Session 3

Solar Power and Policy Paradigm

During the pandemic, both residential and utility scale solar installations in the US soared by 25% to reach a total capacity of 97.2 GW. In New Jersey, solar power provides 5% of state's electricity and it is projected to reach 34% by 2050. To support this, Governor Murphy recently signed key legislation that established a successor to the NJBPU solar renewable energy certificate program, which includes a solicitation process for solar power generation facilities and dual-use solar project pilot programs for unpreserved farmland. This session will discuss how these policies and development in the solar sector can help expand solar energy in the state and advance efforts to achieve 100% clean energy.

Session 3

Solar Power and Policy Paradigm

Moderator: Bob Gordon

Commissioner

New Jersey Board of Public Utilities

Bob Gordon was nominated to serve as a Commissioner of the Board of Public Utilities by Governor Philip D. Murphy in 2018. At the time of his nomination, he had served more than 14 years in the Legislature, 10 of those in the Senate where he attained the positions of Majority Conference Leader, and Chairman of the Senate Transportation Committee, the Legislative Manufacturing Caucus and the Senate Legislative Oversight Committee.

During his tenure as chairman of the latter, he conducted extensive investigatory hearings on deficiencies at New Jersey Transit and the Port Authority of New York and New Jersey. As a result of these investigations, Senator Gordon advanced legislation that led to major reforms in the transparency and accountability of these organizations.

Commissioner Gordon's career has spanned the public and private sectors. In his public career, he has served at every level of government. He was drawn to public affairs by a life-long interest in environmental issues, and his first job was at the President's Council on Environmental Quality.

During his early career in Washington he worked on the economics staff of the Brookings Institution, a public policy research institution, and later, at the inception of the Congressional Budget Office, joined that agency as an analyst focusing on natural resource programs. At the state and local levels, Commissioner Gordon served as an aide to Governor Jim Florio and spent ten years as Mayor and Council Member of the Borough of Fair Lawn. He is the author of Governing New Jersey, a 300-page book describing the skill requirements of key executive branch positions.

Commissioner Gordon's business career is equally diverse. Much of his private sector work was with large management consulting firms, where he led engagements of a strategic nature. He managed the family textile factory in Paterson, New Jersey, and most recently, worked as a broker with one of the largest commercial real estate organizations in the world. Commissioner Gordon earned his undergraduate degree in political economy and environmental studies from Williams College, where he graduated Phi Beta Kappa and magna cum laude. He also has a Master of Public Policy degree from the University of California at Berkeley and an MBA in finance and health care management from the Wharton School of the University of Pennsylvania.

Ariane Benrey

Program Administrator & Policy Analyst

New Jersey Board of Public Utilities

Ariane Benrey has been a Program Administrator and Policy Analyst at the NJ Board of Public Utilities' Division of Clean Energy for over 3 years. Her primary focus is developing policies and programs to support the State's ambitious goals for solar deployment through policy design, market analysis, and stakeholder engagement. She administers the Community Solar Energy Pilot Program, for which she has developed and implemented the program rules and regulations, and runs the annual competitive solicitations. Ms. Benrey received her Bachelor's degree in Political Science and Master's degree in International Relations from Science Po in Paris, France, and her Master's of International Affairs in Energy and Environment from Columbia University in New York.

New Jersey's Successor Solar Incentive (SuSI) Program

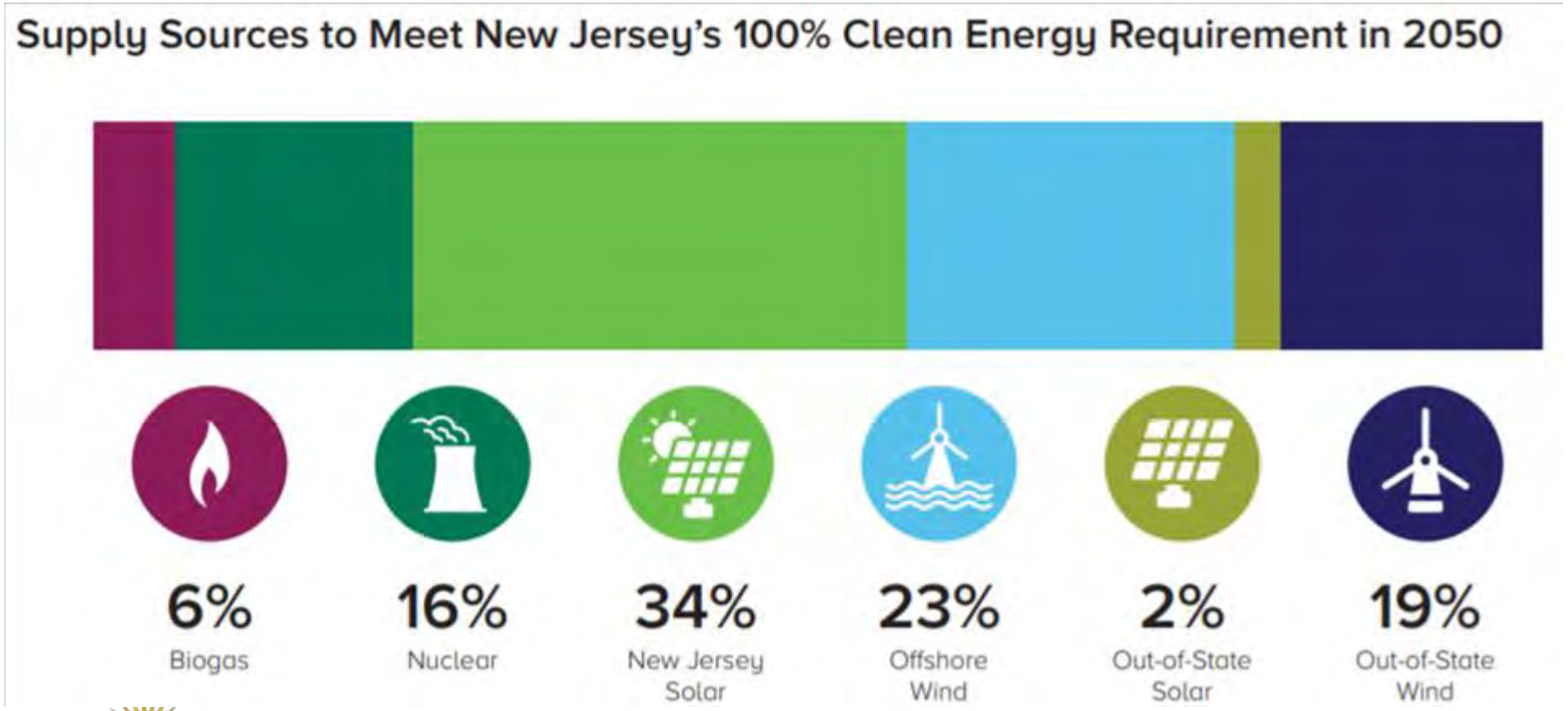
Ariane Benrey
Policy Analyst, Division of Clean Energy
New Jersey Board of Public Utilities

September 23, 2021

Lighting the Way to a Clean Energy Future

Background: 2019 Energy Master Plan

Goal: 100% clean energy by 2050



2019 EMP, p. 102

Background: New Jersey Solar Snapshot

- New Jersey is **7th in the United States for installed solar capacity**, and 1st in the nation for installed solar per square mile.

- Current installed capacity: **3.7 GW**
  - Approx. 79% net metered, 21% grid supply
  - New! Community Solar

- The NJ solar industry provides nearly **5,400 jobs**.

Solar Renewable Energy Certificate (SREC) Program

- **Legacy SREC Registration Program (SRP)**
  - The Clean Energy Act of 2018 directed NJBPU to close the SRP to new registrations once 5.1% of the kilowatt-hours sold in the State were generated by solar electric power connected to the distribution system (known as the 5.1% Milestone).
  - On April 6, 2020, the Board determined that the 5.1% Milestone would be attained before May 1, 2020, and directed that the SRP close to new registrations on April 30, 2020.

- **Why close the SREC Program?**
  - The prior SREC Program has been successful at driving high numbers of solar installations in the state.
  - However, it was very expensive in part due to its “one-size-fits-all” structure and the financial uncertainty inherent in its variable, market-driven incentive values.

Transition Incentive Program

- **Solar Transition Incentive (TI) Program**
  - The TI Program was designed to provide a bridge between the Legacy SREC Program and the soon-to-be-established Successor Program.
  - The TI Program opened to new registrations on May 1, 2020, and closed on August 27, 2021.
    - Fixed, factorized incentives over 15 years.

Successor Solar Incentive (SuSI) Program

- **Goals:**
  - Drive a significant increase in installed solar capacity while prioritizing ratepayer affordability.
  - Tailor incentives to the needs of different projects, thereby enabling the continued growth of the solar industry at a lower cost to ratepayers.
  - Target: **double NJ's installed solar capacity** from 3.7 GW today to 7.4 GW by 2026, by installing **3.75 GW of new solar**.
  - Annual goal of installing 750 MW of new solar capacity, including targets for 300 MW of net metered solar, 150 MW of community solar, and 300 MW of grid supply solar.
  - Solar energy generates over 5% of New Jersey's current electricity needs; under the new SuSI Program, this percentage is expected to rise to approximately 10%.
- **Solar Act of 2021**

Successor Solar Incentive (SuSI) Program

The SuSI Program is comprised of two sub-programs:

1) ***Administratively Determined Incentive (ADI) Program*** which provides administratively set incentive values for net metered residential projects, net metered non-residential projects of 5 MW or less, community solar projects, and, for an interim period, projects previously eligible to seek conditional certification from the Board under Subsection (t).

1) ***Competitive Solar Incentive (CSI) Program*** will provide competitively set incentive values for grid supply projects and net metered non-residential projects greater than 5 MW. Board staff is currently working with stakeholders to develop the design of the CSI Program with the goal of holding the first solicitation by early-to-mid 2022.

ADI Capacity Blocks for Energy Year 2022

Market Segments	System Size	MWdc Capacity Blocks
1. Net-Metered Residential (All Sizes)	**All Sizes**	**150 MWdc**
2. Net-Metered Non-Residential (All Installation Types)	**All sizes at or below 5 MWdc**	**150 MWdc**
3. Community Solar LMI and Non-LMI	**All sizes at or below 5 MWdc**	**150 MWdc**
4. Interim Subsection (t)	**All Sizes**	**75 MWdc (Interim Basis)**

ADI Incentives Per Market Segment

Market Segments	Size MW dc	Incentive Value ($/SREC II)	Public Entities ($20 Adder) Incentive Value $/SREC II
1. Net Metered Residential	All types and sizes	$90	N/A
2.Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	$100	$120
3. Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	$90	$110
4.Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	$85	$105
5. Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	$80	$100
6. LMI Community Solar	Up to 5 MW	$90	N/A
7. Non-LMI Community Solar	Up to 5 MW	$70	N/A
8. Interim Subsection (t)	All types and sizes	$100	N/A

SREC-II 15 Year Qualification Life

More Information

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NJCleanEnergy.com

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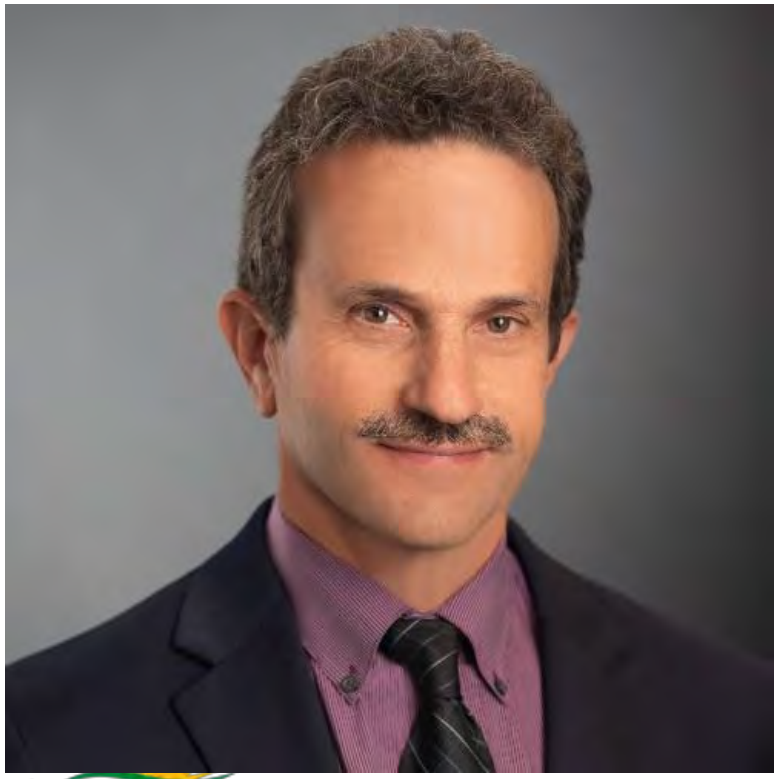
THANK YOU

Larry Barth

Director Corporate Strategy

New Jersey Resources



Larry joined NJR Clean Energy Ventures (CEV) in 2010, and was named Director of Corporate Strategy in 2016. In this role, Larry he has been an active participant in New Jersey clean energy policy proceedings, and in developing new business opportunities for NJR.

Prior to joining NJR in 2010, he was the Renewable Energy Program Manager supporting the New Jersey Clean Energy Program (NJCEP), responsible for designing and implementing programs to stimulate the growth of solar, wind and biomass markets. He led the Global Marketing team at McGraw-Hill Platts, the world's leading provider of energy market information, and capped a 10-year career at Dun & Bradstreet as Vice President of the Supply Chain Solutions business unit.

Larry has a BA from Franklin & Marshall College and an MBA in Finance from Columbia University.

BPU New Jersey's cleanenergy program™

Raymond Cantor

Vice President Government Affairs

New Jersey Business and Industry Association

Raymond Cantor has worked as the Vice President of Government Affairs for the NJ BIA for over two years, where he is responsible for energy and environmental issues affecting the business community. Mr. Cantor is an attorney with a wealth of experience and expertise on environmental policy and regulatory matters earned through years in high-level positions in the legislative and executive branches of government. He previously oversaw policy, legal, management, and economic matters as the Chief Advisor to the New Jersey Department of Environmental Protection Commissioner. Raymond earned his bachelor's degree in Political Science and Government from Rider University, and a Doctorate of Law from New York Law School.

Sydney Oluoch

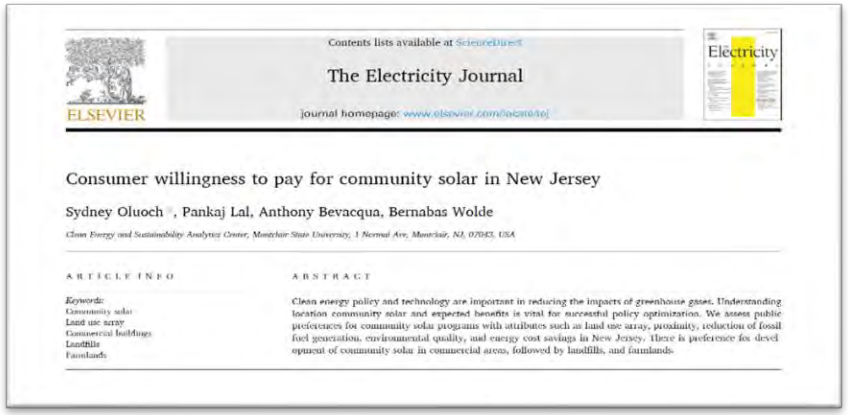
Research Fellow

Clean Energy and Sustainability Analytics Center

Sydney Oluoch is a Post-Doctoral Research Fellow at the Clean Energy and Sustainability Analytics Center of Montclair State University. His work focuses on quantitative literature reviews, econometrics, economic valuation techniques (Discrete choice experiment and Best worst scaling) in clean energy and sustainable development topics in New Jersey, other US states, and Sub-Saharan Africa. Dr. Oluoch is experienced with policy assessment, survey development, data analysis, stakeholder and community outreach. Dr. Oluoch received his Master's degree in Biochemistry from Egerton University in Kenya, Master's degrees in Molecular Biology and Environmental Studies from Montclair State University, and his Doctorate of Philosophy in Environmental Science and Management from Montclair State University.

Consumer Willingness to Pay for Community Solar in New Jersey

Sydney Oluoch, PhD
Co-authors: Pankaj Lal, PhD, Anthony Bevacqua, PhD, & Bernabas Wolde, PhD



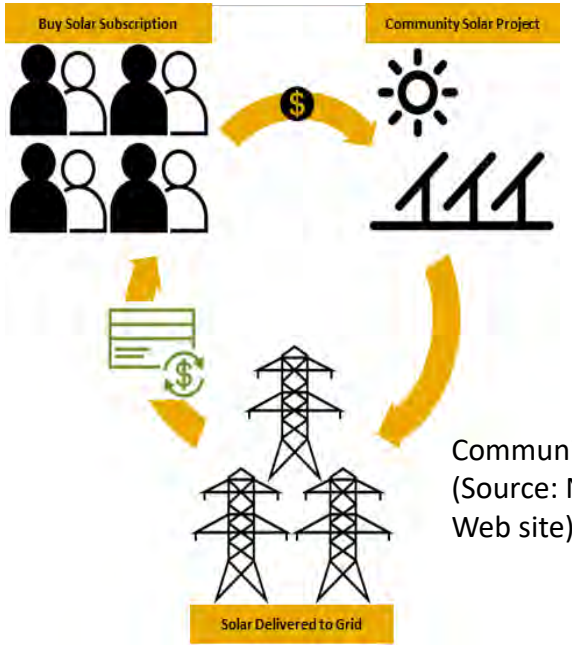
MONTCLAIR STATE UNIVERSITY

Clean Energy and Sustainability Analytics Center (CESAC)

This research was partially funded by the National Science Foundation Award 1555123.

Introduction

- Advances in solar photovoltaics (PV) improve GHG mitigation efforts, energy supply diversification, & regional energy independence.
- Community solar provides opportunities for consumers to participate in solar PV market; benefits solar developers; and increases access to clean energy by removing road blocks.
- Community solar stabilizes residential demand & revenues, offers cost saving opportunities for LMI participants.



Community Solar (Source: NJ OCE Web site)

Linden Hawk Rise Community project-NJ Landfill repurposed as a solar garden (Source: Renewable energy World)

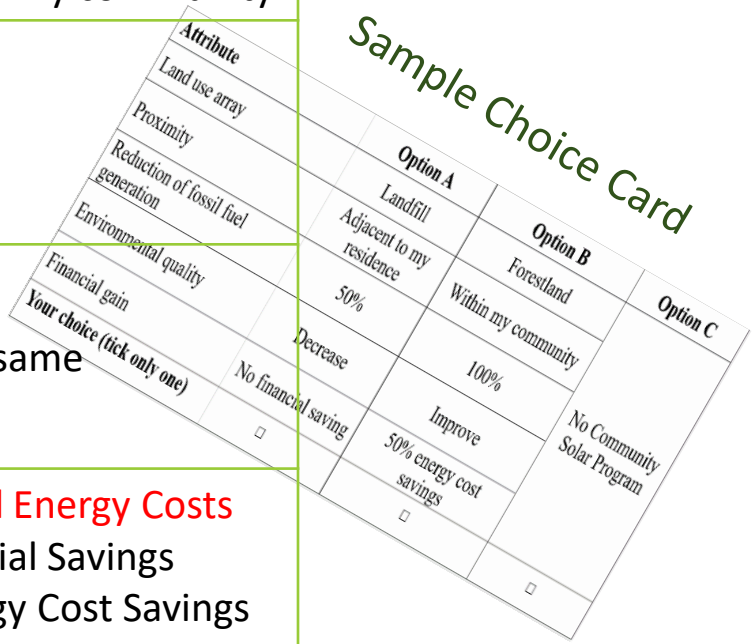
Research Framework

- Evaluate public preferences on land use considerations, energy savings, & environmental improvements for future NJ community solar energy programs.
- Focus on the environmental quality improvements, cost benefits, and proximity of arrays to residences.
- Apply Discrete Choice Experiment to evaluate consumer willingness to pay/accept for community solar in NJ.
- Choice experiments assume that utility an individual derives from a good depends on its **individual characteristics** & **unobserved** components (Lancaster, 1966; McFadden, 1976).

Attributes & Levels

Attribute	Description	Level
Land use Array	This attribute investigates functional ways to re-purpose areas.	➢ Landfill ➢ Farmland ➢ Commercial building ➢ Forestland
Proximity	How close the community solar arrays situated to the respondent's residences	➢ Adjacent to my residence ➢ Within my community ➢ Outside of my community
Reduction of fossil fuel generation	Role of community solar in reducing fossil fuel energy generation.	➢ 20% ➢ 50% ➢ 100%
Environmental Quality	Regional impacts to climate change, or local air quality improvement.	➢ Decrease ➢ Stays the same ➢ Improves
Financial Gain	Energy saving cost in terms of electricity bill reduction.	➢ Additional Energy Costs ➢ No Financial Savings ➢ 50% Energy Cost Savings ➢ 100% Energy Cost Savings

Sample Choice Card



Attribute	Option A	Option B	Option C
Land use array	Landfill	Forestland	No Community Solar Program
Proximity	Adjacent to my residence	Within my community	
Reduction of fossil fuel generation	50%	100%	
Environmental quality	Decrease	Improve	
Financial gain	No financial saving	50% energy cost savings	
Your choice (tick only one)	☐	☐	☐

Survey design and Implementation

Three-part questionnaire was developed for this study:

1. Brief introduction to the survey and background information on community solar and preliminary questions on benefit valuation and preferences towards community solar.
2. Socioeconomic information about respondent's demographic characteristics such as gender, age, education, occupation, household income, and place of residence, and monthly utility bill.
3. Choice Experiment (parameter estimates & WTP)

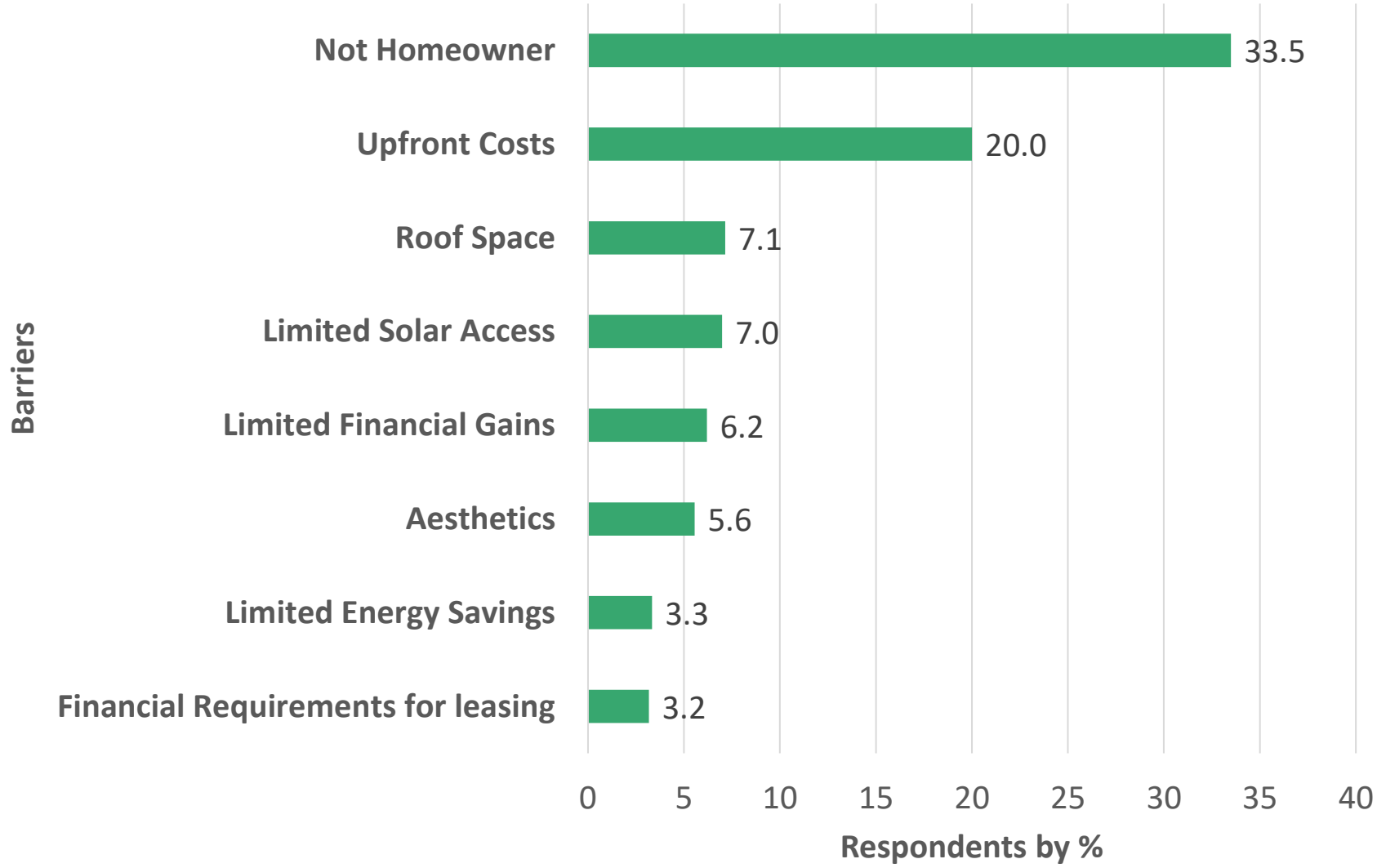
RESULTS: Socio-demographic data

To reduce sampling bias, the key demographic characteristics (age, income, education, and gender) for the respondents balanced with the NJ census 2019 data

Category	Sample Population (n=630)	NJ Census
Gender (% Female)	51.73%	51.20%
Median Age	45.5	39.6
Education (H.S./GED)	97.90%	89.20%
Median Income	$59,999.50	$76,475
Household Size	2.73	2.68
Percent Owner Occupied Housing	59.07%	64.15%

In italics the sample mean and the population mean are not equal at the 10% level according to the Pearson χ^2 test.

RESULTS: Barriers to Solar Use among Respondents



RESULTS: Parameter Estimates and WTP values

Attribute Levels	MNL Estimate	WTP ($)
Land use array (Landfill)	0.777 (0.051) ***	71.58
Land use array (Farmland)	0.545 (0.051) ***	50.22
Land use array (Commercial)	0.871(0.048) ***	80.29
Proximity (Within the community)	0.336 (0.042) ***	30.93
Proximity (Outside the community)	0.388 (0.043) ***	35.79
Reduction of fossil fuel generation (50%)	0.490 (0.040) ***	45.17
Reduction of fossil fuel generation (100%)	0.594 (0.041) ***	54.69
Environmental quality (Stays the same)	0.798 (0.043) ***	73.50
Environmental quality (Improves)	1.135 (0.042) ***	104.60
Financial benefit/costs	-0.011 (0.001) ***	
ASC	8.221 (0.359) ***	
Pseudo R^2	0.4652	
Loglikelihood	-4441.12	
Number of Respondents	630	
Number of Observations	22,675	

Note: ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. Values in parentheses show standard errors

RESULTS: Summary

Land use array attributes

- Commercial building-highest increase in WTP ($8.71) for community solar programs as compared to Landfills.
- Landfills is $21.36 > solar arrays on farmlands. Solar arrays on closed landfills can be resource-efficient land use method.

Proximity attributes

- Preference for community solar arrays outside their community, With increase in WTP by $4.86.

Reduction of fossil fuel generation

- 100% reduction of fossil fuel generation, attracts an increased WTP of $9.52.

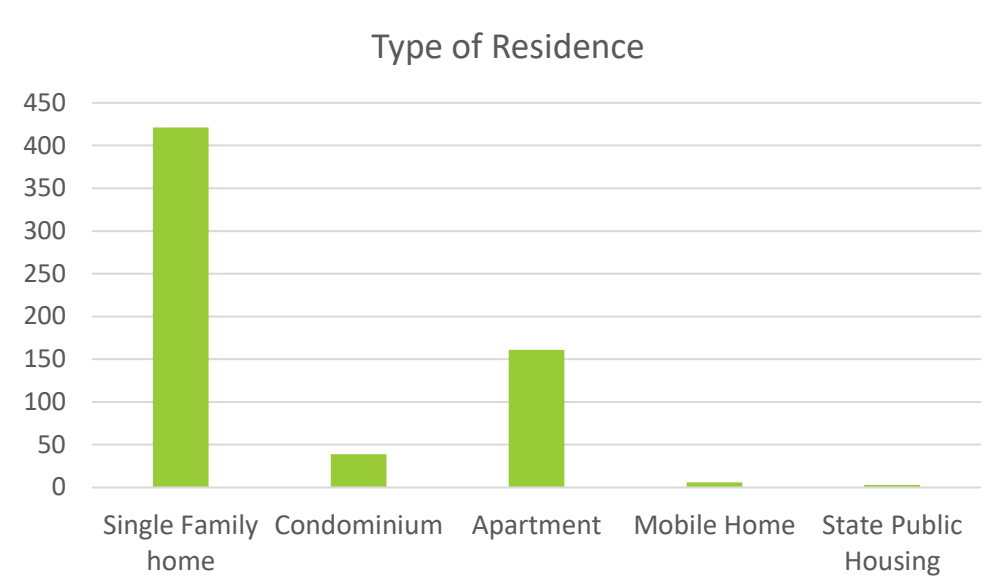
Environmental quality attributes

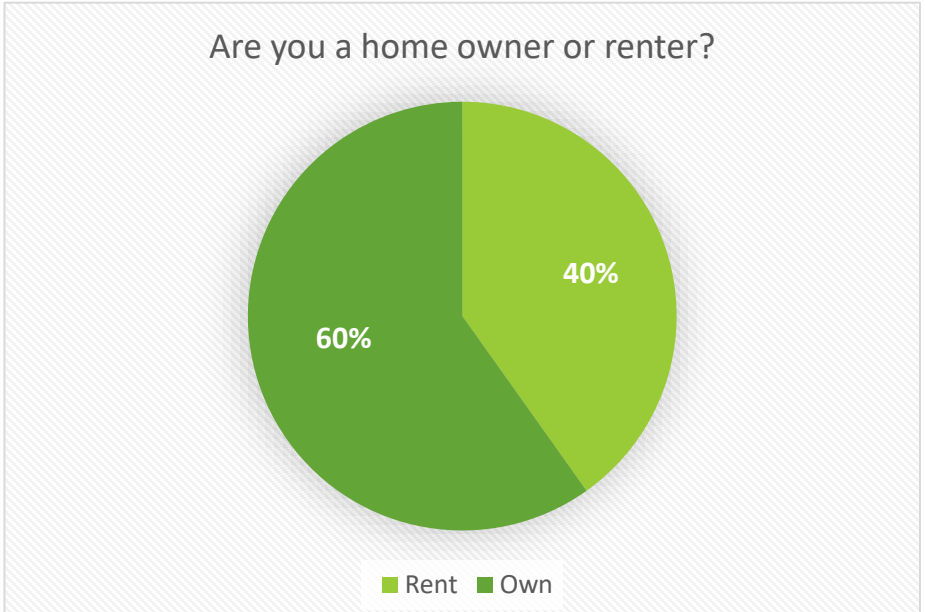
- Improved environmental quality attract an increased WTP of $31.10, highest change in utility for all attributes.

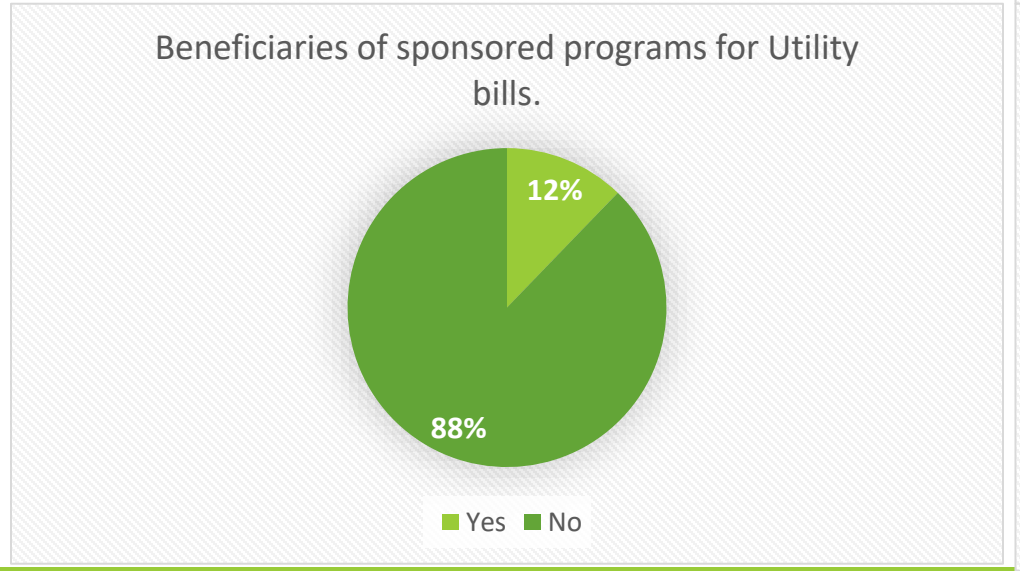
Conclusions

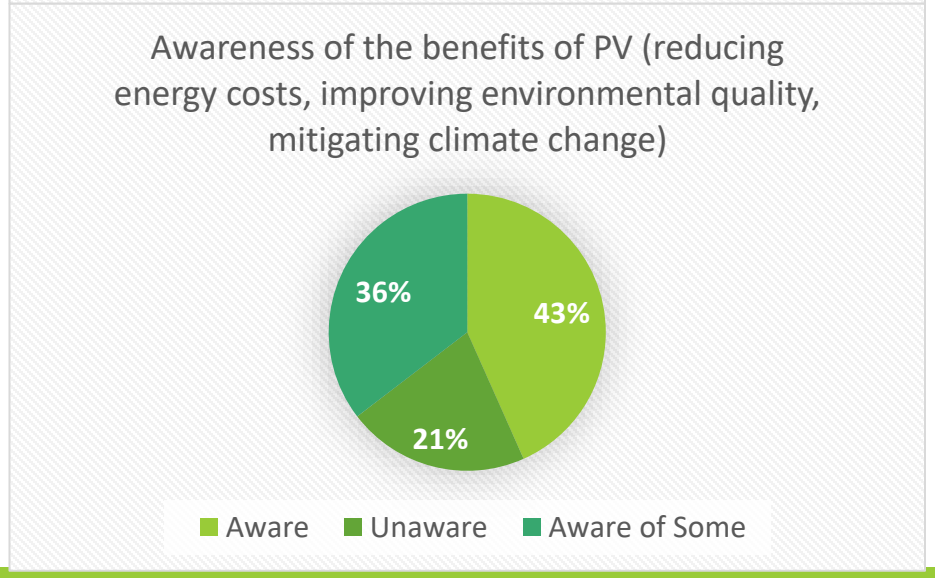
- NJ residents prefer community solar in commercial areas, followed by landfills & farmland.
- NJ residents prefer arrays to be outside of their communities.
- NJ residents are willing to participate in community programs offering improved environmental quality & maximum reduction in fossil fuel generation.
- Attributes such as land-use array, proximity, & reduction of carbon emissions play a key role in NJ residents' decisions to participate in community solar.
- Critical to develop optimal programs to avoid market failure traps by considering iterative processes involving key stakeholders.
- The task for NJ decision makers, stakeholders, third party companies, & utilities to design community solar programs reflecting consumer preferences.

APPENDIX


Type of Residence
450
400
350
300
250
200
150
100
50
0
Single Family home
Condominium
Apartment
Mobile Home
State Public Housing


Are you a home owner or renter?
40%
60%
Rent
Own


Beneficiaries of sponsored programs for Utility bills.
12%
88%
Yes
No


Awareness of the benefits of PV (reducing energy costs, improving environmental quality, mitigating climate change)
36%
43%
21%
Aware
Unaware
Aware of Some