

Date: **January 25, 2016 Meeting**

Members: Larry Pritchett, Bill Pearce, Tony Coyne, Brooks Winner
Nathan Davis (Mayor Has Nominated/Pending Council Confirmation)

To: Eric Laustsen & Members Of Planning Board

Regarding: **Ordinance Amendment #48**
Development Of Standards For Grid Scale Power Generation Facilities

1. Summary/Overview

On January 11, 2016 the City Council enacted a moratorium on site plan applications for new power generation facilities over 10 megawatts in capacity. The moratorium as enacted does not apply to businesses constructing heating or power generation systems to meet on-site heating and/or power needs. The first step under the moratorium is for the City's Energy Committee to provide a summary of issues and questions that the Committee recommends be considered by the Planning Board based on the questions raised and information presented at the community forums facilitated by the Committee in 2015. This document constitutes that summary.

The Energy Committee held three meetings (1/14, 1/21 and 1/25) to review materials and develop this summary for the Planning Board. At the initial meet on January 14th, the Committee discussed at some length the types of power generation facilities that would likely be covered by this moratorium. While wind power projects are being built at sizes over 10 Megawatts, the City's long standing height ordinance precludes the construction of grid scale wind projects in the City. Likewise, solar is being developed at some locations on a scale over 10 megawatts. But a 10 MW solar farm would require 50 acres of land, which makes development on that scale in Rockland unlikely.

After some discussion the Committee concluded that in practice this moratorium would apply to a couple of related power generation technologies. First the moratorium would apply to facilities that use a liquid or gaseous fuel (biogas, natural gas, diesel, etc.) to power a turbine that drives a generator. Second, the moratorium would apply to facilities that burn some form of feedstock or fuel (biomass, natural gas, oil, biogas, etc.) to make steam that in turn drives a generator. Many modern power generation facilities utilize both processes (i.e., biogas or natural gas powers a turbine; the exhaust heat from the turbine is utilized to make steam that in turn powers a steam turbine).

The points detailed below are drafted around these types of technologies. The Committee also discussed that regulations should be crafted with careful thought not to inadvertently preclude renewable energy sources or preclude a business from installing power or heat generation equipment that would lower a business' emissions and energy consumption.

2. Water Utilization, Recycling & Disposal

A. Background Information:

Historically, many types of electrical power generation facilities utilized large volumes of water. Some of this water was used for equipment cooling. In many cases the largest water utilization was to make steam to drive generators. If this water was used on a "once through basis" (i.e., run through the power plant and then discharged to a water body or released into the air as low

pressure steam), daily water consumption by an electrical power plant could be on the scale of hundreds of thousands, if not millions, of gallons per day.

However technologies like “Combined Heat and Power” were developed to utilize the heat from the power generation process for manufacturing purposes or building heating and cooling. The U.S. Environmental Protection Agency supported research on these types of technologies in part because CHP type plants can, in a cost effective manner, dramatically reduce if not eliminate daily source water consumption and daily wastewater discharges from power generation facilities.

B. Key Question(s):

1. Should the City add standards requiring a minimum percentage (50%? 85% or ???) of source water utilized in a combined cycle power generation facility, a combined heat and power facility or in a steam powered electrical generation facility for cooling, steam generation, or hot water distribution be recycled?
2. If the City requires a minimum level of water recycling, should that minimum requirement be reduced, or eliminated, if processed wastewater is the source water for the facility?
3. For a power generation facility, should the City add standards that would set an absolute maximum peak or average water consumption or set standards for drought conditons?
4. Should the city regulate or prohibit (if it does not already) thermal discharges to the municipal stormwater system or new direct thermal discharges to the harbor?

3. Noise Standards & Site Plan Evaluation Mechanism

A. Background Information:

Electrical power generators may be driven by direct fuel powered turbines (i.e., natural gas, biogas, etc.) or by steam turbines (i.e., powered by heat recovered from the fuel driven turbines or from biomass or similar stream boilers). Both sides of this process (i.e., the turbine and the steam) may generate substantial noise that can have unique sound attributes.

B. Key Question(s):

1. Does the City need to modify its noise standards, or add specific site review noise modeling provisions that would be paid for by the applicant, to insure adequate analysis of potential sounds/noise attributable to processes in these types of electrical power generation facilities?
2. Should the City add local ordinances provisions governing either noise easements or sound mitigation measures on nearby properties?

4. Local Air Emissions And Meeting Emissions Reduction Targets

A. Background Information:

Burning virtually any fuel (natural gas, oil, biogas, diesel, solid waste, biomass, wood pellets, coal, etc.) generates some level of the air pollutants nitrogen oxides (NO_x), sulfur oxides (SO_x), particulate matter (PM₁₀) and carbon dioxide (CO₂). NO_x, SO_x and PM₁₀ all can contribute to respiratory problems like asthma. In Maine, especially along the coast, these pollutants are the primary source of acid rain which degrades lake water quality and weakens softwood trees.

Carbon dioxide (CO₂) emissions from burning fossil fuels are generally accepted as a major contributor to climate change. The best available data indicates CO₂ emissions and global warming present significant challenges to the Gulf of Maine due to related warming of the Gulf's historically cold waters and due to CO₂ emission making the Gulf more acidic. The northeast states have a goal of reducing CO₂ emissions by 80% from historic peaks by 2050.

High efficiency systems combined with emissions controls can limit emissions of SO_x, NO_x, and PM₁₀ to low levels Utilizing technology like "Combined Heat and Power" allows electrical power to be generated and the heat from the power generation process utilized for other purposes. Thus electricity could be produced locally with no increase in emissions (or a reduction in emissions) if the recovered heat from new power generation displaces heat being generated by existing boilers.

B. Key Question(s):

1. For power generation facilities developed to sell power, as opposed to facilities developed to directly supply a local business' energy needs,, should the City make site plan approval contingent on MeDEP approval of any required air emissions license for the proposed facility combined with an additional submittal by the applicant showing that the MeDEP approved emissions limits will lower air pollutants released locally (by a specific target percentage??) because of other existing local air emissions sources replaced by the facility or by efficiency measures implemented as a part of the project?

5. Standards Specific To Open Cooling Towers

A. Background Information:

In some cooling tower designs, the water being cooled cascades down an open tower directly exposed to the air as opposed to flowing through coiling coils. Steam/mist will be visibly under some (many) atmospheric conditions around open cooling towers. Utilized on a large scale, an open cooling tower may produce enough steam/fog/mist/precipitants in the immediate area to potentially be a nuisance or to potentially raise traffic safety questions.

B. Key Question(s):

1. Should the City either prohibit open cooling towers over a specific size or develop standards by which to evaluate larger open towers and to base conditions that avoid potential localized impacts?

6. Traffic Impacts and Transportation Routes For Trucked Fuel/Feed Stock

A. Background Information:

Power generation facilities utilizing compressed natural gas (CNG), biomass (i.e., wood chips, wood pellets, straw, etc.) or solid waste could require more than a dozen 80,000 lb. GVW truck deliveries daily depending on the size of the facility (municipally owned 70 megawatt McNeil Biomass plant in Burlington Vermont as one example).

B. Key Question(s):

1. Should the City's site plan standards be revised to allow the City to specify which routes would be used, or the timing of deliveries, to supply the fuel to the facility?

2. Should the City's site plan standards be revised to allow the City to require the developer to pay for road or intersection improvements needed to safely accommodate added truck traffic providing fuel/feedstock to the facility?

7. Onsite Fuel/Feedstock Storage, Fugitive Emissions & Emergency Response Plan

A. Background Information:

A natural gas fueled facility supplied by a pipeline would likely have some onsite fuel storage (either CNG or diesel). A biomass facility could have several days of feedstock stored onsite. A CNG supplied facility would have several trailers parked on site. Also, power generation facilities of these types would require an emergency response plan for both onsite fuel and the generation facility.

B. Key Question(s):

1. Are any revisions needed to the City's site plan standards to insure appropriate screening and safety measures are required for onsite fuel storage or any other hazardous materials utilized?
2. Are any specific revisions needed to the City's site plan standards to address any potential fugitive emissions of fuels or other chemicals from a power generation facility?
3. Do the City's site plan standards (or other ordinances) require the developer to pay for any municipal costs related to the development of emergency response plans for the facility?

8. Development Of Properties on Zone Boundaries

A. Background Information:

In some locations in the City properties in Commercial or Industrial zones on which a grid scale electrical power generation facility could be located are adjacent to, or across the street from, residential zones or existing residential uses.

B. Key Question(s):

1. Should any supplemental revisions to setback, screening, or sound standards be added for grid scale power generation projects where the property on which the facility is proposed abuts a residential zone (or an existing residential use)?

9. Development Of Properties Abutting High Value Wetlands

A. Background Information:

In some locations properties in Commercial or Industrial zones on which a grid scale electrical power generation facility could be located are adjacent to high value wetlands.

B. Key Question(s):

1. Should any supplemental revisions to setback, screening, sound or other standards be added for grid scale power generation projects where the property on which the facility is proposed abuts high value wetlands?

10. Fiscal Capacity Standard For Developer

A. Background Information:

Grid scale electrical power generation facilities require multi-million dollar level of investment to bring to full operational status.

B. Key Question(s):

1. Is the City's financial capacity requirement adequate to insure that once permits are granted the facility will likely be completed and the City is not at any significant risk of acquiring a partially completed project due to unpaid taxes in the future?

11. Decommissioning CostsA. Background Information

Smaller power generation facilities likely raise no unique questions once closed than a range of other commercial and industrial uses the City permits. However larger power generation facilities (30 MW, 75 MW, 250 MW) may be of a scale that the facility would present substantial financial challenges to repurpose or demolish when closed down.

B. Key Question

Should the City create a mechanism by which facilities over a specified size would be required to set aside some percentage of annual revenue from the sale of electricity generated into a City verifiable escrow account that can be used solely for decommissioning?

12. Questions Raised That Appear Not To Be Site Plan Or Zoning Questions

When the community forums were held, City Council had approved an option on both the current Public Services Garage site and the adjacent City Hall property with a developer who was considering constructing a combined heat and power generation facility up to 74 Megawatts in capacity. Many of the questions raised and concerns expressed can be translated into regulatory standards.

A few of the questions raised at the forums appear straightforward to consider as conditions to insure community benefits from the sale of public land. But the Energy Committee could not clearly identify any site plan aspect to these questions (or in one case noted below there is a local regulatory questions, but the issue appears to be mostly a street opening question and possibly not a site plan question). The Energy Committee decided to note these here in case there might be a Site Plan/Zoning facet to these which the Committee missed. And, all of these questions would appear valid if a developer requested a Credit Enhancement Agreement, or any similar form of City support.

A. Not Displacing Cleaner Local Distributed Generation

Conservation Law Foundation's presentation, "Getting Natural Gas Right," at the August forum included the point that a natural gas powered facility should not displace cleaner local distributed sources of power generation

B. Local Community Benefit

Some new construction of power generation is targeted to meet local electrical needs (or even consumption of just one business, home or institution). Larger projects are often developed to sell power to the New England grid. In this later scenario the benefits are regional. One key question is what benefits associated with grid scale power generation projects benefit the local community? A second question is whether the city should consider negotiating monetary and/or non-monetary community benefits with the developer?

C. Standards For High Pressure Steam Lines/Safety Response to Steam Leaks

The Moratorium clearly envisions possible revisions to City's street opening ordinance to address natural gas lines and related questions. The moratorium does not mention steam lines. But thermal and pressure and joint standards may also warrant review.

13. Documents From Local Forums

The following documents are available on the City web site (and can be easily emailed to members of the Planning Board by the Energy Committee).

- A. May 26th Forum: EMI Slides & Energy Committee Record of Public Comments
- B. August 19th Forum: Greg Cunningham/Conservation Law Foundation Slides
- C. August 19th Forum: Tim Schneider/Public Advocate Slides
- D. August 19th Forum: Kathleen Everett/SMRT Slides
- E. August 19th Forum: Energy Committee Compilation of Community Questions