

DOER PON-ENE-2024-021 2024 Green Communities Competitive Grant Program

COMMBUYS Bid Number: BD-24-1041-ENE01-ENE01-100639 Block 2 Submission

Section 5 – Additional Qualified Projects (Special Eligibility)

NARRATIVE

Project Overview

The Town of Becket is seeking a Green Communities Competitive grant in the amount of \$139,500 for construction of a small wind turbine project to be sited at Becket Town Hall in Becket, Massachusetts. The funding request will cover the cost of a 15kW Bergey Excel Wind Turbine, 25kW Powersync III Inverter, 120' Monopole Tower and installation costs.

Based on the excellent wind resource at the site, it is expected that the power generated will cover the electricity required for Town Hall as well as a significant amount that will be applied to other town accounts with the potential to offset current propane usage with the use of heat pumps for heating. An option currently considered is to use this excess for the Highway Garage.

We believe this project will significantly contribute to reducing the Town's carbon footprint while cutting costs to taxpayers for municipal electricity. This will also help meet the new statewide renewable electricity standard that every town have 30% fossil free energy by 2030 with its power coming from renewable energies like wind and solar.

We are submitting this grant under Section 5 – Additional Qualified Projects (Special Eligibility). Although wind projects were not specifically listed, Director Joanne Bissetta spoke with Energy Committee member Susan Purser about our interest in a Small Wind Turbine. During this conversation on March 15, 2022 Susan asked whether wind projects would be considered in the Green Communities' competitive grant program and Joanne replied that they would be considered.

The wind turbine will be procured, delivered, installed and maintained by Hudson Valley Wind & Solar, LLC of Pine Plains, New York ("**Hudson**")

Background

The Becket Town Hall (10,899 sq ft) building was constructed in 1992. An outdoor pavilion and a small garage have also been added to the property. The Highway garage (3,280 sq ft) was constructed in 1950. There are two fire stations in use designated as #1 and #2. Fire station #1 (2704 sq ft) was built in 1959. Fire station #2 (3000 sq ft) original construction completed in 1974, upgraded in 1995 and includes the town ambulance headquarters. The Mullen House (1810 sq ft) was built in 1845 and serves as office rental space and a non-profit museum. The Becket Art Center (3000 sq ft) is a former Seminary built in 1855 and houses a non-profit organization actively involved in modernizing this building.

Becket's Energy Committee was founded in 2013 and has initiated significant energy upgrades to the municipal buildings since that time. Through the Committee's work in combination with the Green Community Grant program and other grants, and with the guidance of multiple energy audits, all energy and conservation upgrades of municipal buildings have been completed as well

as the upgrade of the streetlights. Becket Town Administration requested an energy audit in 2022 but were told that none was needed as there were no outstanding projects.

Please see the list of projects completed below. The Town of Becket is now a Level 2 Green Community.

- *Town Hall* – Roof replacement, attic insulation, new entrance doors, energy efficient HVAC system, occupancy sensors. During this project, the Energy Committee recommended a full electric system. This was prohibitively expensive and took 2 rounds of bidding to complete the project. This is a high efficiency project, but still requires propane usage at the town hall. Based on this experience, we hope to have capacity on hand for electric power to replace propane in other town buildings, such as the Highway Garage.
- *Highway Garage* – Sealed the building envelope, repair and sealing of overhead doors, new insulation, re-sided of building, installed heat pump and programmable thermostat.
- *Mullen House* – installed new insulation, a programmable thermostat and high efficiency water heater, and repaired the foundation.
- *Fire Station #1* – Spray foam insulation and heat pump added.
- *Fire Station #2 and Ambulance Garage* - energy retrofit with a new Viessmann Propane Boiler, sprayed-on open and closed insulation, and reconfigured the space for energy conservation. Since completion in July 2011, the retrofit has achieved approximately 121 million Btus of energy savings.
- *Street Lighting* – upgrade all streetlights with LED bulbs
- *Becket Art Center* – insulation was added, heat pumps installed, and window treatments done.

Wind Project

As much of the energy conservation work had been completed, Becket's Energy Committee initiated the small wind turbine project as part of a continuing effort to reduce the Town's energy usage and carbon footprint through onsite renewable energy generation.

The committee had explored Photo Voltaics (PV) installations on town property but we were not able to fund any of these projects due to a lack of grant funding and the lack of power grid interconnection capacity at the identified solar locations limiting the viability of these PV projects.

Large scale wind turbines are common in our area of western Massachusetts due to the favorable wind resources present, however, large scale wind turbines in Becket are not an option due to the strict bylaws for these projects. A small wind turbine project would work on town hall property due to its small footprint and based on our committee member Garth Klimchuk's extensive knowledge and experience with wind resource projects.

Small Wind Turbine Project

The Energy Committee obtained a quote from Hudson (see Attachment E) for \$176,000. The Bergey Exel 15kW small wind turbine (SWT) is 120' high with a 32' diameter rotor ("**Turbine**") (see Attachment F).

The Turbine is a workhorse in the SWT industry with many sites in use predominantly in the Midwest. It is known for its reliability and excellent performance. Small wind turbines are not common in the Northeast despite the excellent wind resources in many areas. There have been other manufacturer's turbines used in the northeast, but they lacked the reliability and support structure of the Turbine. We expect that, should this Turbine be approved for funding, it will serve as a strong example of this renewable energy alternative to PV.

The Turbine is expected to generate an average of 40,430 kWh annually based on the location's estimate wind speed of 13.8 mph (see [Attachment C](#)). This would offset 100% of the annual electricity consumed by the town hall of 22474 kWh per year based on FY2023 usage as documented in MassEnergyInsight data. The remaining approximately 18,278 kWh of power generated would be available to offset town power consumption from other municipal accounts, such as the Town Highway Garage and Fire Stations 1 and 2. Having this alternative power source on hand will help justify the replacement of propane still used at these other town buildings.

Wind speed calculations based on the Bergey wind calculator software confirms that there is adequate wind speed on site. Wind speed and production are based on wind maps, field tested power curves for the proposed Bergey wind turbines and mathematical approximations of wind speed probabilities. These estimates are best done using the Bergey software as it is customized to that particular type of turbine and was developed by New Roots utilizing the highly respected 3Tier wind annual wind speed database. Data is provided at a nominal height of 100 ft above ground level and has a resolution of 5 km x 5 km, or 3.1 miles x 3.1 miles. Corrections for different tower heights are calculated with the shear exponent. The 3Tier wind speed database is calculated from available upper air and terrestrial wind data using the ground topology in the area. The mathematics employed were first developed by the US-DOE/NREL and later refined by private sector companies such as 3Tier. All current wind maps are based on these methods. These figures were confirmed by the site assessment consultant, Self-Reliance.

The Turbine proposal package includes the following (see [Attachment E](#)):

- 1 x Bergey Wind Power 15kW Wind Turbine;
- 1 x 120' Mono Pole Tower & Down Tower Wiring Kit;
- 1 x Power Synch III Inverter;
- 1 x Installation & Labor package that includes: Excavation, Trenching, Concrete, Rebar, Electrical Connections, Disconnects, Turbine Assembly Crane and Erection as needed to complete installation.
- All engineering submittals, software, programming, installation and wiring, system commissioning, start-up, check-out, owner training;
- 5-year installation warranty;
- 5-year factory warranty;
- 50-year life expectancy;
- Equipment Maintenance Agreement

Site Assessment

Upon Town Select Board approval of the small wind turbine project, the Energy Committee applied for and received a META grant to fund a technical small wind site assessment (see [Attachment B](#)). We contracted with Megan Amsler of Self-Reliance Corporation, Falmouth, MA, who has extensive wind energy expertise.

The wind at the Town Hall site (altitude 1,506 ft.) was found to be very favorable and would supply an estimated annual output of 40,430 kilowatt hours (see [Attachment C](#)). The Becket Town Hall currently uses approximately 27,500 kWh per year based on calendar year 2023 usage as documented in MassEnergyInsight data. A current 2024 Eversource bill is included (see [Attachment D](#)). The wind turbine would more than cover the Town Hall usage with the surplus assigned to other town electricity accounts (via Schedule Z).

Power Interconnection

Please note that the Eversource interconnection application for the Bergey 15kW wind turbine and Eversource's 3-phase line was approved on 5/02/24. (see [Attachment G](#)).

Funding

Pending the approval of the Green Communities' ("GC") grant application, the Becket Energy Committee has developed the following financial plan. As the funding from the GC grant may not align with the payment schedule of the vendor, Hudson Valley Wind and Solar, we have planned with the Town to secure a bond for \$82,000 or use other Town funds to provide cash flow for the project. This is to be reimbursed from the GC grant payments and ultimately, the Inflation Reduction ("IRA") tax credits which will serve as the 25% matching funds for the project. We are requesting \$139,500 from the GC grant and will fund the remaining 25%, the match, with \$46,500 in IRA tax credits. Should the IRA tax credits not be realized, the Town of Becket is prepared to fund the 25% balance. The Select Board has given its support for this plan (see [Attachment H](#)). Please see the attached financial schedule in [Attachment I](#). Without the support of the GC grant, we would not be able to proceed with this project as the payback is not timely without this support. This was the case when we could not secure funding for a PV system following the roof replacement on the Town Hall in 2015.

Utility Incentives

The Committee investigated utility incentives with Eversource but were told that none existed for wind projects (see [Attachment J](#)).

Public Outreach

The Committee has held two public information sessions in April and October 2024. Some of the topics covered included setbacks, noise, flicker and two balloon tests to demonstrate the height and location of the tower. The abutters have been contacted and have shown support.

Zoning / Setbacks

The proposed project is allowable under Becket's zoning bylaw. Small wind energy systems, which includes wind turbines and related structures under 200 feet in height, are permitted on lots greater than 2 acres. We are currently requesting a special permit (see [Attachment N](#)) from the Becket Planning Board due to easement constraints on 2 property lines and to 1 abutter's property.

Timeline

The Town of Becket is prepared to move forward with the wind turbine project as soon as Green Communities' grant funding is awarded. Hudson anticipates it will take up to 6 months to get delivery of the wind turbine components and then a month for construction. (see [Attachment K](#))

Project Support

The members of the Energy Committee will all support this project with assistance from Becket Town Administrator, Kathe Warden and Building Inspector Paul Greene (see [Attachment O](#)).

Questions required for the grant:

1. Have we secured utility incentives?

Answer: Eversource has told us that no incentives are available for small wind projects at this time. (see [Attachment J](#))

2. Does the project benefit the Environmental Justice community?

Answer: Becket is an EJ community and we believe this project will help reduce taxes for the EJ population and the taxpayers in general.

3. Meeting the 20% energy reduction goal since becoming a Green community.

Answer: Through Becket's many energy conservation measures, we have achieved a 23% reduction in energy used. Please refer to the Annual Report Table 2 (MMBTU) 2009-2023 = decrease of 23% in energy usage. (see [Attachment L](#))

4. Is the project shovel-ready?

Answer: Site is a flat, open grass covered field and ready for the construction. We have been told by Hudson that the wind turbine components may take up to 6 months to arrive.

5. How much energy reduction will result from the GC grant?

Answer: (see [Attachment M](#))

6. How much of a reduction in greenhouse gas is expected to result from project?

Answer: (see [Attachment M](#))

7. Is there strategic electrification of buildings and/or vehicles?

Answer: There are propane replacement possibilities within the town building infrastructure as described in the history section/ Town hall HVAC project above.

Conclusion

Becket has made a serious commitment to conserving energy and reducing emissions as called for in the Next Generation Roadmap and the Massachusetts Clean Energy and Climate Plan for 2025 and 2030. The META Grant funding of the site assessment and interconnection analysis has enabled the wind turbine project to move to the next step with the Green Community funding application for the turbine project. This will contribute to decreasing the Town's use of fossil fuels and lowering the cost of living for the taxpayers.

We appreciate your time and consideration of our application. Thank you.

Becket Energy Committee
Becket, MA

Attachments:

Attachment A:	GC Grant Application Narrative
Attachment B:	Site Assessment
Attachment C:	Wind Assessment Report
Attachment D:	Town Hall 2024 Eversource Utility Bill
Attachment E:	Hudson Proposal (including Equipment Maintenance Agreement)
Attachment F:	Bergey Wind Turbine Specifications Information
Attachment G:	Eversource Interconnection Approval
Attachment H:	Becket Select Board Approval
Attachment I:	Financial Schedule
Attachment J:	Eversource Utility Incentives Response
Attachment K:	Hudson delivery and construction schedule
Attachment L:	Green Community Town Annual Report
Attachment M:	Energy and GHG Reduction Support
Attachment N:	Planning Board Written Description for Special Permit Request
Attachment O:	Applicant and Project Support Member Backgrounds