Community-Shared Solar

Finding Target Neighborhoods in Boston

BACKGROUND

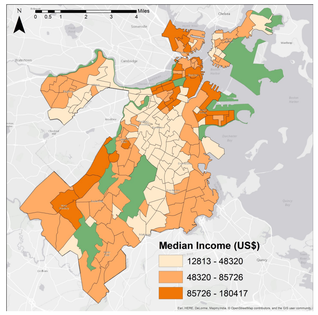
This project explores some of the spatial tools that could aid organizations in targeting underserved communities for access to community shared solar.

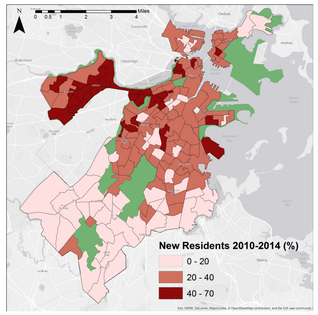
The explosive growth of rooftop solar energy in the US has been a result of technological advancement, and favorable public policies on the state and federal level. But while considerable public support has been committed to the expansion of solar, and solar has become a financial boon for those who build solar installations on their rooftops, these publicly supported financial benefits have been unequally distributed. Lower income households and renters, especially those living in urban areas, are underrepresented in the solar revolution.

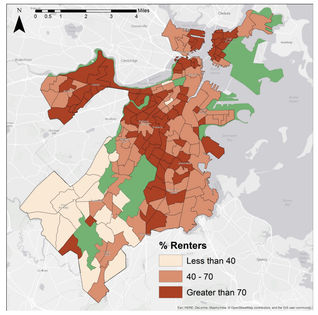
Remembering that we are pursuing solar and other clean energy technology primarily as a response to global climate change, policymakers must look towards long-term strategies for solar development in order to expand the base of potential solar customers, beyond affluent homeowners with large, south-facing roofs.

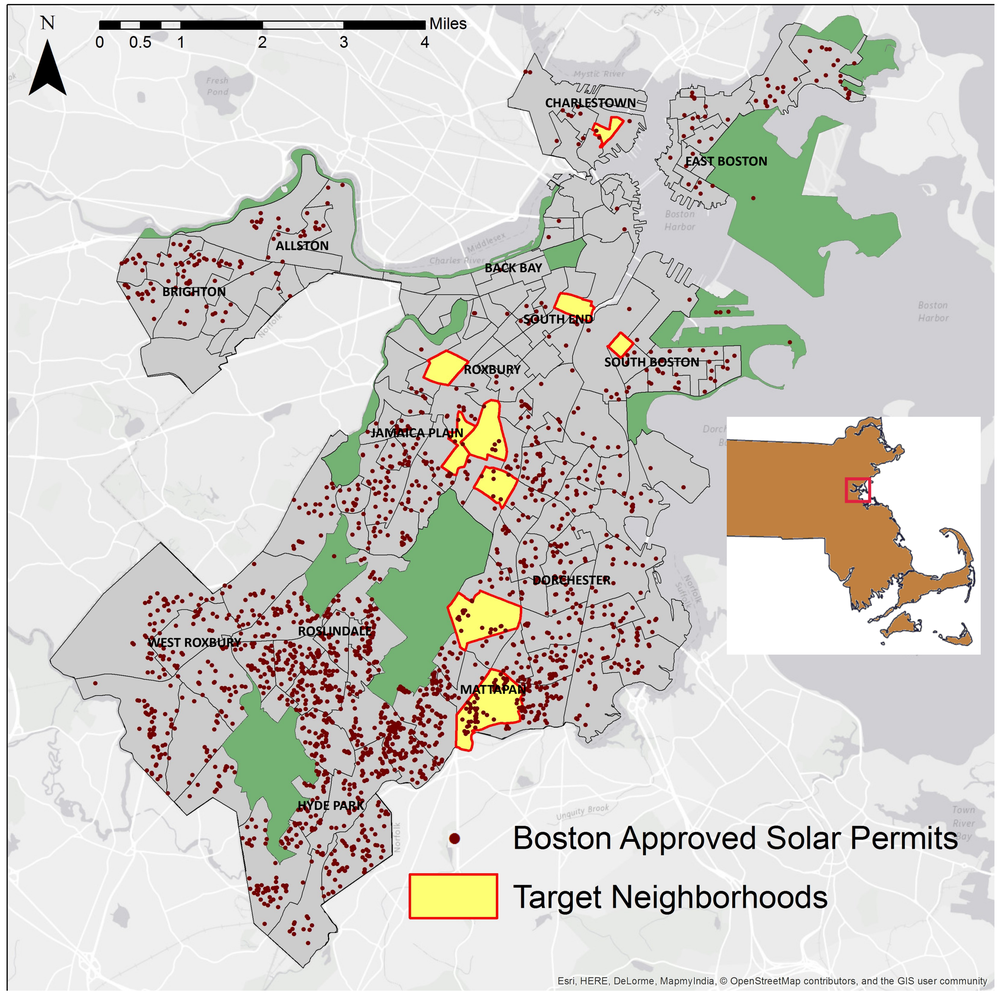
Community-shared solar projects are larger, off-site, group-owned installations that provide a similar range of benefits to participants as rooftop installations, and these projects offer the potential to expand access to the benefits of solar energy. With CSS, renters can be protected from the loss of their solar benefits if they move. Lower income households without the financial resources to pay the large up-front costs of a rooftop installation could buy a more manageable share of a large installation.

So how do we expand solar access to a broader base of customers? We must work fast to experiment with policy innovations: what if we could create a model for CSS that would give policymakers, solar developers and project financiers insights as to how to make solar work for lower income households and renters? Could such a model not only help address climate change, but also provide an avenue for wealth-building in these underserved groups?

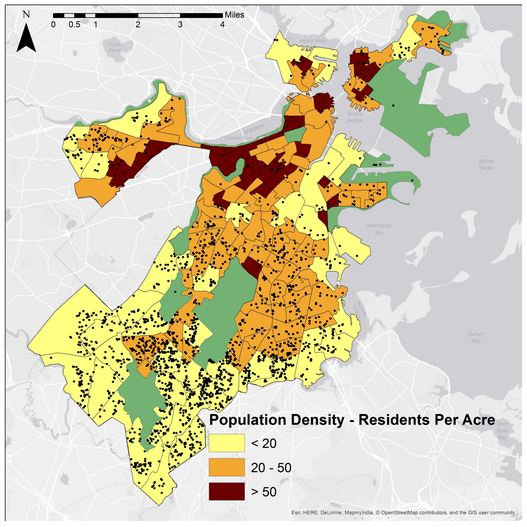


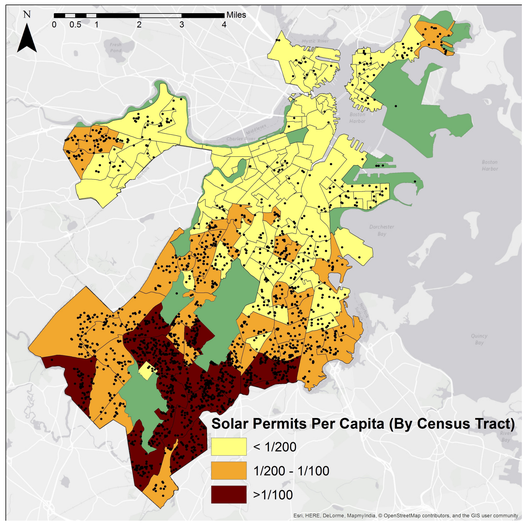


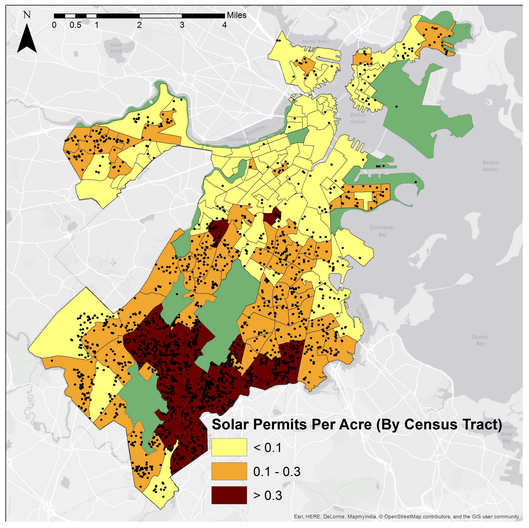




What Neighborhood Characteristics Determine Solar Development?







METHODS

Since customer recruitment is a significant challenge when developing a community shared solar project, narrow targeting of potential customers can offer significant cost and resource savings for a CSS project. Locating target neighborhoods for is an important starting point for a CSS project serving lower–income residents and renters.

This project uses data from the US Census American Community Survey on income and housing characteristics for the census tracts that make up the city of Boston. We identified those census tracts with low household income and those tracts with a high percentage of renters. We also examined resident transience: how often residents move in and out of each given census tract. Since current regulations make it difficult to transfer solar benefits to a new address after a customer moves, we have identified those tracts with low transience as target tracts, given the current regulatory landscape.

Additionally, this project used open-source building permit data from the city of Boston to identify the location of over 4,100 solar construction permits issued between 2010-2015. With this information we can establish solar permit counts by census tract, and explore the determinants of rooftop solar development, to try to find correlations between proliferation of solar and other neighborhood characteristics, such as income, or population or building density.

CONCLUSIONS

After cross-referencing the three Income and housing characteristics discussed above, we identified ten census tracts in the City of Boston as having low median income, a high percentage of renters, and low transience. The neighborhoods highlighted in yellow have a median household income below $48,320, a higher than 70% rate of renters, and lower than 20% of residents having moved in the previous five years. **In the current regulatory landscape, these neighborhoods represent those most appropriate for a concentrated recruitment effort to aggregate customers for a community-shared solar pilot project for lower income, renter households.**

Our examination of the determinants of current rooftop solar development suggested that population density and building characteristics are more closely correlated with rooftop solar development than income or renter/owner occupancy characteristics of a neighborhood. However this relationship is complex, and since there are just over 4,000 solar permits issued in a city of roughly 650,000 people, (roughly one solar installation per 165 residents, city wide) solar installations may represent too small a sample to correlate neighborhood level characteristics with solar development.

Data Sources:

US Census American Community Survey 2014 5-Year Estimates

City of Boston Open Data Building permits 2010-2015

Map Projections: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001_Feet

Acknowledgements:

Thank you to Barbara Parmenter for ideas, encouragement and lots of trouble-shooting.

Nathaniel Mayo

UEP 232—Intro to GIS

Spring, 2016

Tufts UNIVERSITY