

**Evaluation of Solar Power for Municipal Energy Use
Rye Energy Committee
May 2019**

Background

The Rye Energy Committee (REC) is charged with working with the Town and its residents to encourage actions that support energy efficiency and conservation. Since formation of the committee in 2007, we have also incorporated the goals of energy security and cost savings in our approach to assisting the Town. The Rye Master Plan Energy Chapter calls for reducing the Town’s energy use by aligning with the goals of the NH Climate Action Plan. This plan calls for a 20% reduction of carbon dioxide emissions below 1990 levels by 2025. Some progress has been made toward this goal by working to reduce heating and cooling costs through insulation, improved lighting and windows in many town and school buildings and through geothermal system installation at the town hall, but there is more work to be done.

Recently, the REC has had lighting audits performed on municipal buildings to reduce energy consumption and carbon dioxide emissions. Many of these upgrades have paybacks in 2 to 3 years with rebate incentives and financing making the upgrades cost neutral to the Town. Energy audits are also recommended to review larger energy consuming equipment such as air compressors and pumps. Though these conservation measures have successfully reduced usage and cost, the Town is still not making sufficient progress toward achieving the Climate Action Plan goal. Based on the REC’s energy tracking efforts, we have learned that Rye municipal buildings’ carbon dioxide emissions increased 1% over the five-year period from 2012-2018. In order to reach the Climate Action Plan goal significant reductions in carbon emissions are needed. One means of doing that would be to reduce the emissions that come from electricity usage by Town buildings. In 2018 electricity used by Rye’s municipal buildings was responsible for 33% of the Town’s total carbon dioxide emissions. Below is a list of municipal facilities showing the percent of the Town’s CO₂ emissions produced by electricity sorted in order of largest to smallest contributors.

| <u>Facility</u> | <u>2018 Pct. CO₂</u> |
|---|-------------------------------------|
| Rye Elementary School | 25% |
| Rye Junior High in Historic District | 22% |
| Water District | 17% |
| Public Safety in Historic District | 15% |
| Rye Public Library in Historic District | 6% |
| Sewer | 6% |
| Town Hall in Historic District | 5% |
| Public Works Garage, Recycling Building and Swap Shop | 3% |

In addition to reducing electric usage through conservation measures, adding solar power generation, which contributes no carbon dioxide emissions, to the town’s energy portfolio will help to eliminate these emissions. It will also provide more energy security in the future by diversifying our energy sources. If solar power infrastructure were installed, the power generated could be used by all Town buildings.

The remainder of this report summarizes the areas and outcomes of our exploration of the use of solar power on behalf of the Town.

Breakfast Hill Landfill

The Board of Selectmen asked the REC in 2016 to research using the Breakfast Hill Road landfill for a municipal solar array. This closed landfill occupies a 6-acre parcel owned by Ciborowski Associates. The site has good solar potential and the owner has considered installing solar on the site. The site is located next to a Rye Water Department storage tank with an electric meter on it. Having a town owned electric meter to feed power from an array into the grid is necessary to take advantage of group net metering. However, the amount of power used by the storage tank is too low to meet the 20% of on-site use PUC rules require to take advantage of group net metering. The benefits of any solar installation at this site would be less economical than the projected cost of purchasing electricity. Additionally, this installation may also require a costly electric fee to tie in to the grid. This combined with the fact that the owner would potentially want to be paid for use or purchase of the site, makes installing an array on this site not feasible.

Rye Historic District Restrictions

The Town of Rye Zoning Ordinance gives the Historic District Commission (HDC) jurisdiction over solar collectors on or adjacent to buildings in the Rye Historic District. All applications for solar panels require the Historic District Commission's review and approval. Panels that are visible from adjacent public streets and adjoining properties would be in variance with their guidelines and therefore denied. However, we understand from the HDC that it does not actually have jurisdiction over these buildings, but we assume that the Town would likely want to comply with HDC guidelines, which may rule out the use of solar panels on these buildings.

Since most Rye municipal buildings are in the Historic District, the REC met with the HDC in December 2018 to review our findings and request consideration of solar panels. A product that could allow the panels to blend in architecturally was introduced in order to re-start the conversation about the use of these products. We were discouraged from this approach due to the necessary visibility of these installations, which would detract from the historic appearance of the buildings. A description of the possible use of panels on these buildings is described below.

Municipal Buildings

The Town Hall and Public Safety Building have roofs capable of supporting solar panels, however, since the best location for the panels would be on roofs visible from the street, they would be in variance with the historic district guidelines. The Library has a roof that is not visible from the street, but shading prevents it from being a good solar site.

If the Town wishes to explore the potential for solar panels on municipal building roofs, the Public Safety building may be the best location for such an installation, and although in the HDC, it is not itself an historic structure so roof mounted panels may be appropriate.

School Buildings

Although the Elementary and Junior High schools are not under the Board of Selectmen's jurisdiction, they are the Town's largest energy users. In meeting with school staff, we learned the flat roof of the Elementary school may be capable of supporting a fairly large solar system. The roof of the Junior High could support a system that could provide about 60% of its power but many of the panels would be visible from the street and would therefore be in variance with historic guidelines. Some panels could potentially be mounted over the gymnasium, but it would only supply a portion of the school's consumption requirements. ReVision Energy has agreed in principle to install enough free solar panels

to offset the RJS computer use. It would be possible to install these panels on the gymnasium portion of the roof that is not visible from the street.

Rye Water District

The Rye Water District is an independent entity not under the Board of Selectmen's jurisdiction, however it is the third largest consumer of energy and producer of carbon emissions in Town. It also owns land surrounding the Garland Road pumping station that is large enough to site an array capable of providing all the needs of the water district and the rest of the Town's municipal buildings. An installation at this site may make economic sense if the concerns about installation over protected areas can be addressed. The economics of producing power at this location that would largely be consumed there, thus avoiding transmission costs, would likely make this an economical site based on today's costs.

Transfer Station and Public Works

ReVision Energy has estimated that a 30-kW solar system installed on the roof of the Transfer Station garage could provide all the power used by buildings at the Transfer Station. The estimated cost for this system would be \$85,000 or \$.13 per kWh. This would result in cost savings for the town, since the distribution and demand charges would be eliminated. ReVision also estimated it would be possible to install a 100-kW system on the Transfer Station garage which would allow the excess power to be Group Net Metered to other municipal buildings. However, due to distribution charges, which account for roughly half the total electricity cost, the town would potentially pay more than it currently does for utility supplied power.

Summary and Recommendations

A centralized solar array large enough to supply all municipal, school and water district needs would be able to produce power at a cost per kWh that would potentially make it economically justifiable to cover the power requirements of all municipal building by Group Net Metering. A centralized solar installation potentially offers a cost-effective approach to meet carbon dioxide emission reduction targets. It also provides stable and potentially lower costs for decades to come.

However, there is a trade-off in cost. Centralized solar power offers the lowest installed cost, "one installation for the town". The negative is that this power needs to be distributed to the consuming locations at prevailing utility rates. Another option is to install panels at the consuming locations, at higher installed cost but avoiding the variable distribution costs. Historic District issues would come under consideration as well.

In either case, the advantages include reducing carbon dioxide emissions, increasing energy security and providing visible leadership in helping to reduce the impacts of climate change. There may be some cost savings to the town at present with these installations and with improvements in technology and statewide energy policy, may be an overall net savings.

In conclusion, the Energy Committee recommends the Town further explore all options in installing solar power for municipal facilities, including both centralized and at consuming locations. We recommend including the Historic District, Schools, and Water Districts in conversations about achieving the Climate Action Plan goal of reducing carbon dioxide emissions.

If there is consensus, the REC would recommend issuing Requests for Proposals for solar installations at these municipal sites: Transfer Station Garage, Public Safety Building, Elementary and Junior High Schools. We will continue a conversation with the RWD about an array at the Garland Road pumping station or adjacent land, the latter also, potentially being the site for a Centralized installation. Details at each potential location would need to be finalized prior to issuing any requests. After responses are received, a review will be provided to the Board of Selectmen.