removing *“everyday needs”* and leaving *“marginalized and vulnerable populations.”* Chair Shedd read aloud the clause of the Resolution that speaks to vulnerable populations and it explicitly states that the “margins” should be included.

Chair Shedd asked for thoughts on the statement, *“our energy system is resilient and able to adapt to changing climate and political conditions, as well as new and emerging technologies.”*

Ms. Baum said that is a great example of a very clear, yet stretching statement. Mr. Naadzenga and Councilor Clark agreed. Chair Shedd stated that it points to the resilience of the energy systems but not the capacity for community resilience. She used the example of microgrids as offering the police departments and hospital the resilience to still function even if the grid is down, so they need to come up with a phrase to add to that. Mr. Brehme noted that sentiment about resilience might fit better in the first bullet tying it into health and well-being.

Mr. Lamb said the word “political” should be omitted. Vice Chair Hansel said they could swap out the word “economic” for the word “political.” Ms. Baum said the term “ecological resilience” should also be added. Mr. Lamb stated that the way most people think about resilience is in the “community” sense and they are talking about an energy system. He suggested staying more aligned with “community resilience” and the ways in which the community can bounce back from extreme weather events. Mr. Dachowski suggested stating an “energy system that supports a resilient community” and other members agreed. Ms. Baum said they need to bolster the idea that “community resilience” is tied into ecological resilience, for example, carbon sequestration efforts, and that should be equally emphasized. Vice Chair Hansel said they can modify the first bullet to include that. Chair Shedd asked if the word *“resilience”*

belongs in the first statement *“promote the health, well-being and resilience of the community.”* Members agreed.

Chair Shedd asked members to take a look at the values statements which relate to the process of developing the Plan, *“we value everyone’s input and will actively engage a wide range of stakeholders in the process of achieving and maintaining our vision for a clean and affordable renewable energy future.”*

Vice Chair Hansel said it sounds good. Chair Shedd said *“maintaining our vision”* is helpful in that it is not just a plan that is going to sit on the shelf, it will take work and updates. Chair Shedd continued reading the statement, *“We are not in this alone; we will reach out to peer communities to exchange ideas and inspiration.”*

Vice Chair Hansel suggested stating that *“peer communities”* include neighboring towns, other U.S. towns and Chair Shedd suggested adding Keene’s sister city in Germany.

Chair Shedd read *“as we work toward our goals, new ideas and technologies will emerge that may change our approach. The process for achieving our goals must be transparent, flexible and adaptive. In order to engage everyone, our communications and messaging must be accessible, and focus on the benefits to us as a community and as individual. All should take an active role in achieving our vision.”*

Chair Shedd said at the Retreat they talked about the messaging being accessible and discussed potential forms the Plan might take. She said they discussed somehow making this complicated Plan easy to grasp perhaps using graphics and creating a living document. Ms. Brunner said Mr. Naadzenga had suggested during the retreat that they try to avoid jargon and that is the idea she was trying to capture with that statement. Ms. Baum and Mr. Naadzenga stated that Ms. Brunner did a wonderful job of boiling down their flip chart ideas into well-crafted statements.

Chair Shedd stated that the first page of Ms. Brunner’s Retreat notes does a good job of showing what the document will actually look like in terms of accessibility and evidence-based messages. She said the bullet stating, *“The goals and action items should be based on facts and action items that will actually work”* should be the first bullet point. Councilor Clark asked if they are supposed to put these in order and Ms. Brunner said there is no specific order necessarily, instead these were her attempts to summarize what she heard. Mr. Brehme stated that many of the statements relate to how a reader will interact with a final Plan, whereas the evidence-based and inspirational items are two distinct items from those so maybe they should come to the top, and perhaps the other items can be collapsed into fewer numbers as they are discussing similar things. Chair Shedd agreed that those are talking about the presentation and format of the Plan. Ms. Baum said the bullets including *“a living document”* and *“easy to navigate”* are two sides of the same coin. Chair Shedd stated that maybe those two can be consolidated into fewer bullets.

Chair Shedd said she created a long list of potential stakeholders to include in Keene’s Sustainable Energy Plan. She said she categorized sectors that ECC may want to engage. Chair Shedd will send the document to the committee before the next meeting. Ms. Baum stated that

most of the stakeholders are larger commercial and industrial institutions in the region and she would like to see come Main Street businesses included. Chair Shedd said she was thinking of placing small businesses in a separate category.

Mr. Lamb stated that the list is great, but to also keep in mind the level of effort it will take to reach out to stakeholders individually. He said learning about their interest level in the whole subject area and creating a dialogue about their shared goals is absolutely critical, but they should also keep in mind what it will take to create effective communication with all of these entities as this is a very long list and some of these will take more effort than others. Community outreach must be strategically considered. He said, for example, the City has been doing one-on-one interviews with CEOs of major businesses and small businesses, and it is a long process as this is not their subject area, and he suggested keeping in mind what they can actually achieve. Ms. Baum stated that perhaps instead of focusing on the different sectors and names of institutions, they can focus instead on hubs and communication modalities, for example, organizations like the Chamber of Commerce, Keene Sentinel and other communication veins that touch many parts of the list.

Chair Shedd said Concord's Energy and Environment Committee is in the process of developing their 100% Renewable Plan and a few weeks ago they had the first of three stakeholder meetings presenting drafts of their evolving Plan. She said they had between 25-35 different stakeholders from different sectors that committed to coming to all three meetings and it was also open to the public. Chair Shedd said she can get more information on their process to share with the committee.

Chair Shedd announced that March 25-28 is NH Clean Energy Week and last year Keene hosted the initial event with a roundtable sponsored by the Chamber of Commerce and Nature Conservancy. She said there is nothing planned for Keene for this year. Chair Shedd said it takes a lot of planning to have a public engagement session, but perhaps they can have an informal conversation opportunity to engage the public on the Plan which will include basic information and models from other communities. She asked if that is way too far outside the Planning world's process. Mr. Lamb said that it is a good opportunity to talk about subject matter but it is really a matter of publicizing and getting people to come out. Chair Shedd said it is only six weeks away and asked if the Communications group will be able to work on it. Ms. Baum and Mr. Brehme said they could commit to this. Chair Shedd said they still need to continue with questions on vision and values statements and also firm up some further plans for the March 25-28 week event.

Councilor Clark asked if they could keep track of the progress on the scope of work by checking off items that have been completed. Ms. Brunner said she created the chart before the Resolution was adopted, but she can certainly update it. Ms. Baum said a strong project management system on a dynamic platform that they could all access in real time, like a Google Sheet, would be a good idea, although they cannot make comments because it would be akin to a public meeting. Ms. Brunner said she can put it in the ECC folder. Mr. Lamb said this chart is not current, they need to work with the City Manager to understand what they can do and it is a work in progress. Mr. Lamb said they will be meeting with the Town Manager in Hanover to learn about their

scope of work is and who can do what within that scope. Chair Shedd thanked Mr. Lamb for going to Hanover to learn their process so that efforts are not duplicated.

5. Keene School District Update on Energy Efficiency Upgrades

Mr. Dooley introduced himself as the Director of Buildings and Grounds for the Keene School District. He said he has been with the District for 7.5 years and Director for 5.5 years. He said he is usually more organized, but he has been swamped with budget priorities so he does not have a savings sheet to show the committee today. He said as a whole, everything the School District does is based on financial savings; however, a lot of those savings come from energy savings. He said the largest ticket in his budget is staff, second to that is oil, electricity and propane. He said saving energy saves money, and that has been the primary inspiration for the School District.

Mr. Dooley stated that when the Jonathan Daniels School was shut down in 2014, they were able to convince the Facilities Committee and the Board to reinvest that money back into the elementary schools in Keene which were pretty dated. He said they invest about 2 million dollars a year, initially it was a 6 year plan but that has been stretched out to 8-9 years. Mr. Dooley said the project is based on HVAC and lighting, and it is essentially an energy savings project. He said the project involves taking out very inefficient steam heat oil burners and replacing them with high efficiency, condensing propane boilers which were the best option for the School District to have a cleaner and more affordable source of fuel. Mr. Dooley said there is an immense amount of work that goes into the underground source tanks for propane so it alleviates all the permitting required and associated DES inspections work. He said they are installing all new advanced LED lights, occupancy and photo sensors, which they have set at 70% and nobody has even noticed. Mr. Dooley stated that this is the reoccurring project each year which saves a lot of money.

Mr. Dooley stated that in between all of that there is a lot more that he does and any time they get the opportunity to save money in the other buildings they pursue it. He said right now they are switching to LED lights in their high use areas, for example, they just completed installing LEDs in the hallways of the high school over the fall. He said none of this has been planned but rather was done as opportunities arose. Mr. Dooley stated that Eversource had extra rebate money and so they jumped on the opportunity and spent \$58,000 and got \$38,000 back and saved even more money. He said they have big, medium, and everyday projects that are all focused on saving money and energy by replacing fixtures as they go to suit their tight budget.

Councilor Clark asked Mr. Dooley why every light in the high school hallways are always on. Mr. Dooley replied that the new lights have sensors, and in the high school, instead of every light being on, every fourth light is on and they also dim, which allows the police to drive around the buildings and check the halls. He said they also have an alarm system. Mr. Dooley said the District is also completing a project to install control systems for the heat, as most of the buildings did not have them, and now rooms are almost one hundred percent controllable. He said the control systems have demonstrated huge savings in fuel and electrical usage as well.

Vice Chair Hansel said the Sustainability Plan looks into the future 30 years or more, and because the School District just installed propane heaters, what decisions will they make about

the type of heating systems they will use in the future, will they be fossil fuel related or consider alternatives? Vice Chair Hansel also asked if the School District is looking at the envelopes of the buildings to improve the insulation factors. Mr. Dooley replied that the elementary school renovations are a complete energy overhaul; they have sealed the buildings, caulked the windows, reinsulated attics all in a multi-phase plan. He said the heat plan and heat source are done first as they are most expensive, and then they start tackling finishes like flooring, new lighting, paint and new ceiling tiles. He said all decisions were made with “green” in mind, for example, the floor product they chose is a no-finish, green-certified floor product. However, the quality of the air and space for students and for the staff that maintain the buildings are also important to the project. Mr. Dooley stated that their cleaning procedures have also changed, for example, instead of using chemical cleaning products they now clean with water only, except in the bathrooms where they use a bathroom product. He said the School District has changed a lot in the past 4-5 years in terms of accomplishing huge energy savings. Mr. Dooley said the Board has also been very supportive in allowing him to roll remaining Eversource rebate money into other projects on a continual basis. He stated that at one point lightning destroyed the control panel at the high school, so instead of simply replacing the control panel, they utilized Eversource’s on-bill payment system and replaced everything with LED lights.

Ms. Baum stated it sounds like the School District is doing amazing work. She asked Mr. Dooley if he has taken on any educational opportunities to share this information with students and parents. Mr. Dooley said he himself has very little time to do education; however, there is always a staff member or teacher that is very supportive of these changes and he is supportive of their interests in what he does. He said, for example, a teacher at Fuller wanted to bring their recycling program to the next level and he helped create a revamped recycling program which involves the student body as well. He said one of the Science teachers at the high school observed them installing the LED lights and used that as a source of inspiration for an energy unit for her students.

Mr. Dachowski asked Mr. Dooley if he experiences pushback when these changes occur. Mr. Dooley replied in the affirmative, noting that no one likes change and he has gotten pushback from his own staff. He said scheduling with contractors is difficult as they prefer day time work hours, and he gets pushback from the schools about the contractors doing work during the day. Mr. Dachowski asked whether, once a change has been implemented, people generally accept them. Mr. Dooley replied that the teachers actually like the idea of being able to control and dim the lights, as it is perhaps calming for students and he has gotten very few complaints.

Councilor Clark asked if the School District has any plans for implementing alternative energy, like solar. Mr. Dooley said he currently sits on the City’s Joint Purchasing Committee, and they often talk about coming together with other groups to pursue energy alternatives. He said he can get a better rate through the School District; however, they have not yet come together on electricity, oil and propane alternatives, as the City uses different ways of purchasing energy. Vice Chair Hansel stated that it is important that they are even having these types of discussions.

Councilor Clark asked Mr. Dooley about the potential for rooftop solar at the high school. Mr. Dooley said they talk about it but the idea is not quite as accepted on the Board and Administrative levels right now mainly because there is pushback about putting anything on the

buildings. He said the School District owns over 106 acres in Keene, but most of it is comprised of sports fields and school buildings, so they are struggling to find any major, impactful way to place solar installations. He said lately he has been receiving many requests from solar companies. Vice Chair Hansel said the reason is because there are now loan funds available now for nonprofit organizations like schools. Mr. Dooley said as soon as they can demonstrate substantial financial savings for solar installations for the School District that is when the idea would be more likely to be accepted by the people who make those decisions. Mr. Lamb said that his department would be happy to share their experiences about the City's solar installation at 350 Marlborough Street. Mr. Dooley said that would be great.

Chair Shedd stated that there are only about 20 schools in New Hampshire with solar installations, and 250 school buildings and they are not solely rooftop installations, for example, UMass in NH is installing solar in parking lots which can provide shading, snow shelter, EV charging potential and electricity generation. Chair Shedd told Mr. Dooley it is very inspiring to hear what the District has done with the schools, and it is a huge success story that they should find a way to share with the public. She said finding the communications medium to share with residents about the savings in energy efficiency and how rapid the payback can be are one of ECC's early priorities. Vice Chair Hansel asked if the Monadnock Energy Hub has a way of publicizing the School District's work. Chair Shedd said the Clean Energy Team has a website where they share stories and they might be willing to place a story on that platform and then duplicate it across multiple websites. She thanked Mr. Dooley for his presentation to ECC.

Councilor Clark said he spoke to Mr. Bouchard (Assistant County Administrator) and he expressed interest in speaking with ECC if invited. Chair Shedd said in terms of transportation, some of the VW diesel settlement money is for electrifying fleets and school buses are specifically mentioned, however, all buses in NH are contracted so that could be difficult. Mr. Dooley agreed that the entire school bus fleet is contracted in the School District as well as all the vehicles in his department. Chair Shedd said the City is using 20% biodiesel for its diesel vehicles. Mr. Dooley said the School District has diesel tractors but they use gas vehicles. Ms. Gaunt shared that Keene State College uses biodiesel for their vehicles and Chair Shedd said there may be another opportunity for shared savings between the College and the School District.

6. Energy-Related Legislative Updates

a. HB 365, "Relative to net energy metering limits for customer generators"

Chair Shedd stated that the text of the bill for HB 365 is included in the packet. She said that last year a similar bill had bipartisan support to increase the net metering cap for individual projects from 1 to 5 megawatts, and then the governor vetoed it. It came back in the fall of 2018 for a veto override vote; however, there were not enough votes to override the veto at that time. She said the bill is back again. Ms. Brunner stated that she reached out to Clean Energy NH to see if they had any summaries or talking points that relate to these bills and she received some information that she will share with the committee.

Chair Shedd said this bill was not specifically commented on by the City last year because they had already asked the City to support maintaining the renewable portfolio standard and RGGI funding, and this bill came to their attention a little bit later when it was too late to get through

City channels. However, this bill will clearly impact what Keene can do. For example, the wastewater treatment plant (WWTP) is the largest electricity user in the county. Ms. Brunner noted the WWTP has already done a significant amount of work to reduce their energy usage, but even so would probably need a larger system than 1 megawatt. Chair Shedd said there has been discussion off and on about the possibility of installing a solar system to offset the WWTP electrical usage, which would probably need to be bigger than 1 megawatt, but the City could not do that with the current 1 megawatt limit. She said raising the cap to 5 megawatts would directly impact what the City can do, much less what residents and businesses can do. She asked the committee if the group is in favor of asking City Council to have the City submit comment to the legislature and the Governor. She asked Ms. Brunner to summarize the talking points from Clean Energy New Hampshire.

Ms. Brunner said the talking points from Clean Energy NH state that the bill would do the following:

- Raise project cap for net-metered projects from 1 megawatt to 5 megawatts*
- Require utilities to account for net-metered power in such a way that maximizes rate payer savings and minimizes rate-payer costs.*
- Would allow large energy users like municipalities, schools and business to invest in renewable energy projects that are properly sized for their needs (which gets to the point that Chair Shedd made about the WWTP, which would need a system that is larger than 1 MW)*

Ms. Brunner noted that the talking points also include some general information about the overall benefits of renewable energy to the state, such as creating renewable energy jobs, reducing fossil fuel use from out of state and keeping energy dollars in the state. Ms. Brunner said she would be happy to share the talking points with the committee if people are interested.

Vice Chair Hansel asked if this bill would affect group-net metering. Ms. Brunner said there is a bill that would affect group-net metering, which is the low-income community solar bill. Vice Chair Hansel asked if they put in a facility that is bigger than they needed themselves, could the City then group-net meter that extra energy. Mr. Lamb said there have been several concepts developed for the airport and one of them is a small energy micro-grid that the City would then own and operate, however, there are some limitations because they would become a power generator which puts them in a new class. However, he said, it is likely that if there would be more energy produced in the WWTP, they could potentially take advantage of group net metering. Mr. Lamb said anytime they can use energy behind the meter it is a better deal financially than putting it back into the grid.

Ms. Brunner said SB 165 is a bill that would modify group net metering in a couple of ways. First, it will allow for members of a group-net metered system to receive on-bill crediting for their share of the net-metered generation. She believes that currently, the utility will send a check to the head of the group net-metered system and then that entity has to distribute the money. The current proposal is to change this to on bill crediting, which makes it a simpler process. It includes a 3% per kilowatt per hour adder for low income, community solar projects and it requires that there are three new moderate or low income community solar projects to be added to each utility service area per year beginning in 2020.

Chair Shedd said the SB 165 group net-metering bill is different than the energy cap bill (HB 365) and perhaps they should pay attention to that right now. She asked members again if they want to ask Council to support the bill. Ms. Baum and Councilor Clark said they are in favor of asking City Council to support the bill. Councilor Clark noted that the City had weighed in on the statewide cap on net metering in the past. Chair Shedd clarified that this bill is to raise the cap for individual projects; the previous bill that the City commented on was for a cap on all projects throughout the state. This bill would allow larger institutions, such as schools, municipalities, and other large electric users, to install systems that are the proper size.

Councilor Clark reviewed several process options and asked about the best way to make this request. Mr. Lamb said he thinks it is important for ECC to take a vote and make a recommendation for the Mayor or City Council to draft a letter. He said if the committee makes a vote today, it may be referred to either the PLD or MSFI committee and at that point public input will be solicited. ECC members could provide input at this point in the process which would allow City Council to hear their story. The PLD/MSFI will make their recommendation and then it will go back to Full Council, possibly by March 5th. Chair Shedd this is a reasonable timing for the process, because bills crossover from the senate to the house and vice versa in April.

Ms. Baum motioned that ECC make a recommendation to City Council to draft a letter to the legislature stating they support HB 365 “Relative to net energy metering limits for customer generators”, Councilor Clark seconded and motion passed unanimously.

b. Other energy-related bills

Chair Shedd said HB 562 updates the State existing building, plumbing and mechanical energy and conservation energy codes from their 2009 versions to 2015 versions. She said there are a couple of bills coming from the House to the Senate but this is the most straightforward one. Chair Shedd said she did talk to Mr. Kopczynski about this bill and asked whether he and other staff members went to Concord to support this bill. Ms. Brunner said they did not provide any testimony on this bill yet; they are watching to see what amendments might get added when it comes out of committee.

Chair Shedd said a good case study which demonstrates why an updated building and energy code is important is the two off campus housing units on Ralston Street, which were constructed recently and are relatively new buildings. When she passed by the other day, the north-facing roofs of both buildings were significantly melted out, which indicates they do not have good insulation. She said the 2015 code is more stringent than the 2009 code. She thinks there is pushback from the building contractor sector on this bill, perhaps because it is more stringent and expensive. Chair Shedd suggested the committee have Mr. Kopczynski come to a future meeting to talk about the bill and its impacts. Vice Chair Hansel said they should monitor the bill for now. He unsure how much of this is state-mandated versus under local control. Ms. Brunner said the City could opt to adopt a more stringent code than the state, but the City of Keene has not done that. However, the SEED district offers incentives to meet a higher building code. Mr. Lamb said building codes are pretty sophisticated and Mr. Kopczynski is as well-trained an expert in building codes as anyone in the State and it is a good subject area to learn more about, remembering that building codes will mostly affect new buildings. He said it does affect the existing building codes, but there are all sorts of ways to work around it for existing buildings

and it would be good to understand the effects that building codes have on energy. Mr. Lamb said they can put that into the context of the thermal goals for the Plan. Of the three goal areas – heating, electricity, and transportation – heating is almost difficult to address as transportation. In order to reach the 100% renewable energy goals, they will need to fully understand the building codes and the role they play with regards to thermal energy. Vice Chair Hansel agreed that should be a part of a bigger discussion.

Ms. Baum said she agrees that would it be great to have Mr. Kopczynski in to talk about that, however, she just does not know if now is the time to dive into the details of the building and energy code. Chair Shedd agreed with Ms. Baum, and noted that members should have access to NH Clean Energy links to the various energy-related bills, and encouraged committee members to pay attention to the legislative updates.

Mr. Lamb said Councilor Hansel would like ECC to take a look at SB 165 and suggested that the committee add it to the agenda for next month.

7. Committee meeting schedule

Chair Shedd stated they spoke at the Retreat about changing meeting times and/or having additional meetings. Ms. Baum clarified that the committee talked about both the length and frequency of the meetings as well as the time that the committee meets. Her proposal was to shorten the regular monthly meeting to one hour and add a longer, quarterly meeting to focus solely on the Energy Plan to move things forward. Ms. Brunner said she could put this topic earlier in the agenda for the next month to give the committee more time to discuss that topic.

8. Other Business

Chair Shedd handed out a sheet with upcoming events. Mr. Lamb shared that Mr. Ward, member of the public, wrote about the goals with respect to renewable energy and wind power and he would like to address the committee at some point in time. He said perhaps they can take into consideration whether or not they want to agendize a presentation from Mr. Ward at a future meeting. Chair Shedd said the 2004 action plan called for assessing Keene's wind potential and that has not been done yet and thanked Mr. Ward for bringing that back to the committee's attention. Mr. Ward replied that he would like to be added to the agenda for next month and Chair Shedd agreed.

9. Next Meeting: Wednesday, March 6, 2019

Chair Shedd adjourned the meeting at 9:37 am.

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

Reviewed and edited by Mari Brunner, Acting Planner

ECC RESOURCES & LINKS

MARCH 6, 2019 MEETING PACKET

1. Energy and Climate Committee – Link to Shared Drive:
<https://drive.google.com/drive/folders/1O1WIR0fADTNijRt13v3DU7k2FwxXDcGs?usp=sharing>
2. Clean Energy NH – Overview of NH Energy-Related Legislation. Includes a list of energy-related legislation and an overview of Clean Energy NH's assessment of each bill (including whether the organization supports, does not support, or is neutral). <https://www.cleanenergynh.org/energy-bills>
3. Upcoming Dates of Interest:
 - a. Monadnock Earth Festival: Saturday, April 20, 2019 from 12 – 4 PM on Railroad Square and along the bike path (rain date: Sunday, April 21).
<https://monadnockfood.coop/earthfestival/>
 - b. Radically Rural: Thursday and Friday, September 19 & 20, 2019. www.radicallyrural.org
This annual, 2-day summit will have a renewable energy track with three sessions on renewable energy: <https://radicallyrural.org/program-3/schedule/>
4. Solarize kick-off events in the region: www.solarizemonadnock.com/kickoff-events
 - a. Peterborough, Sharon, and Hancock: Wednesday, March 13th, Peterborough Town House from 6:30 – 8:00 p.m.
 - b. Rindge & Fitzwilliam: Thursday, March 14th, Franklin Pierce University (Spagnuolo Hall) from 6:30 – 8:00 p.m.

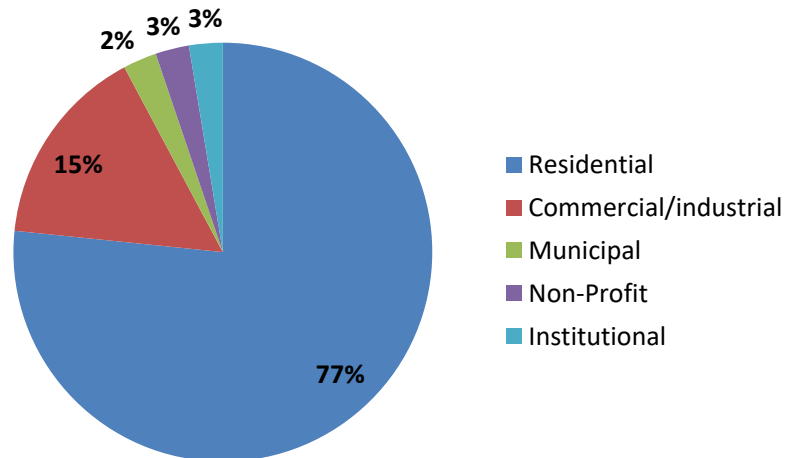
ECC Energy Plan Work Group – Data Collection

Summary of Solar Installations in Keene

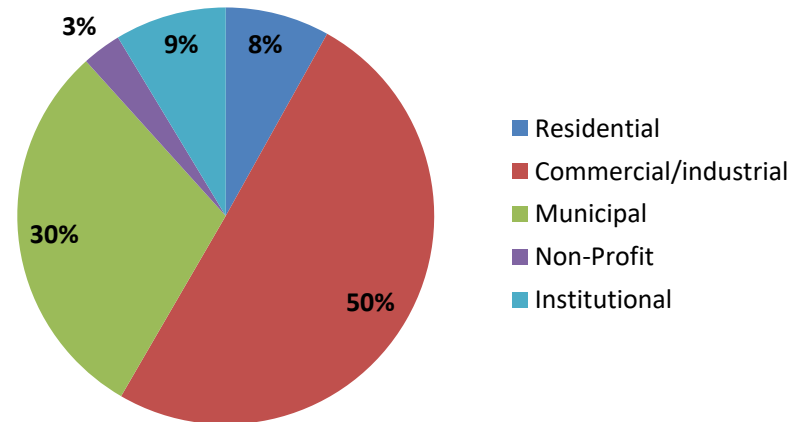
Sector	Number installations	Total Capacity* (kW DC)	Average Capacity (kW DC / installation)	Adjusted Total Capacity** (kW DC / installation)
Residential	59	176.6	5.7	336.2
Commercial/industrial	12	1097.7	91.5	1097.7
Municipal	2	653.8	326.9	653.8
Non-Profit	2	66.3	33.2	66.3
Institutional	2	188.9	94.4	188.9
Total	77	2183.2	44.6	2342.8

*For the residential installations, the capacity is known for only 31 systems (53% of total). ** Adjusted Residential capacity based on average capacity per installation

Number of Solar Installations



Solar Capacity, Adjusted (kW DC)



EXAMPLES OF COLLABORATIVE & OTHER PURCHASING OPPORTUNITIES

Prepared by Ann Shedd for the Keene Energy and Climate Committee

1. Hanover Municipal Real-time Pricing Purchase

<https://lebanonnh.gov/DocumentCenter/View/6327/Lebanon-Community-Power-Update-1?bidId=>

The Town of Hanover switched from fixed price electric rates to real time pricing a few years ago. This process of buying its electricity supply directly from the wholesale market has saved the town about \$50,000 to \$100,000 a year. If Lebanon had paid the average RTP that Hanover paid for the 12 months ending 2/17, the City would have saved over \$160,000 and over \$60,000 for the 12 months ending 2/18. While this approach could be an option for Lebanon, the alternatives described below may provide even greater savings and price stability over the long term while helping the City achieve its energy and environmental goals. Hanover and Lebanon may collaborate to implement some of these goals and projects.

2. Community Choice Aggregation

<https://orr-reno.com/electricity-demand-aggregation-under-chapter-53-e-can-help-your-constituents-save-money-on-their-electricity-bills/>

New Hampshire law Chapter 53-E brings the competitive marketplace to retail electricity consumers by empowering town officials to act as brokers for their municipalities and school districts, negotiating lower electricity rates and other electricity-related perks. Chapter 53-E enables counties and municipalities to aggregate electricity demand within their boundaries, broker agreements for power supply, and coordinate demand-side management, conservation, meter reading, and customer service. Counties and towns may also establish electricity aggregation committees and write electricity aggregation plans, giving constituents the ability to choose among this range of benefits. Chapter 53-E puts all of these perks within their constituents' reach—upon approval from their constituents, towns and school districts can all opt-in to any aggregation program that their region puts forward.

The statute was enacted in 1996 with the aim of allowing counties and municipalities to access the competitive electricity market so as to “encourage voluntary, cost-effective, and innovative solutions to local needs with careful consideration of local conditions and opportunities.”

NH limited to “opt-in” model due to Section 53-E:7 “No retail electric customer shall be included in the program unless the customer affirmatively responds to the notification or requests in writing to be included in the program.”

Sustainable UNH report in Community Choice Aggregation in MA, including opportunities for other states/communities to develop the model

https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/Fellows/lichtenstein_-_aggregation_in_ma_report.pdf

3. Peterborough Power Collaborative

<http://www.peterboroughprojects.info/collaborative-purchasing/>

The Town of Peterborough led the formation of a coalition of ten communities and organizations that combined purchasing power to cooperatively bring about larger regional energy consumption awareness, change, and cost reduction. This local energy collaboration currently consists of the following towns and organizations; Town of Peterborough NH, Town of Dublin NH, Town of Hancock NH, Town of Jaffrey NH, SAU 47, Town of Frankestown NH, Town of Temple NH, Town of Swanzey NH, Town of Rindge NH, and the Monadnock Economic Development Corporation.

With the Town of Peterborough providing the initial example and project leadership, the coalition partnered with Integrys in 2013 to deliver renewable energy to participants in the local energy collaborative through the utilization wind-generated power. As a result of this collaborative purchasing partnership, members of the coalition are now utilizing 100% renewable energy in their facilities.

This collaborative partnership earned the Town of Peterborough and the Peterborough Power Collaborative national award recognition as a Green Power Purchasing Leader.

4. Nashua Region Electricity Supply Aggregation

<http://www.nashuarpc.org/energy-environmental-planning/energy-aggregation/>

The goal of the Nashua Region Electricity Supply Aggregation is to purchase electricity as a group from a competitive supplier at a lower rate than each member could receive on its own. By purchasing as an aggregation, municipalities and school districts can offer electricity suppliers a larger demand than if they each tried to purchase electricity individually. The larger demand, in turn, allows suppliers to offer a better rate to the aggregation than it could to individual members.

The Nashua Regional Planning Commission serves as an aggregator to facilitate a bid process among competitive electricity suppliers licensed with the NH Public Utilities Commission. Each aggregation member signs its own contract with the supplier for a fixed electricity supply rate. Rates and contracts are identical for each member within a given electric distribution territory.

Total Aggregation Savings 2012-2017: \$1,608,931

Lebanon model in development:

<https://lebanonnh.gov/DocumentCenter/View/6981/TESC-18-Presentation-Clifton-BELOW---LCP>

SB 122-FN - AS INTRODUCED

2019 SESSION

19-0834
10/05

SENATE BILL **122-FN**

AN ACT relative to expenditures from the energy efficiency fund.

SPONSORS: Sen. Fuller Clark, Dist 21; Sen. Hennessey, Dist 5; Sen. Levesque, Dist 12; Sen. Feltes, Dist 15; Sen. Sherman, Dist 24; Rep. Balch, Hills. 38; Rep. Cali-Pitts, Rock. 30; Rep. McGhee, Hills. 40

COMMITTEE: Energy and Natural Resources

ANALYSIS

This bill:

- I. Requires the public utilities commission to allocate certain funds to school districts for energy efficiency projects.
- II. Repeals a rebate to retail electric ratepayers.
- III. Requires the public utilities commission and the department of environmental services to submit a report with recommendations for allocations of auction proceeds.

Explanation: Matter added to current law appears in ***bold italics***.

Matter removed from current law appears [~~in brackets and struckthrough.~~]

Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

19-0834
10/05

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Nineteen

AN ACT relative to expenditures from the energy efficiency fund.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 Regional Greenhouse Gas Initiative; Energy Efficiency Fund and Use of Auction Proceeds. Amend RSA 125-O:23, III to read as follows:

III. All ~~remaining~~ proceeds received by the state from the sale of allowances, excluding the amount used for commission and department administration under paragraph I, shall be allocated by the commission as follows:

- (a) At least ~~[15]~~ **35** percent to the low-income ***utility*** core energy efficiency program.

(b) Beginning January 1, ~~[2014]~~ **2020**, ~~[up to \$2,000,000]~~ **no more than \$5,000,000** annually to utility core **energy efficiency** programs for municipal, **school district**, and local government energy efficiency projects, including projects by local governments that have their own municipal utilities. Funding elements shall include, but not be limited to, funding for direct technical and project management assistance to identify and encourage comprehensive projects and incentives structured to assist municipal and local governments funding energy efficiency projects. In calendar years 2014~~, 2015, and 2016,~~ **through 2019** any unused funds allocated to municipal and local government projects under this paragraph remaining at the end of the year shall roll over and be added to the new calendar year program funds and continue to be made available exclusively for municipal and local government projects. Beginning in calendar year ~~[2017]~~ **2020**, and all subsequent years, funds allocated to municipal and local government projects under this paragraph shall be offered first to municipal and local governments as described in this paragraph for no less than 4 full calendar months. If, at the end of this time, municipal and local governments have not submitted requests for eligible projects that will expend the funds allocated to municipal and local government projects under this paragraph within that program year, the funds shall be offered on a first-come, first-serve basis to business and municipal customers who fund the system benefits charge.

(c) The remainder to ~~[all fuels, comprehensive energy efficiency programs]~~ **programs for reducing carbon emissions in the transportation sector** administered by qualified parties which may include electric distribution companies as selected through a competitive bid process. The funding shall be distributed among residential, commercial, and industrial customers based upon each customer class's electricity usage to the greatest extent practicable as determined by the commission. Bids shall be evaluated based on, but not limited to, the following criteria:

- (1) A benefit/cost ratio analysis including all fuels.
- (2) Demonstrated ability to provide a comprehensive, fuel neutral program.
- (3) Demonstrated infrastructure to effectively deliver such program.
- (4) Experience of the bidder in administering ~~[energy efficiency]~~ **programs for reducing carbon emissions in the transportation sector**.
- (5) Ability to reach out to customers.
- (6) The validity of the energy saving assumptions described in the bid.

2 Review and Report. The public utilities commission and the department of environmental services shall review the use of auction proceeds under RSA 125-O:23, III and shall submit a report, with recommendations to continue or revise the allocation of auction proceeds among the core programs based on program needs, to the house and senate finance committees, the speaker of the house of representatives, the president of the senate, the house clerk, the senate clerk, and director of legislative services on or before July 1, 2023.

3 Repeal. The following are repealed:

- I. RSA 125-O:23, II, relative to rebates to retail electric ratepayers.
- II. RSA 125-O:23, IV and V, relative to use of remaining proceeds received by the state from the sale of allowances.

4 Effective Date. This act shall take effect 60 days after its passage.

LBAO
19-0834
1/15/19

AS INTRODUCED

AN ACT relative to expenditures from the energy efficiency fund.

FISCAL IMPACT: ☒ State ☒ County ☒ Local ☐ None

STATE:	Estimated Increase / (Decrease)			
	FY 2020	FY 2021	FY 2022	FY 2023
Appropriation	\$0	\$0	\$0	\$0
Revenue	\$0	\$0	\$0	\$0
Expenditures	\$100,000	\$100,000	\$100,000	\$100,000
Funding Source:	<input checked="" type="checkbox"/> General <input type="checkbox"/> Education <input checked="" type="checkbox"/> Highway <input checked="" type="checkbox"/> Other - Energy Efficiency Fund, Multiple Others (See Methodology)			

COUNTY:

Revenue	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase
Expenditures	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase

LOCAL:

Revenue	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase
Expenditures	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase	Indeterminable Increase

METHODOLOGY:

This bill would repeal the \$1 per allowance amount deposited into the Energy Efficiency Fund.

Instead, all proceeds from the sale of allowances would be deposited into the Energy Efficiency Fund for specific programs and the provision in current law to rebate all electric ratepayers with any revenue above the \$1 per allowance would end. Below is an estimate from the Public Utilities Commission and Department of Environmental Services of how this bill will impact the allocation of auction revenue based on the assumption that net auction revenue from the sale of allowances will be \$13.65 million in FY 2020 and each year thereafter:

Current Law	Current Allocation of Revenue	Proposed Changes	Proposed Allocation of Revenue	Net Estimated Change
Low-income Core Energy Efficiency Program (15%)	\$440,000	Low-income Utility Core Energy Efficiency Program (35%)	\$4.8 Million	\$4.4 Million
Energy Efficiency Program (only municipalities)	\$2 Million	Energy Efficiency Program (municipalities + school districts)	\$5 Million	\$3 Million
	\$200,000		\$3.8 Million	\$3.6 Million

All-fuels Program (remaining balance of \$1 per allowances)		All-fuels Program (remaining balance)		
Rebates to all electricity rate payers	\$11 Million	Rebates to all electricity rate payers	\$0	(\$11 Million)
Total	\$13.6 Million		\$13.6 Million	\$0

Note: These estimates assume an average allowance price of \$4.75.

This bill will have no impact on net state revenue, but will reallocate state revenue to energy efficiency programs from rebates to electricity rate payers. Therefore, the cost of electricity will increase generally for all state, county, and local governments that consume electricity. For example, the Commission and Department estimate the elimination of the rebates to all electricity rate payers will increase state electricity cost by \$100,000, based on the state's consumption of electricity in FY 2017. This increase in state electricity costs will impact all funds used to purchase electricity. The Commission and Department note that investments into energy efficiency may offset, in the future, any increase to electricity costs.

While local governments would directly receive a net revenue increase of \$3 million, the total direct and indirect benefits to local and county governments will increase by an indeterminable amount.

AGENCIES CONTACTED:

Public Utilities Commission and Department of Environmental Services

From: [Rhett Lamb](#)
To: drfred@myfairpoint.net
Cc: [Mari Brunner](#); [Ann Shedd](#)
Subject: RE: March 6 meeting
Date: Monday, February 25, 2019 3:36:24 PM

Hello Fred,

I didn't see an attachment. Can you double check please.

As far as sending it to the committee goes, it's our practice to send correspondence with the agenda packet which goes out a few days before the meeting. We'll make sure we include your email/letter once we have it.

Rhett

-----Original Message-----

From: drfred@myfairpoint.net [<mailto:drfred@myfairpoint.net>]

Sent: Saturday, February 23, 2019 1:11 PM

To: Rhett Lamb

Subject: March 6 meeting

Rhett, 23 February 2019

I've attached a copy of my letter to the Keene Sentinel. It covers much of what I'd like to discuss with the Energy Committee on the 6th. I'd appreciate your distributing it to them now so we can have an interesting discussion on the 6th.

I will add that my goal is to repurpose their time, attention, and thoughts to areas in which they can make a contribution to the environment, without getting into a morass about 100% clean energy, which is quite impossible. I've been at this environmentalism for over a half century, and learned there are few easy answers, but there are some answers, and I would hope to suggest those to the Committee, in the hope of working with the Committee, as a technical consultant (pro bono), in the future.

Fred Ward
386 Route 123 South
Stoddard, NH 03464
drfred@myfairpoint.net
603-446-2312

To the editor: 19 February 2019

Lots of arguments have been made against the Green New Deal, and its goal of 100% carbon-free energy, including carbon-free electricity, by 2030. Most of these arguments have been political and economic. But the fundamental argument destroying 100% clean electricity is more basic. The weather won't allow it!

A wind turbine with a RATED capacity of 3 Megawatts produces only 1 Megawatt of electricity on AVERAGE! This inefficiency is due to the mechanical limits of the turbines, but mostly to the fact that the wind doesn't blow all the time. This inefficiency leads however to a serious problem. The public proposals setting "green energy" contributions from wind at say 25% to 50% of the AVERAGE capacity of the grid, requires the grid to also be able to accept the wind power from the turbines when they are spinning at their maximum power. On windy days that maximum power will be three times the planned 25%-50%. If the goal therefore is to get an AVERAGE of 25-50% of grid capacity just from wind, then the grid must be able to accept, AND USE, electrical surges between 75%-150% of the total capacity of the grid!

The argument is made that things even out, so that when one turbine is operating at its 3 Mw rated capacity, others in the area won't be. However, a simple study of the wind speeds over the New England electric grid (ISO-NE), which is easily replicatable, shows that when the wind is strong at weather stations in northern New England (Caribou, Burlington), it is generally strong at the southern weather stations (Providence, Bridgeport). These wind data show that contributions to the grid from turbines around New England do not even out, they mostly add to each other. When winds are strong in New England, a wind power contribution set at 25% of the AVERAGE electric power capacity to the grid, will balloon to 75% of the grid's total capacity. And a grid designed to use 50% wind power must be able to accept 150% of its capacity, on windy days. Nuff said.

Solar energy has similar, but different, meteorological limitations, and the correlation between winds and sunshine means their individual contributions also conflict.

Clean, green energy is not so much a political or economic problem, but a meteorological impossibility.

Fred Ward

Some background.....

I am a meteorologist. I'm here because all renewable energy is renewable only because it converts the energy from the sun and the rotation of the earth. It's all meteorology.

My goal in speaking to you is to dissuade you from a mission to get to 100% renewable energy in Keene or elsewhere, and to persuade you to work toward a better, cleaner energy policy, for Keene, For America, and for the world.

I assume Rhett has distributed copies of my letter to the editor of the Keene Sentinel. It's purpose was to make the case against the unattainable 100% goal. It distracts from goals which are attainable, albeit less grand. You will feel better, and more useful, working on a less grand scale, and you will avoid obvious criticism.

I have lived in New Hampshire for three decades, moving from Massachusetts to be in an environmentally friendly state. My wife and I have worked with many environmental groups to conserve 200 acres of our own land and contributed to the conservation of hundreds of additional acres. We are members of many such groups, have one of the greenest houses in Cheshire county, drive high mileage automobiles. Our home is partly double-walled and has a foot of insulation in its ceiling. My first course in conservation was at MIT in 1950, and I worked with the professor who started the first Institute of Ecology at UCal Davis in the 1960s.

My other side is as a professional meteorologist, with sufficient curiosity to have been asking about climate change for over half a century, I organized a conference in 1962 on "The Climate of the 11th and 16th Centuries AD. This conference had as it purpose to answer a simple question about "settled science" at the time, were the century when the Vikings settled Greenland, and the century "without summers" really different? We had scientists from all over the world, meteorologists, geologists, oceanographers, dendrochronologists (tree rings), and glaciologists, and historians of science. We met in June 1962 in beautiful Aspen Colorado, and the proceedings are easily available in the Bulletin of the America Meteorological Society for December 1962. I can rightly claim a broad and long career working on the question of climate change.

Like you, I would love to be able to use clean, cheap energy, if such an animal existed. IT DOES NOT! The literature is replete with claims of such. In 1975, Parade magazine had a front-page article titled "An Ice Age in a Hundred Years. More to the point, the literature, scientific and public, is littered with other silly claims of the climate changing. Many of the same scientists who were behind this 1975 article were "famous" in the late 1990s for peddling the warming climate. The very same. They touted their new religion as fervently, and with same degree of evidence, as they proselytized their older religion. They have no shame.

But my experience is tempered by the knowledge that CO2 is a greenhouse gas, and there is no dispute that the level of CO2 has been rising, significantly. The problem with using this accepted knowledge is simply that there is no way to calculate the rise in temperature which should follow from this rise in CO2. The ways in which the effects of increased gases would affect our temperature is much too complex to allow this calculation. Moreover, our atmospheric system could, in fact, use this increase in CO2 to lower the worldwide temperature. When I am asked what odds I would give on whether the world-wide temperature would rise or fall, I give odds of 3:1 that it will rise over the next decades. These odds say that all things being equal, a rise in CO2 should elevate the global temperature, but I would also not be shocked if there were little or no change in the temperature. I like to point out that there is a much stronger greenhouse gas than CO2, and it makes life on earth possible. Without this gas, the world-wide temperature would be 50 or so degrees (if I remember my met 101) colder, and we'd all freeze. So greenhouse gases are required for life on earth. You might want to consider that there is a greenhouse gas, the effect of which dwarfs that of CO2? Water vapor! And you exhale both CO2 and H2O, making regular contributions to keeping all of us warm.

Keene School District Energy Improvements

Summary Page

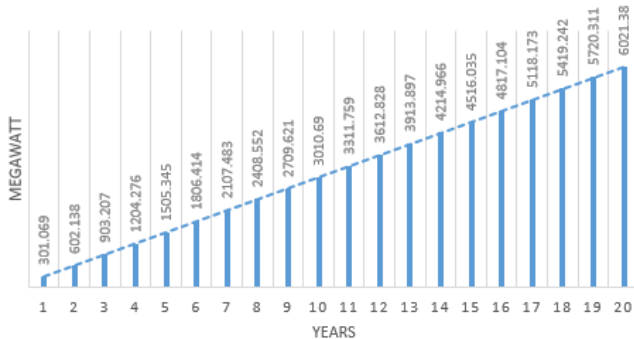
Updated 1/2019

On the attached two pages I have included some highlights of larger projects completed with real savings over the past 5 years. We have some major projects in the future which will only add to the districts savings in both energy and money.

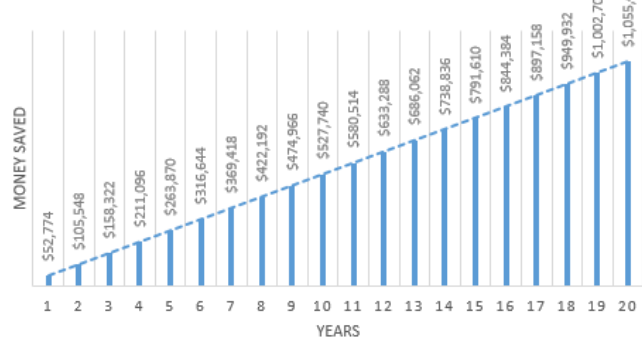
Annual Savings

- 301,069 kW annually
- \$52,774 in electrical cost saved annually
- \$60,984 saved annually by switching elementary schools to propane
- 121,739 gallons of heating oil saved annually with biomass plant

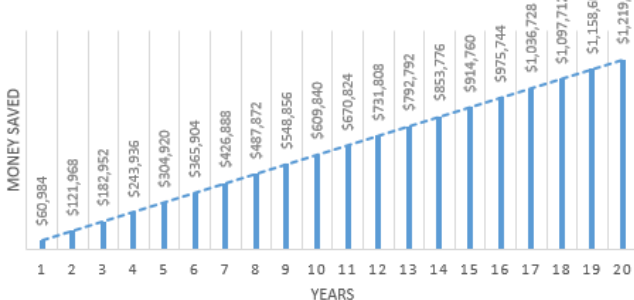
MAGAWATT SAVED



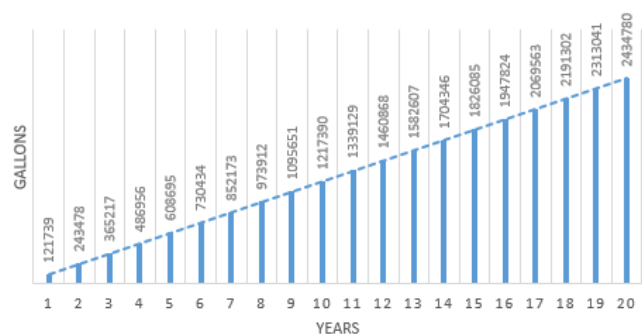
ELECTRICAL SAVINGS



ELEMENTARY HEATING COST SAVED USING LP



OIL SAVED WITH BIOMASS



20 Year Savings projections:

- 6,021 Megawatts of electricity
- \$1,055,480 in electrical savings (based on current rates)
- 2,434,780 Gallons of oil saved with Maple Ave Biomass Plant
- \$1,219,680 in heating cost as a result of the currently completed elementary school Life Safety and HVAC renovations.

Keene High School Exterior LED Lighting 2016

Summary of the conversion. After suffering a major lightning strike which took out our controller we made the repairs to the controller to find that more than half the bulbs/ballast in the parking lots and exterior lights had been damaged. Being unbudgeted we used Eversource on bill payment to replace all exterior wall packs and parking lot lights around the High School to LED.

- Based on the run time of the outside lights and parking lot lights around Keene High School
 - 67 fixtures ranging from 175 watt to 400 watt Metal Halide were replaced with 40 to 77 watt LED fixtures depending on the fixture
 - The project cost \$61,182 with a rebate of \$9,900 from Eversource
 - 55,683 kW saved annually or \$7,796 in electrical cost—ROI 6.6 years

Keene High School Cafe LED light conversion 2017

Summary of the conversion. This project was slightly different than other lighting projects as the issue was inadequate lighting levels. There were 12 fixtures around the outside of the room which were converted to LED bulbs. But we also added 36 LED fixtures in the center so the return is not as appealing. But with that said we were going to add lights regardless so I compared below the savings with the LED verse 216 watt T5 HO light which were to “old” normal install in this circumstance.

- Based on the cafe run times and current control settings I estimated the cost to run the lights
 - 216 watt T5 HO—24,375 kW annually
 - 49 watt LED—5,625 kW annually
 - Savings with LED—18,750 kW annually or an annual savings of \$2,625
 - We also installed dimmers which are not calculated into the savings

Keene High School Large Gym LED light conversion 2018

Summary of the conversion. We redesigned the layout of the fixtures and reduced the amount of fixtures from 52 to 32. The original fixtures were 320 watts each and were replaced with 150 watt LEDs. We also added dimmer switches and occupancy sensors. Normal day use we have the lights set to 50% output and max output was set for 85%.

- Based on the gym run times and current control settings I estimate the savings to be
 - 37,692 kW annually
 - \$7,565 annually
- The project cost \$27,600 with a rebate from Eversource of \$5,200 = costing the District \$22,400
- Given the annual savings the ROI was only 3 years

Keene High School Hallway LED conversion 2018

Summary of the conversion. We converted existing light fixtures to LED using a Philips EVO kit. We replaced 381 existing fixtures that used 64 watts to LED kits using only 27 watts.

- Based on hallway run times and current control settings I estimate the savings to be
 - 80,626 kW annually
 - \$15,288 annually
- The project cost \$54,000 with a rebate from Eversource of \$22,000 = costing the District \$32,000
- Given the annual savings the ROI was only 2.1 years

Bio mass heating plant—Keene Middle School, SAU Building, and Jonathan Daniels Elementary School 2010

2010 the decision was made to install a biomass plant to heat the Middle School, SAU building and JD. Since that time all three locations have almost used no heating oil. JD and Middle School both have backup oil boilers but only if the plant fails.

On average the plant burns 1,000 tons of hard wood chips each season.

If we take those chips and convert them to BTU's we can estimate how many gallons of oil we have been burning throughout the past few years if we only used the boilers.

1,000 tons = 16,800,000,000 BTU's

16,800,000,000 BTU's = 121,739 gallons of oil annually (2010-present = 1,095,651 gallons not used)

- Two ways to look at the ROI—if we use the oil or propane cost back in 2010 and compared to woodchips at the time of construction the ROI was between 3 and 4.75 years. Now the past few years we have contracted at a much lower oil and propane cost so if we had installed oil or propane instead of wood chips because of the lower contracted rate the ROI would be 13 years.
- Given the average cost for oil and propane for the district and compared to what we have for a woodchip contract the ROI average is 7.9 years or an annual savings of \$236,398 for making the choice to use woodchips and not oil or propane.
- This means as of December of 2018 the plant has paid for itself with savings!

Life Safety and HVAC Renovations of the Keene Elementary Schools— Each project we improved building envelope, insulated attic spaces, added control systems for HVAC, installed LED lighting, improved air quality with energy recovering roof top units, and convert the heating fuel source from oil to propane.

2015—Fuller Elementary Phase I	Electrical Savings—30,169 kW annually	Heating BTU's Saved—473,616,000
2016—Symonds Elementary Phase I	Electrical Savings—35,634 kW annually	Heating BTU's Saved—165,186,000
2017—Symonds Elementary Phase 2	Electrical Savings—23,503 kW annually	Heating BTU's Saved—341,964,000
Total: 59,137 kW savings		Total: 507,150,000 BTU's
2018—Franklin Elementary Phase I	Electrical Savings—19,012 kW annually	Heating BTU's Saved—1,245,607,469
2019—Franklin Elementary Phase 2 <i>future</i>		
2020—Franklin Elementary Phase 3 <i>future</i>		
2020—Fuller Elementary Phase 2 <i>future</i>		
2021—Wheelock Elementary Phase I <i>future</i>		
2022—Wheelock Elementary Phase 2 <i>future</i>		

Summary of Savings from Life Safety and HVAC Renovations 2015 to present (all totals based on annually savings)

- Electricity—108,318 kW or 108.3 Megawatts annually = estimated \$19,500
- BTU's (Heating)—2,226,373,469 BTU's or 16,133 gallons of oil or 24,200 gallons of propane

Cost Savings = If oil based on current contract = \$60,984

Propane on current contract = \$32,420

Annual savings between \$51,920 and \$80,484