Town of Needham

Jack Cogswell Building
Solar Photovoltaic Update

BEACON
INTEGRATED SOLUTIONS

October 13, 2021

Assumptions

- **Proposed Solar Array:**
  - Capacity: 203.8 kW DC
  - Expected annual generation: ~216,500 kilowatt-hours
  - Annual degradation: 0.5%
- **Jack Cogswell Building Energy Usage:**
  - JCB would consume approximately 10% of total estimated annual solar generation.
  - Approximately 90% of the total estimated annual solar generation would be net metered to other Needham utility accounts to reduce operating costs.
- **Updates Impacting Analysis:**
  - SMART incentives includes Block 4.
  - SMART Value of Energy charges include current data from January 2021.
  - Net Metering Credit rate reflects current market rates.
  - Alternative On-Bill Credit rate reflects current market rates.

Environmental Attributes

Estimated Key Metrics

- **~216,500 kilowatt-hours of Solar Generation per year is the equivalent of ~170 tons of carbon dioxide emissions reduction.**
- **Greenhouse Gas Emission Equivalents:**
  - ~33 fewer cars on the road, or
  - ~385,500 fewer miles driven per year
- **Carbon Dioxide Emission Equivalents:**
  - ~17,250 gallons of gasoline per year
  - ~30 homes of electricity consumed per year
- **Carbon Sequestered By:**
  - ~2,500 tree seedlings grown for 10 years
  - ~190 acres of forests in the US in one year

Project Economics

Summary of Financial Options Considered

Scenario	Cost / kW DC	Borrowing Rate	Total project revenue over 25-years	Net Benefit over 25-years (w/SMART & Net Metering)	Average Annual Benefit	Notes
Borrow- Best Case	$3,000	3%	$1,481,464	$405, 011	$16,200	Positive cash flow from 1st year
Borrow- Conservative Case	$3,000	5.3%	$1,481,464	$248,906	$9,956	Positive cash flow from 1st year
Borrow- Worst Case	$3,350	7.2%	$1,481,464	($5,307)	($212)	Roughly break even
Grant funding	$3,000	0%	$1,481,464	$1,255,027	$50,201	Positive cash flow from 1st year
Town Cash Capital	$3,000	0%	$1,481,464	$608,627	$24,345	10.91 year simple payback period
PPA with Net Metering Credits	**N/A**	**N/A**	**$1,179,356**	**$331,828**	**$13,273**	**Net Metering reflects retail rate**
PPA with Alt. On-Bill Credits	**N/A**	**N/A**	**$700,871**	**$43,056**	**$1,722**	**AOBC reflects supply rate only**

Note: On-site Solar electricity is a hedge against future escolation of electric rates so net benefits may be higher.

General Findings

Advantages of Power Purchase Agreement (PPA)

- **General:**
  - No Town borrowing or use of Town funds
  - No Town operational requirements
  - No Town maintenance requirements
  - No Town capital upgrade, repair requirement or risk of technology obsolescence
  - Solar array at JCB offsets electricity costs at other RTS facilities and other Town accounts
  - Hedge against energy volatility and escalation
  - Pay-for-Performance guarantees provided by private owner
  - Contract through PowerOptions renewable energy group procurement

Indicative Schedule

JCB Solar Schedule - Indicataive	Calendar Year	2021						2022								2023					
PPBC. Needham, MA	Fiscal Year	FY 2022										FY 2023				FY 2024					
10/13/2021 (revised)	Duration	J	A	S	O	N	D	J	A	M	J	J	A	N	D	J	F	M	A	M	J
Solar Array- Jack Cogswell Bldg																					
Town Meeting Approval of Article #8					25																
DPU Exception to "single parcel rule"	6-8 mos.																				
PPA Contract Agreement - Draft	3 mos.																				
Private Developer Construction & Commissioning	5-7 mos.																				
Interconnection by Eversource	2 mos.																				
Estimated Start of Operation	1 mos.																				

Thank You!

Beacon Integrated Solutions

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