To: Claverack Town Board
From, John Bradley, Climate Smart Coordinator
Re: Town Garage Tour Feedback Summary
Date: Oct. 25, 2021

In August, the Climate Smart Committee reported on the Greenhouse Gas Inventory of Town Operations and opportunities to reduce emissions and save costs. The section on the Claverack Highway Department summarized the energy cost of $69,800, comprising electricity - $8,844, heating fuel oil - $25,999, and vehicle fuel - $34,9958. Our report recommended that opportunities for conservation and transition to renewable energy be explored to reduce emissions and long-term energy costs. The CSC also offered for a team of volunteer professionals to tour the garage facility both to learn about the town operations and to see if we might be helpful to the Town Board in reducing emission and costs.

On Oct 15, the CSC team of 2 architects, 2 engineers, a solar development specialist and the CSC Coordinator toured the garage facility with the Superintendent of Highways. This volunteer team has extensive experience in energy efficiency relating to facility management and design.

Superintendent LaMont was very informative and helpful in explaining the recent history and status of energy efficiency for the facility and in engaging in discussion about the various challenges in managing the facility.

The following notes summarize our team's observations and recommendations based on these discussions.

- Maintenance - The garage doors have not been maintained sufficiently, resulting in wasteful heat loss. Gaskets on the big doors need to be repaired/replaced. Insulation inside the doors has been torn by wind entering the building and needs to be repaired. Much of this heat loss is preventable and represents a considerable waste of energy and cost.
- Lighting - The facility's lighting has been improved to be energy saving.
- Heating - The radiant heating in the floor is a sound system as are the auxiliary fans to move the warmer air. The two issues that need to be explored are the replacement of the boiler and using renewable energy. The outcome of these investigation should be a longer term plan for the facility.
    - A full evaluation of renewable energy for heating should be explored, including Solar Thermal panels and geo-thermal for heating , and photovoltaic for electricity.
    - A geothermal heat-pump system would eliminate the need for fossil fuel but has a high upfront investment and the low cost summer cooling benefit is not needed.
    - The solar thermal system option should also be considered to significantly reduce heating fuel use and be used inconjunct in with the boiler.
    - The boiler is approaching the end of its life cycle and its replacement may be an opportunity for significant long term cost savings.

        - A higher efficiency boiler should be considered; condensing boilers with greater than 90% efficiency (vs 79% now)) are available and should be evaluated with an economic analysis. The following link rovides basic background - How Do I Choose Between a Conventional vs. Condensing Boiler? - AccuServ Heating and Air Conditioning.
        - Natural gas/propane fueled boiler produces half the emissions of fuel oil https://www.ny-engineers.com/blog/heat-source-comparison-heating-oil-and-natural-gas
- Photovoltaic Panels should also be considered to provide renewable electricity for the facility, thus replacing much of the electricity presently purchased from the grid.
    - We were told that the roof was compatible with solar panels. The peaked roof of about 14,000 sq ft provides ample space and there is also plenty of open land around the facility for a field installation.

- Energy planning - The complex interplay of heating and electricity needs and the ready availability of solar or geothermal options indicates that a full evaluation of these options for the facility's longer term needs should be undertaken.
    - The investigation of alternatives should begin now so as to create a plan that can be implemented when needed, to ensure selection of the best future cost to the town and not needing to default to the cheapest, fastest option when a system fails. Such an investigation, with its cost benefit analysis can look at the value of long-term energy independence v. short term reliance on price volatile fossil fuel. A plan can provide a framework for climate smart and cost effective decision making for the Town Board.

In summary, the CSC team of technical experts makes the following recommendations:

1. Upgrade regular maintenance to minimize heat loss from the garage doors;
2. Thoroughly explore renewable energy options for both the facility's electricity and heating needs.
3. Develop a longer-term plan to prepare for equipment upgrades and replacement and a transition to renewable energy with lower emissions and costs.

Our volunteer experts, all residents of Claverack, reaffirm their offer to advise the Town Board on Climate Smart actions.

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