Solar Roadmap for The City of Cambridge

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Background

- The City of Cambridge initiated the Net Zero Action Plan in 2015 to reduce greenhouse gas emissions to zero by mid century.
- Net zero is defined as “An annual balance of zero greenhouse gas emissions from building operations citywide, achieved through improved energy efficiency and carbon-free energy production.” (Integral Group).
- Section 3.2 of the Net Zero Action Plan states that “Cambridge should introduce a requirement for onsite renewable energy generation, with a focus on solar. The action would begin with the exploration of a requirement that all roofs on new construction projects must be solar ready.” (Integral Group)
- This research evaluates the current barriers to solar PV installation by market segment, including multi-family ownership barriers, building structural barriers, roof barriers, lack of solar readiness in new construction and renovation, limited financing options, and limited access to tax credits and other incentives.

Research Goals

(a) Creating case studies illustrating a successful project installation overcoming each barrier listed above and accompanying solutions.
(b) Ranking market segments in terms of solar potential, barriers, and timeframe to enact solutions.
(c) The ranking of the market potential and market solutions will thereby produce an ordered list that will show which solutions are most important and feasible to enact first, then which solutions are most important and feasible to enact next, and so on to create a pipeline of solutions that will “unlock” projects. The rooftop solar requirement should be one of these solutions.

Key Data Results

Top 5 Cambridge Building Sectors by Total Solar Viable Roof Area

- Residential
- Office
- Higher Education
- Commercial
- Mixed Use Residential

Top 5 Building Owners for Solar Viable Roof Area in Cambridge

- Massachusetts Institute of Technology
- President & Fellows of Harvard College
- Cambridge City
- Cambridge Housing Authority
- Vertical Visions Inc. & Sarah Rumbur

Top 5 Building Sectors controlling for Building Age and Building Height

- Commercial
- Office
- Residential
- Industrial
- Mixed Use Residential

Key Findings

- Key building categories vary by how you define “low hanging fruit”.
- Residential seems to be a very apparent sector in all levels of analysis.
- MIT, Harvard, and the City of Cambridge own 21% of total solar viable roof area, making them key stakeholders.
- Buildings that are “ideal” only comprise 1.24% of total solar viable roof area, which presents challenges in large scale solar energy development for Cambridge.

Next Steps

- Contact key building sectors to better understand the barriers to devise effective solutions.
- Not shown here, but a solar supply cost curve has been developed. Applying solar costs, along with other costs of GHG reducing options for buildings, will help devise the most cost effective set of actions for buildings to achieve net zero.
- With a better understanding of the barriers, and how solar costs fit in the equation, the city can enact a set of actions to help overcome the barriers and develop more solar energy. This will help achieve the goals in section 3.2 of the Net Zero Action plan.

References