

CITY OF PORTSMOUTH, NEW HAMPSHIRE

BLUE RIBBON RENEWABLE ENERGY COMMITTEE

AUGUST 15, 2017 MEETING

DATE: July 18, 2017

TIME: 7:30 – 9:00 PM

PLACE: CONFERENCE ROOM A

AGENDA

I. CALL TO ORDER

1. Present:

- Ben D’Antonio, Resident Expert
- Stephen Roberson, Resident Expert
- Joe Harrison, Resident Expert
- Nancy Colbert Puff, Deputy City Manager
- Peter Britz, Environmental Planner
- Jared Sheehan, Pease Development Authority’s Environmental Coordinator filling in for Maria Stowell
- Patrick Ellis, School Board
- Rebecca Perkins, City Councilor
- Josh Denton, City Councilor
- Suzana Mihajlica, Volunteer
- Peter Rice, Director of the Department of Public Works / Presenter
- Doug Bogen, Director Seacoast Anti-Pollution League / Steering Comm. Member, 350 NH / Presenter
- Stephanie Marshall, Seacoast Anti-Pollution League / Presenter

II. APPROVAL OF THE MINUTES OF JULY 18, 2017

1. Meeting Minutes from July 18 were adopted unanimously.

III. COMMITTEE CHARGE AND POLICY OVERVIEW / DISCUSSION

1. Josh began by reading the following charge of the Renewable Energy Committee: *The Mayor's Blue Ribbon Renewable Energy Committee is charged to report back to the City Council for adopting a phased Renewable Energy Policy to be implemented by City Staff when applicable. The Renewable Energy Policy will rely on a combination of various generation sources such as solar, wind, geothermal, hydro, biomass, biogas, landfill gas, sewage gas, or solid waste to energy.*

i. Josh asked that everyone start using the City government of Portsmouth to refer to the City government, the larger Portsmouth community to refer to everything else inside Portsmouth's borders, and the Pease Development Authority as Pease.

ii. Josh said the ultimate goal is to produce a phased high level detailed policy and he plans to present a beginning working draft of such a policy at the beginning of the next meeting based off what was discussed at the previous meeting and what will be discussed at today's meeting.

iii. The recently adopted Master Plan calls for "A local Energy Policy to move towards a net zero carbon emissions goal" and I plan for this to be that policy. Josh had initially hoped to ideally create for a phased Renewable Energy Policy to for the City government of Portsmouth to become a net zero community first, and then for the larger Portsmouth community to use 100% renewable energy for electricity second, and then for the larger Portsmouth community to use 100% renewable energy for heat third. However, the previous meeting on energy markets has led Josh to conclude that a policy grounded in reality should consist of recommendations to get the City government of Portsmouth to Net Zero and then the Portsmouth community and Pease as close as possible with a number of incentives.

iv. Some policy recommendations, like for the City government of Portsmouth which only accounts for 1% of energy emissions to spend additional taxpayer money solely on energy from renewable energy sources to get to Net Zero is pretty straightforward.

Meanwhile, other policy recommendations may be for the City government of Portsmouth to explore items for future study, for example, when it comes to some of the large renewable energy generation sources that we are discussing today.

v. Rebecca Perkins recommends we set aside time in future meetings to look at the policy and discuss it so we can shape it. She would also like to discuss a way to include residents who are interested in being involved with this effort, like California, that offers its residents the opportunity to buy renewable energy directly.

2. Nancy led an overview policy discussion:

i. Community is 99% energy use while municipality is only 1%. The community was 72% transportation, residential was 8%, 9% commercial, and 6% was industrial. The municipality was 52% buildings, 24% was water/sewer, 10% employee commute, 10% vehicle fleet, 4% for street lights.

ii. Eco-municipality. Idea is to do no harm to the earth, and our goal is to improve from the previous year. We're making new buildings conform to LEED, LED streetlights, we're looking at electric charging stations (we have one in the garage, we're going to do one here), we're going to do solar (at Madbury specifically at the high school), we've put good energy into recycling and composting, variable speed pumps, and rebate programs.

ii. Some examples that we're seeing fall into either renewable energy reduction.

a. We're talking about energy supply now and how we can access large renewable suppliers.

b. We'll talk about buildings in terms of their consumption and efficiency.

c. If we can get to it, we're going to talk about transportation.

d. And solid waste.

iii. Are we aiming for a specific target for a percent renewable we'll be using or reducing our consumption of energy? All the examples we saw in the homework frame the questions in different ways. Where is the biggest bang the city is able to make?

iv. Joe Harrison said we should talk about the concept of net zero. The way I understand that is that it's netted out on an annual basis. Doesn't mean we wouldn't use any fossil fuels ever, so if in a year the city uses 200 units of electricity, if it produces 300 units of renewable energy, and uses 100 units of fossil fuels, then it is achieving net zero.

v. Josh said Cambridge defined ‘net zero’ as essentially what Joe described. The City government can probably do better than going net zero, because we control where we get our energy from. In the following meeting, we can define it and decide if it’s something the City can do better than. For the rest of the community, it’s hard to set a goal for them, but it’d be difficult to obtain that goal given the state we are, but we can push for incentives to motivate the community. Bring actual things with you to the next meeting that you think can contribute to our goal and how we define the various objectives.

vi. Peter Britz: They do a fellowship program at UNH and one of the fellows is writing a report on a roadmap to net zero. It’s not complete, but the key thing they talk about in there is there is specific frameworks that are used: compact of mayors approach, carbon neutral climate approach, metro-boston climate preparedness, etc. The point is that we don’t need to reinvent the wheel, they actually recommend using an already established framework, like the mayor’s compact. It helps set the metrics and milestones, it would be a useful model to follow. We might as well look at the roadmap and decide if that is what we want to do.

vii. Peter Rice asked that it include maximum flexibility, because as the implementer, he’ll be charged with conflicting objectives (cutting budget vs meeting goal) by ensuring you provide the staff with some flexibility, it takes time to turn a large organization around, so provide the flexibility to accomplish the goals.

viii. Ben D’Antonio agrees with taking a broad, somewhat aspirational statement that then gets more specific with strategies, like what Nancy put on the board. Within each of those strategies we can talk about specific task items that mesh with specific measures.

IV. LARGE RENEWABLE ENERGY GENERATION SOURCES

Josh said that in 2014, Burlington, Vermont, a city of 42,000 residents, achieved their entire community relying on 100% renewable energy as a municipal utility by purchasing the 7.4 megawatt Winooski River hydropower facility at the city’s edge. The energy portfolio of Burlington, a city that once relied on coal, now receives its energy from hydropower (50%), biomass from wood chips (30%), and landfill methane, wind, and solar (20%). New Hampshire is a restructured (retail choice) state, and as such cities in New Hampshire may form municipal utilities like traditionally regulated states like Vermont. However, being in a restructured state, the Portsmouth community and Pease

would not be required to buy their power from the City government of Portsmouth if it formed a municipal utility to become a renewable energy generator. Josh went on to say that three of the most likely sources of renewable energy generation if Portsmouth were to form a municipal utility are off-shore wind, biomass at Schiller Station, and waste-to-energy at a Regional Anaerobic Digester at Pease.

1. Off-Shore Wind: The federal Department of Energy's National Renewable Energy Laboratory has determined that the Gulf of Maine has significant potential wind power capacity in excess of 150 gigawatts within 50 miles of the coasts of New Hampshire, Maine and northeast Massachusetts, and that utilizing just a small percentage of this potential, combined with other renewable resources, could provide much of the future power needs of our region. A bipartisan 2015 New Hampshire legislative study committee concluded that "The wind resource off of New Hampshire's coast has the potential to generate significant amounts of electricity," and that services supporting "offshore wind development has the potential to generate significant economic activity within Portsmouth Harbor. The same 2015 New Hampshire legislative study committee recommends that the Governor explore cooperative offshore wind industry development with Maine and Massachusetts, including regional long-term resource planning facilitated by the federal Bureau of Ocean Energy Management, which requires the Governor to request formation of an intergovernmental Task Force and stakeholder process to plan for regional offshore wind development. Operation of floating wind farms 10 to 50 miles off our coast is expected to provide environmental and public health benefits relative to existing conventional power sources. The Committee at that time took no action on the City Council Resolution supporting efforts to develop wind power off the New Hampshire coast, urge Governor Sununu to engage other regional leaders on this important economic development opportunity, and support a formal request to the federal Bureau of Ocean Energy Management to form a Task Force and stakeholder process to plan for regional offshore wind development in the Gulf of Maine.

i. In addition to 'the Report of the Committee to Study Offshore Wind Energy and the Development of Other Ocean Power Technology' read ahead that I sent everyone in advance, I sent a draft resolution from the Seacoast Anti-Pollution League that if we approve I will seek City Council approval in September.

ii. One thing to keep in mind during this presentation is that this topic may be one were in our policy we say further study would be required to determine if ultimate goal should be to own or have a PLA to acquire offshore wind.

iii. Either way the state needs to reach out to feds first.

iv. Stephanie Marshal volunteers with 350 New Hampshire, and Doug Bogen with Seacoast Anti-Pollution League. 350 New Hampshire works locally but also globally, they are a grassroots organization. Their strategies are citizen based. This is one of their campaigns, it is a long term project, it's a legislative task in the planning phase. Asking us to take it to the city council and support it.

v. Doug Bogen: The off-shore wind issue has become a very exciting prospect. He's not sure this will meet immediate needs, since it's a long term project, but this presentation will give you an idea of the realistic nature of this renewable energy.

a. The problem is that we have climate disruption going on that is unsustainable. "Fossilized" thinking is the inertia we are dealing with, one example being baseload power that is key to electricity and we need to maintain it, but a lot more people are saying this is not the way to go in the future and must be rethought.

b. By 2050, Portsmouth could see 12 feet of sea level rise.

c. Solution: the 4 S's: sustainability, safety, security,

d. The Solutions Project from Stanford, put forth a vision of how we can get to 100% renewables, it's not a blueprint, but it's an aspiration. They're doing it by states and countries. It gives an idea of the overall approach.

e. Wind makes more sense than solar in our part of the country. They say this is economically feasible.

f. Ocean Power from the Gulf of Maine: huge power potential just offshore. Goal of 5000 MW by 2030. They project they could run the whole state on it and they'd still have some left over to sell.

g. 40 GW wind power available off NE/NY coasts, 2.6 GW potential just off NH coast (which is all we need). Nationwide could see 10 GW by 2020 and 54 GW by 2030.

h. Europe is a decade ahead of U.S and has developed off-shore, on-shore, and floating off-shore. The goal with Maine is going to be deep-water. You have the

advantage of building on shore port and then floating it out. In the long run it is much more cost effective to do it this way.

i. Today in the Gulf of Maine, UMO has put together a prototype that worked fine and they are now building a system.

j. Block Island wind farm is the first offshore wind in the U.S.

k. BOEM: What we'd like to see come into NH. Active projects of MA, NY, NJ, MD, VA. There is nothing going on in the Gulf of Maine, so we'd like for BOEM to start looking there, but the Governor has to want it to happen.

l. 2 turbines/12 MW farm in state waters of Gulf of Maine, hope to have it running by 2019. 340 new jobs, \$120 M cost, cost to ratepayers: 75 cents/month. The turbines are getting bigger so they can deliver more energy.

M. Question from Joe: what do we need the Governor to do and is there not some workaround? Unfortunately not, BOEM for whatever reasons needs to get approval from Governor.

N. Motion is to bring this Draft to city council, seconded by Patrick Ellis. Josh asked us to write down questions, he'll send to Doug. The resolution is only to request the governor to ask BOEM to do this.

vi. Latest strategy is to do these town and city resolutions. They are here to ask us to join us the resolution that would go to Sununu from as many towns in the city to appoint this task force.

vii. Also, Doug wanted to invite to the table, Mike Behrman who is the Director of the NH Clean Tech Council (NHCTC), which has been engaged with Pease in discussing concepts such as the Port of NH along with Pease itself being staging areas for offshore wind projects that will be built eventually in ME, MA, and potentially NH.

2. Schiller Station Biomass: Nancy spoke to a memo from Deputy City Attorney Suzanne Woodland

i. Units 4 – 6 are active at Schiller Station with Units 4 & 6 having dual residual oil and low sulfur coal capabilities and Unit 5 having been retrofitted and entered into service in late 2006 to burn wood chips, woody biomass, and wood waste products. PSNH created a special entity for Unit 5 called Northern Wood Power that has been an operational and financial success for PSNH and the local forest products industry.

Biomass burner component produces about 50 Megawatts by burning 400,000 tons of wood annually and the other two coal fired burners that produce a combined total of 150 Megawatts annually.

ii. In the Spring the City sat down with one of the potential buyers. City has met with one of the current prequalified bidders but did not get to specifics details of entering into a PPA for the sale of biomass energy to the City. Most bidders are interested in the wholesale market and not consulting with the retail market.

iii. Community as a whole used 149 million kilowatts for the residential sector in 2006 and 158 million kilowatts for the residential sector in 2012.

iv. The auction of Schiller Station is part of a highly regulated public auction process involving energy generating assets across the State of New Hampshire. Divestiture of these assets arises from State legislative efforts that began in 1996 to restructure the electricity market due to New Hampshire having some of the highest rates for electricity in the country and resulting in the legislature finding that divestiture of PSNH's generation plants being in the public interest. The divestiture process is being overseen by the Public Utilities Commission (PUC) which is an independent state body that has regulatory authority over utility providers such as Eversource (PSNH). Various energy providers and interests in addition to Eversource/PSNH have also participated, along with the municipalities of Berlin and Gorham.

v. The auction effort arises out of settlement agreements in 2015 and 2016 approved by the PUC pursuant to an express statutory directive. As part of those agreements, the following conditions are some of those imposed on the sale of the assets power-generating assets must remain operational for at least 18 months after the close of the sale and Eversource would participate in an annual auction process that takes place in the energy markets to ensure adequate future energy capacity – this participation typically results in contractual commitments to supply energy three years out. As a final note, the bidding process is currently on hold because of an appeal to the Supreme Court of one the recent PUC orders relative to certain elements of the bidding process.

vi. As a consequence, Schiller Station is likely to continue to operate in its current form for at least several years. In addition, Schiller Station is unlikely to be sold independently of other Eversource assets. Likely bidders are those that will be seeking to

acquire multiple assets within the Eversource portfolio given the existing operational interrelationships among the various assets. The PUC will look to that bidder or collection of bidders that will maximize the value of the entire Eversource energy-generating portfolio.

vii. Certainly over the course of next several years as the energy markets continue to change and the terms of the sale are fulfilled and no longer become an impediment to reuse, a potential future owner may determine that Schiller Station is best transformed into a different use.

viii. Josh said biomass as a reusable energy source can be controversial however, if sourced correctly can be good although he believes it is lower on the list compared to wind or solar.

ix. Josh said we could suggest owning and repurposing all burners to biomass, having just a PPA for biomass if it stays open, or if Schiller Station does go under, what should the seafront industrial zone future use be to get the best use of transmission lines, such as battery storage.

3. Regional Anaerobic Digester Waste-to-Energy: In the FY 2018 – 2023 City of Portsmouth CIP, \$50,000 is to be spent in FY18, \$1,500,000 in FY20, and \$16,500,000 in FY22 on a Regional Anaerobic Digester at the Pease Waste Water Treatment Facility (WWTF) to stabilize sewage sludges, food wastes, and fats, oils, & greases. The facility would reduce sewer operating costs for sewer sludge disposal and potentially generate revenues through tipping fees and cogeneration of electricity. Costs for the construction, operation, and maintenance of the facility may be shared by using a public private partnership.

i. Peter gave a presentation that included the typical wastewater treatment process at WWTFs.

a. Headworks takes out solid states, then primary clarifiers, then aeration tanks which convert to biomass, then to secondary clarifiers (filter system), and disinfection chamber.

b. There is potential energy from the waste.

c. Peirce Island is a primary treatment plant.

d. Pease is a secondary treatment plant.

ii. The majority of sludge in New Hampshire are disposed of in landfills with Nashua and Hanover being the only other New Hampshire governments with local digestion facilities.

iii. Peter also discussed how waste organics are ingredients for a sustainable energy source with primary wastewater sludge containing 75 – 85% volatile solids (VS), grease (FOG), dairy waste, & food waste containing 85 – 95% VS, and the combustion heat value is the equivalent of low grade coal at 6,000 – 7,000 BTU / dry pound. A lot of supermarkets dispose of it by recycling, so if the city expands its composting program, so that it's another source of waste.

iv. If you create a digester you need to upsize your treatment plants so they can handle that load. You might generate more but you are consuming more, so you need to look at the net.

v. Portsmouth can't be self-sufficient to scale this, so you'd need to truck materials in so there's energy associated with that.

vi. The energy is comparable to a low-grade coal, so there are treatment plants like Schiller station.

vii. Digester acts like a big stomach, often set up in 2 stages. They were started as a volume reduction for water treatment, the less volume sludge you have to expose off, the less expensive it is.

viii. Combined heat and power is really where the industry is going, they're realizing there's a lot of potential to generate energy.

ix. The biggest challenge is storage and the other is to make sure the gas is clean. If you don't have clean gas you can corrode your generators and combustion systems.

x. Our future buildout we're looking at 50 KW of power.

xi. Challenge is doing this cross communities, because it's a long term commitment. He recommends a private company taking on the liability vs the city

xii. Peter further discussed how Brown and Caldwell Engineers did a bio-solid projection study of twenty nearby entities that produced 5,280 tons of bio-solids in 2017 and would produce 7,356 by 2030.

a. As a municipality we'd need guarantee we'd have a 20 year cash flow to take that on.

b. The digester doesn't like 20% sludge, it wants a 3% or 4%.

c. If private industry believes this is cost effective and profitable, they'll be investing in these areas. There's a big capital investment and maintenance, and that is why it's so important to do a feasibility and potentially do an RFP. Where to locate it? Assumption is that we could do it at Pease, but there is a lack of interest there so we might need to find another site.

d. One option is to design a digester to be customized to the communities needs and could have up to a 50 year lifespan. Then there is the option to buy something off the shelf, which won't last as long, but would be a 1/10th of the cost.

e. In terms of revenue stream: is the community is paid to send the sludge, but then you're selling the electricity? How does it all compare? In the case of the on farm anaerobic farm generators, the vast majority of revenue comes from sale of energy. The farm is a very small user, so they're selling at retail, unlikely we'd be able to do that, but we have the advantage of using a lot of energy, so we could produce what we'll use and offset it that way. As an example, it's probably about a \$15 cost to transfer the sludge from Lowell to here. A commercial is going to want to make a 10-20% margin on that. There is a significant revenue stream from that but that may be used to offset the costs. There is still a sludge that is produced, that isn't sellable, that needs to be managed. Usually you can manage it for half cost of undigested sludge.

xiii. Patrick stated that significantly more tonnage of bio-solids were available from the region today that were traveling further to be disposed of in landfills than they would have to travel to get to Pease to be converted in energy. If the city, whether it's private/public partnership, made the capacity available, there are a lot of companies that would give that as an opportunity to direct that sludge.

xiv. Josh stated that if New Hampshire bans food wastes from landfills, a need to process them will become necessary.

V. FUTURE AGENDA ITEMS

1. September 18, Solar Energy, 6:30 PM

i. A presentation will be given on the state of solar in NH, the Fire Chief is coming in to discuss a potentially controversial zoning proposal, and Josh is hoping to get someone from the HDC in to discuss Historic District restrictions.

VI. ADJOURNMENT