

Good Evening. My name is Rick Smith. I was a member of the 2016 Ad Hoc Alternative Energy Committee. That committee's charge was to produce a report providing specific proposals and cost estimates for projects using alternative energy sources in municipal and school buildings and vehicles. The committee had nine months to complete its work which became seven months of actual work time. That was not enough time to consider all available options. For that reason, it is easy to identify the section of the report that is of greatest importance to this new standing committee, the Energy Committee. That section appears on pages 6 and 7 of the 2016 Committee's report. It lists those technologies and alternative energy sources that the 2016 committee decided not to investigate thoroughly because of time constraints and the perceived need to recommend systems that could and would be adopted quickly. As a standing committee, the Energy Committee does not have those time constraints and can therefore recommend ways to achieve sustainability goals

while lowering energy costs after looking at all options; options that include the following technologies identified by the 2016 committee as requiring further study at a later time.

Those technologies are:

First, natural gas, including extending the pipeline or using trucked natural gas for heating and for possible use in NG school busses and trucks. The standing committee seeks to simultaneously achieve sustainability and lower costs. With 55 years' worth of oil in worldwide reserves, the 90 years of natural gas reserves may look sustainable to some people. Despite the fact that NG is finite, it deserves a look because pipeline delivery is more storm resistant than the truck delivery required for propane and oil, and once available, NG can allow for easy development of combined heat and power installations that provide even greater resiliency.

Second, biomass, including wood pellets for heating particular buildings. Biomass;

Third, biofuels, including biodiesel for certain municipal vehicles and heating certain buildings, and, in particular, the Ensyn Company's Renewable Fuel Oil, the biofuel selected by Bates College to meet its sustainability and cost goals for building heat.

Fourth, geothermal systems (really ground source heat). This technology can potentially meet sustainability and lower-cost goals simultaneously for heating in the primary municipal building complex using ground source heat pumps and/or warmed foundations. The 2016 committee assumed without sufficient verification, that this technology would only be cost effective for new construction. That assumption should be investigated more fully by the standing committee.

Fifth, power generation and heating, generally referred to as combined heat and power, CHP. CHP can be accomplished using a variety of fuels and technologies in the same system. The cost and complexity of these systems has dropped significantly in the last three years, especially for systems that use natural gas and solar-charged battery power storage. CHP holds the promise of being able to generate heat and power when grid power is unavailable making it ideal for meeting the goal of resiliency. The fact that the lion's share of the town's heat and power use is on one parcel of land and that that parcel is immediately adjacent to the town's commercial center makes Cape Elizabeth an ideal candidate for CHP systems in the longer term.

Sixth, wind power. We are a "cape" after all. Wind is all around us but the wind resource is surprisingly localized. We suspect, but do not yet know, that there are many high wind-resource pockets in the town where small wind machines could be combined with battery back-up to power specific buildings or electric vehicle

charging facilities. Because finding and confirming the amount of power available in these wind pockets is a long process, using wind power is probably a longer-term consideration but one that the Energy Committee could start investigating at any time. If the Energy Committee were to recommend the creation of a municipal utility district, it should realize that a single offshore wind turbine of the size now being installed off Portugal could provide enough power for all of the town's municipal buildings and most of its private needs as well. Although not mentioned in the 2016 report ocean wave and tidal systems require a similar "long-term but don't ignore us" approach.

Seventh, clean fuel vehicles. The numbers of natural gas, battery electric and hydrogen electric vehicles on the road has increased dramatically over the last three years. The rate of adoption of these vehicles is increasing and their cost is decreasing. School busses and municipal trucks are particularly dirty from a per vehicle emissions viewpoint and are good candidates for biodiesel

or natural gas retrofits. New vehicle purchases should look at all clean fuel options. Battery and hydrogen electric vehicles and hybrid vehicles might be particularly good choices for police and other smaller vehicles and hydrogen electric trucks and busses good choices for the town's larger vehicles. The 2016 committee simply did not have time to explore these options even though finding alternative vehicle fuels was part of our charge.

Also not part of our charge was energy efficiency, which was an important part of the 2008 committee's report. We spent too much time discussing efficiency initiatives in place, in progress and planned by the facilities director but this committee should work on efficiency matters. After all a kilowatt-hour saved is worth just as much as a kilowatt-hour purchased or generated, and there's no question that most efficiency improvements are both sustainable and less expensive than buying new electricity or heating fuel.

The 2016 committee mistakenly thought the town had created a short-term ad hoc committee because it wanted to adopt at least some alternative energy technologies immediately. With that idea in mind, Prof James Masi created a plan for, and we recommended, a solar thermal installation at the pool to heat the pool water. Given costs and prices in 2016, that portion of the pool project would have had a four-year payback period and was, in our view, a slam dunk. The payback period stretched to 11 years when we added a PV array to provide electric power to the pool pumps and related equipment. See the chart on page 12 of the report and the details at pages 16-27 of the report. As far as I know, the town has not moved forward on this project. The Energy Committee should update the prices and payback calculation and then recommend to the town to either proceed with the project or not. I anticipate the 11-year payback period will be shortened considerably because of the lower cost of PV panels and installation.

Our second recommendation would bring solar power from from the transfer station site to the meter at the school/library site. The town would pay no upfront costs but would buy approximately 435,000 kWh of electricity per year rom the solar equipment installer under a power purchase agreement at a per kilowatt hour price that was approximately 1/2 cent per kwh lower than 2016 CMP-delivered rates (13 v. 13.5 cents per kWh). The 2016 committee recommended that the town buy the solar power equipment from the installer in year 7 at a cost of \$515,000. We estimated that the equipment would continue to deliver power for another 23 to 27 years at a cost savings of roughly \$1,700,000. That savings would only be \$107,000 if the town elected not to buy the equipment in year 7 but rather continued to pay the solar installer for the power. The calculations were prepared by committee member Laurenz Schmidt, former EVP of Fairchild Semiconductor. His figures are at pages 28-33 of the report, which appear on the town's website as a PDF separate from the rest of the Report. Unfortunately, Laurenz's figures may be even

more obsolete than the pool project numbers because so many installations of this type have been installed in Maine and regionally in the last three years that costs are down and completion among power purchase agreement vendors is up. After interviewing a much larger number of renewable PPA vendors than the 2016 committee was able to interview, the Energy Committee should update Laurenz's figures and modify the 2016 committee's recommendations as appropriate.

Because sustainability and resiliency were important to us, we did not explore power purchase agreement groups that purchase solar or wind power from installations in other states and are therefore susceptible to grid failures. However, the Energy Committee may want to explore such a venture. The poster child in New England for this type of project is a partnership formed by MIT, Boston Medical Center and Post Office Square Corporation to buy solar power from a 650 acre solar farm in North Carolina

that could not have been developed without the partnership's agreement to buy its power.

Over the life of the Energy Committee the priorities of the town council may change. It is therefore important for the Energy Committee to revisit the council's goals regularly and get statements of those goals in form of formal votes or resolutions taken periodically at town council meetings.

In particular, the Energy Committee will want to confirm the relative levels of commitment the council has to projects that:

- i. reduce energy costs
- ii. are economically and technically sustainable over time
- iii. reduce carbon footprint/GHG emissions
- iv. prepare for grid failure/the "resiliency" goal
- v. prepare for superstorms/the "emergency services preparedness" goal

vi. are an energy use model for Cape business & homeowners/"first customer"

vii. support or complement similar nearby municipal clean energy efforts

viii. are a smart energy teacher for Cape students and residents

ix. prepare for sea level rise

b. To help the council establish the priority of these goals, the Energy Committee should collect/calculate baseline data for

i. GHG and pollutant emissions - buildings and vehicles

ii. municipal vehicle fuel cost

iii. building heat cost including maintenance

iv. building electricity cost including maintenance

The 2016 committee had done some of the cost work but not the emissions work and, of course, the cost data is out of date.

c. To help itself make the proper recommendations, the Energy Committee should interview a wider range of vendors/users/experts than the 2016 committee was able to interview

i. solar, wind, geothermal, and maybe wave and tidal installers and developers

ii. PPA-based renewable energy providers

iii. Municipal officials from towns that have adopted renewable PPA projects and renewable town-owned generating systems, including Portland, S. Portland and Bucksport

iv. Officials from towns, universities, hospitals and companies that have installed CHP and “microgrid” systems

v. Public and private fleet owners who have placed NG, propane, battery-electric and hydrogen-electric vehicles in service

vi. natural gas companies regarding NG school busses & building heat

vii. financial companies that structure renewable energy projects

viii. biofuel suppliers for both buildings and vehicles

ix. EV and hybrid fleet vehicle dealers

x. charging station and alternative fuels dispenser

providers

xi. energy storage companies/organizations

ix. CMP regarding facilitating PV power transmission

x. PUC expert regarding timing of likely changes to

transmission regulations and availability of grant money

xi. municipal officials & others regarding their

sustainability programs including, again, those from Portland, S.

Portland and Bucksport

xii. Efficiency Maine regarding its municipal programs

xiii. weatherization and building efficiency companies

xiv. governor's energy office – VW settlement \$? Ideas

from MA

xv. "Augusta watchers" to report on the activities of the energy and natural resources committees.

A subcommittee of the 2016 committee did identify a few companies that we did not have time to interview. They were NextEra Energy (formerly FPL) that is a large scale solar installer and microgrid developer with whom we exchanged several e-mails and calls but never had a chance to interview. NextEra did seem interested in working in Cape Elizabeth; Borrego Solar of Lowell MA that in 2016 had already installed \$500m in PPAs; IGS Solar, Dublin OH, a company that has experience with wind farms and natural gas power delivery as well as with solar. They have partnered with ReVision (we did interview ReVision); and, Sun Guage Financial, Boston, a small firm that specializes in analyzing costs and risks in solar projects.

There is a good deal to be done, but you have the time to do it. I hope you start by updating and hopefully re-recommending our pool and PV-PPA projects.