Community Solar in New Jersey

Sustainable Jersey Webinar
December 12, 2018

Webinar Speakers

- Ariane Benrey

  Program Administrator

  New Jersey Board of Public Utilities
- Mike Winka

  Senior Policy Advisor

  New Jersey Board of Public Utilities

Municipal Program Energy Actions

	Climate Planning and Energy Efficiency	Renewable Energy	Alternative Fuel Vehicles
Municipal Operations	• Municipal Carbon Footprint • Energy Tracking and Management • Energy Efficiency for Municipal Facilities	• On-Site Solar Energy • On-Site Geothermal • On-Site Wind Energy • Purchase Renewable Energy	• Fleet Inventory • Purchase Alternative Fuel Vehicles (AFV)
Community Energy Use	• Community Carbon Footprint • Climate Action Plan • Residential Energy Efficiency Outreach • Commercial Energy Efficiency Outreach	• Wind Ordinance • Renewable GEA • Make Your Town Solar Friendly • Community-Led Solar Initiatives	• Make Your Town EV Friendly • Public EV Chargers

Gold Star Standard in Energy

- Municipal Operations
  - Municipal buildings
  - Fleet management
  - Operations (landscaping, energy/water conservation, etc.)
  - Route optimization
  - Green building training
- Community Wide
  - Make Your Town EV Friendly
  - Public Electric Vehicle Chargers
  - Make Your Town Solar Friendly
  - Community Led Solar Initiatives
  - Residential Energy Efficiency
  - Commercial Energy Efficiency

Upcoming Community Solar Webinar

Community Solar by Local Governments
Weds, January 23, 2019
1PM-2PM
Registration online

January 23rd Webinar Guest Speaker:

Ron Reisman, Solar Ombudsman, Sustainable CUNY

- ACCESSolar: Community Solar Gardens at NYCHA
- NYC Solar Partnership

New Jersey's Community Solar Energy Pilot Program

Wednesday, December 12, 2018

DISCLAIMER

The information and views in this presentation does not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, or the State of New Jersey. This presentation is provided for informational purposes only and does not provide a legal interpretation of any New Jersey Statutes regulations or policies.

NJCEP BACKGROUND

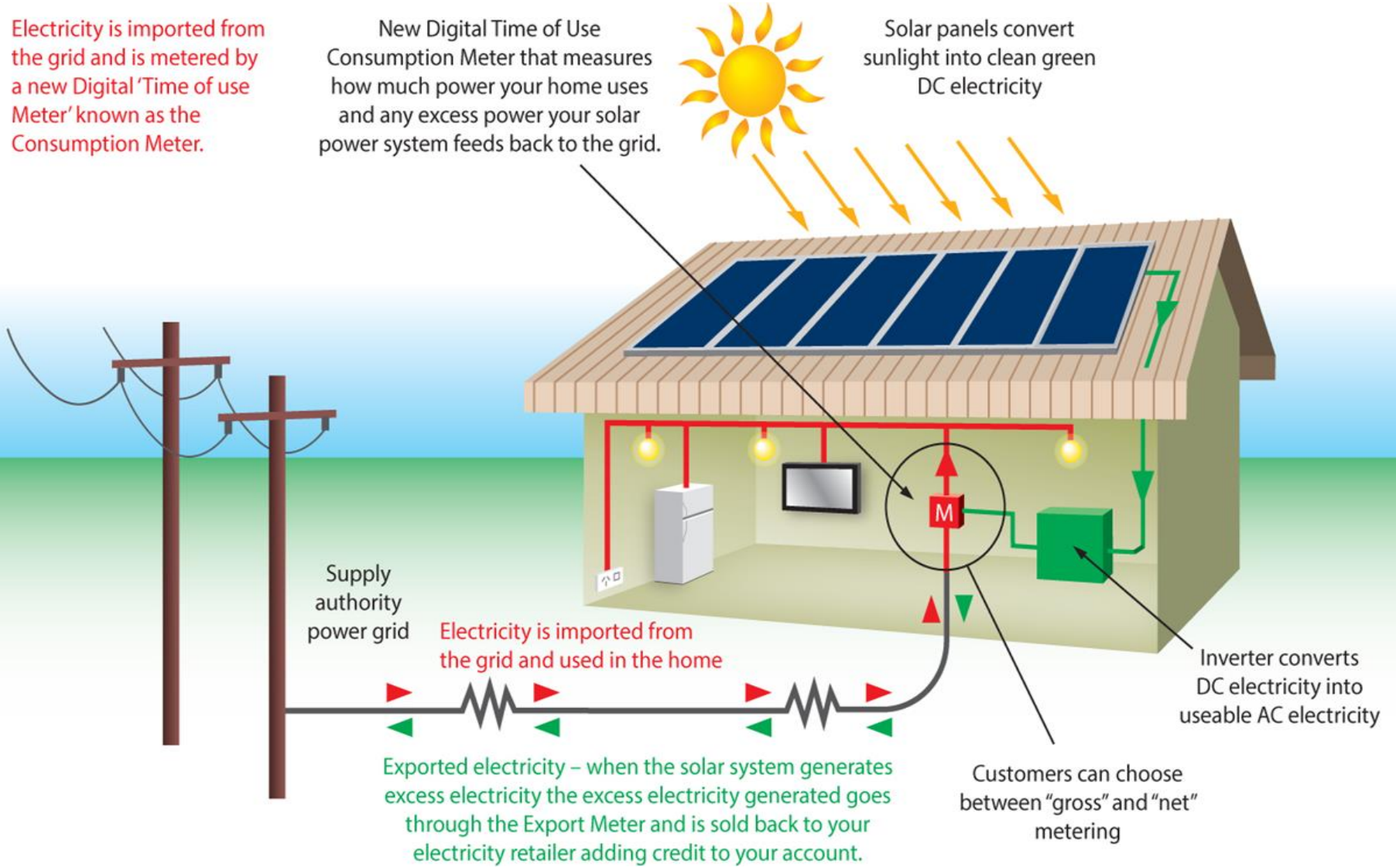
- Administered by the New Jersey Board of Public Utilities
- Funded from “Societal Benefits Charge” on utility bill
- Program Goals:
  - Promote increased energy efficiency and the use of clean, renewable sources of energy
  - Protect the environment and lower emissions
  - Change the business mindset

Clean Energy Act of 2018

- Signed into law on May 23, 2018
- Directs the BPU to adopt rules and regulations establishing a Community Solar Energy Pilot Program within 210 days
- Directs the BPU to adopt rules and regulations establishing a Community Solar Energy Program within 36 months of the enactment of the Pilot Program

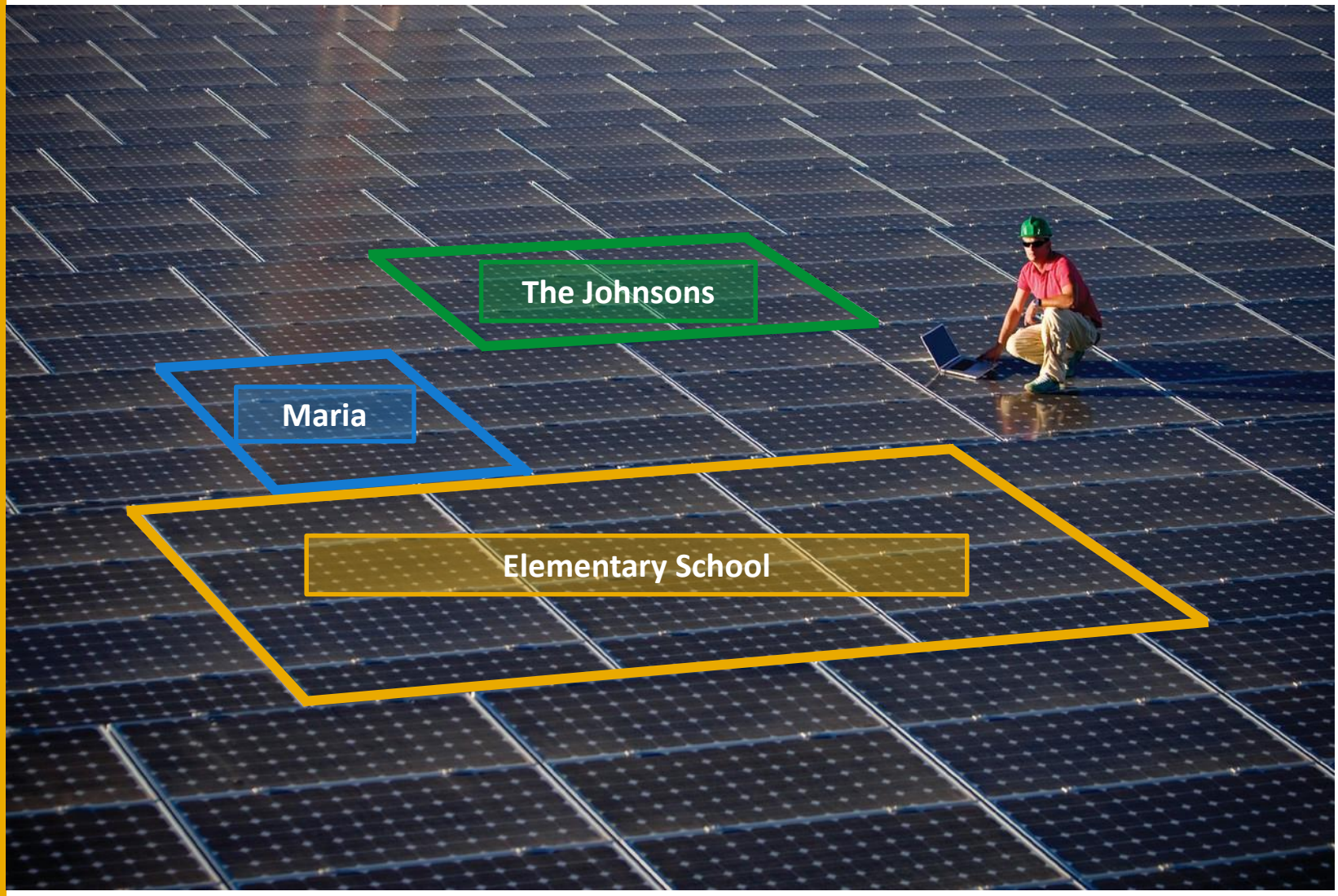
What is Community Solar?

- A larger, remotely located solar array or facility that is virtually divided among multiple participants ("subscribers") by means of a credit on their utility bill.
- Participation can be in the form of:
  - Ownership: buying a direct share or portion of the community solar project or panels
  - Subscription: buying a portion or share of the electric output produced by the community solar project



http://www.geservices.com.au/GridConnectedSystems.aspx

Mars Chocolate Headquarters 18-acre Solar Garden
Hackettstown, NJ


The Johnsons
Maria
Elementary School

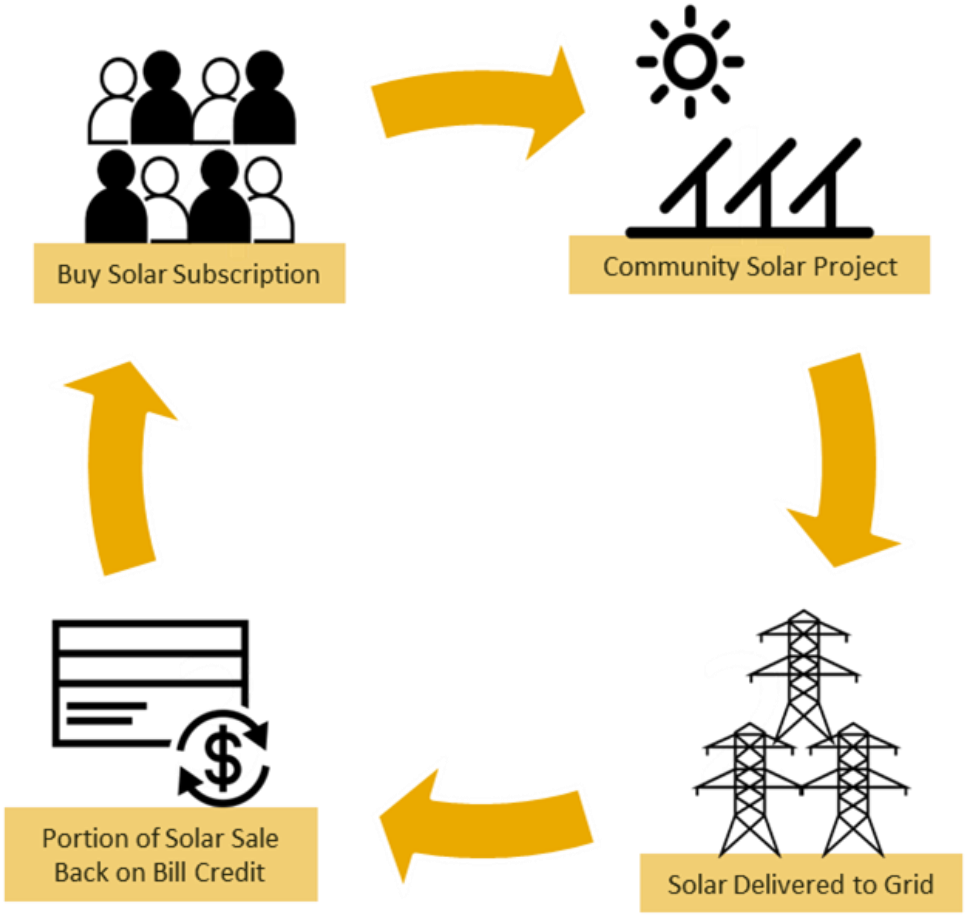
Solar Carport Rendition

Vineland, NJ

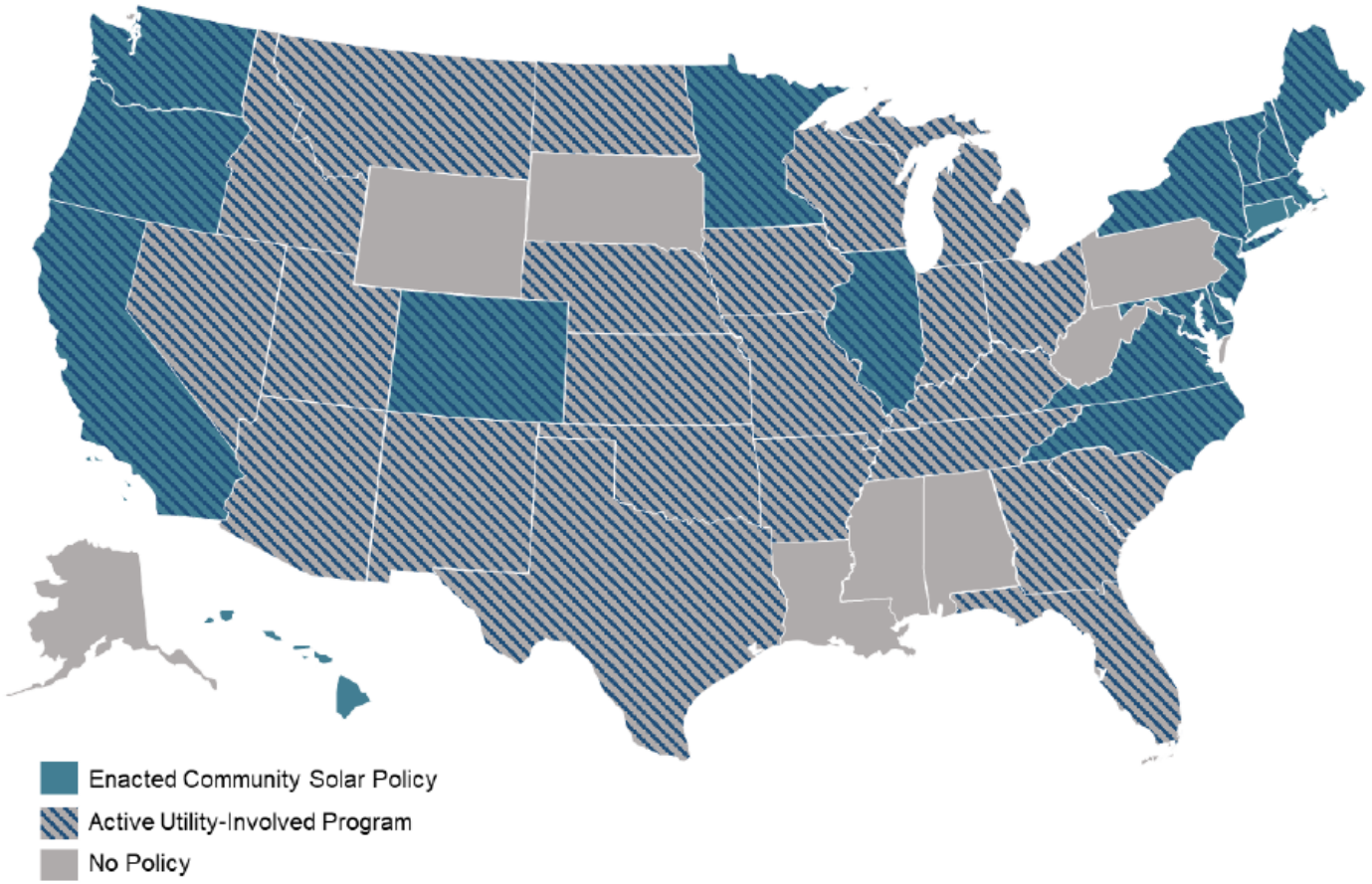
Amazon Solar Warehouse

https://arstechnica.com/information-technology/2017/03/amazon-to-cover-millions-in-warehouse-rooftop-square-footage-with-solar-panels/

What is Community Solar?



Community Solar in Other States



Source: NC Clean Energy Technology Center; Smart Electric Power Alliance[5]

Program Benefits

- Enable access to solar energy for electric utility customers who have previously been unable to go solar.
- Enable low-and moderate-income households and environmental justice communities to access clean energy and save on their electricity bills.
- Pursue local clean energy development that is tied to the communities without materially compromising the preservation of open space or protected lands in New Jersey.

Pilot Program Characteristics

Structure	• 3-year Pilot Program • Anticipated Pilot Program start: early 2019 • Projects selected via an application and competitive scoring
Size	• Individual community solar project capacity limit: 5MW • Annual capacity limit: 75MW for PY1, at least 75MW PY2&3 • Min. 10 subscribers, max. 250 subscribers per 1MW capacity
Siting	• Prohibition of community solar on preserved farmland • Siting on Green Acres open space subject to DEP approval • Additional siting restrictions may be set in the application
Credit Value	• Bill credit set at retail rate net metering, minus SBC
Low & Moderate Income (LMI) Access	• At least 40% of program capacity reserved for LMI projects • Option for further 10% reserved for LI projects

Pilot Program

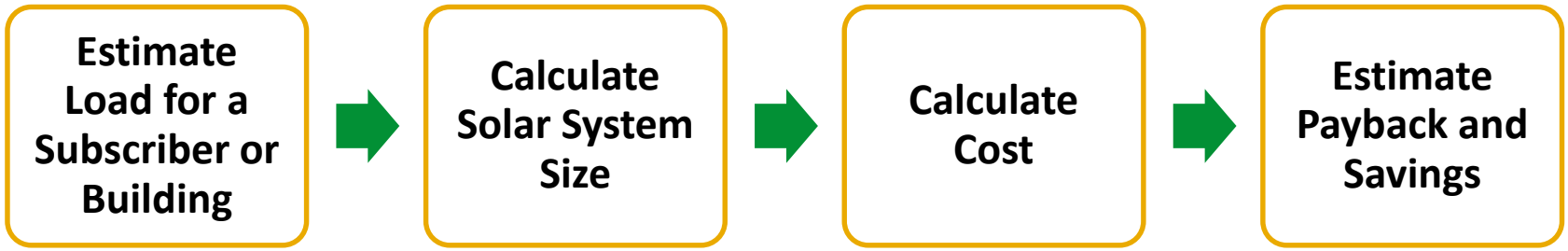
LMI Access

- Ensure that LMI households are able to participate in the clean energy market
- Address barriers to LMI and Low Income (LI) access

Siting

- Preference to projects that make creative use of marginal or low-value land
- Brownfields, landfills, areas of historic fill, parking lots, rooftops, …

Solar 101: How to Estimate the Amount of Solar, Space & Cost for a Community Solar Project



Estimating Load

For residential loads the electric bill and natural gas heating bills are the best source for usage and costs

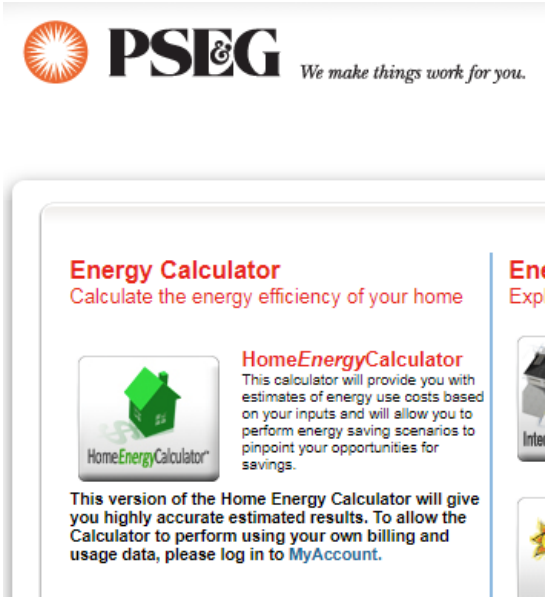
Or you can use Energy Calculators

www.pseg.com/home/save/manage_costs/tips_tools.jsp

Home Energy Calculator
http://c03.apogee.net/clients/?utilityid=pseg

Fill in question on Home type/age, insulation, windows,
HVAC, HWH, Refrig/Freezer, TV, Kitchen …

For a Deeper Analysis
https://scout.energy.gov/baseline-energy-calculator.html

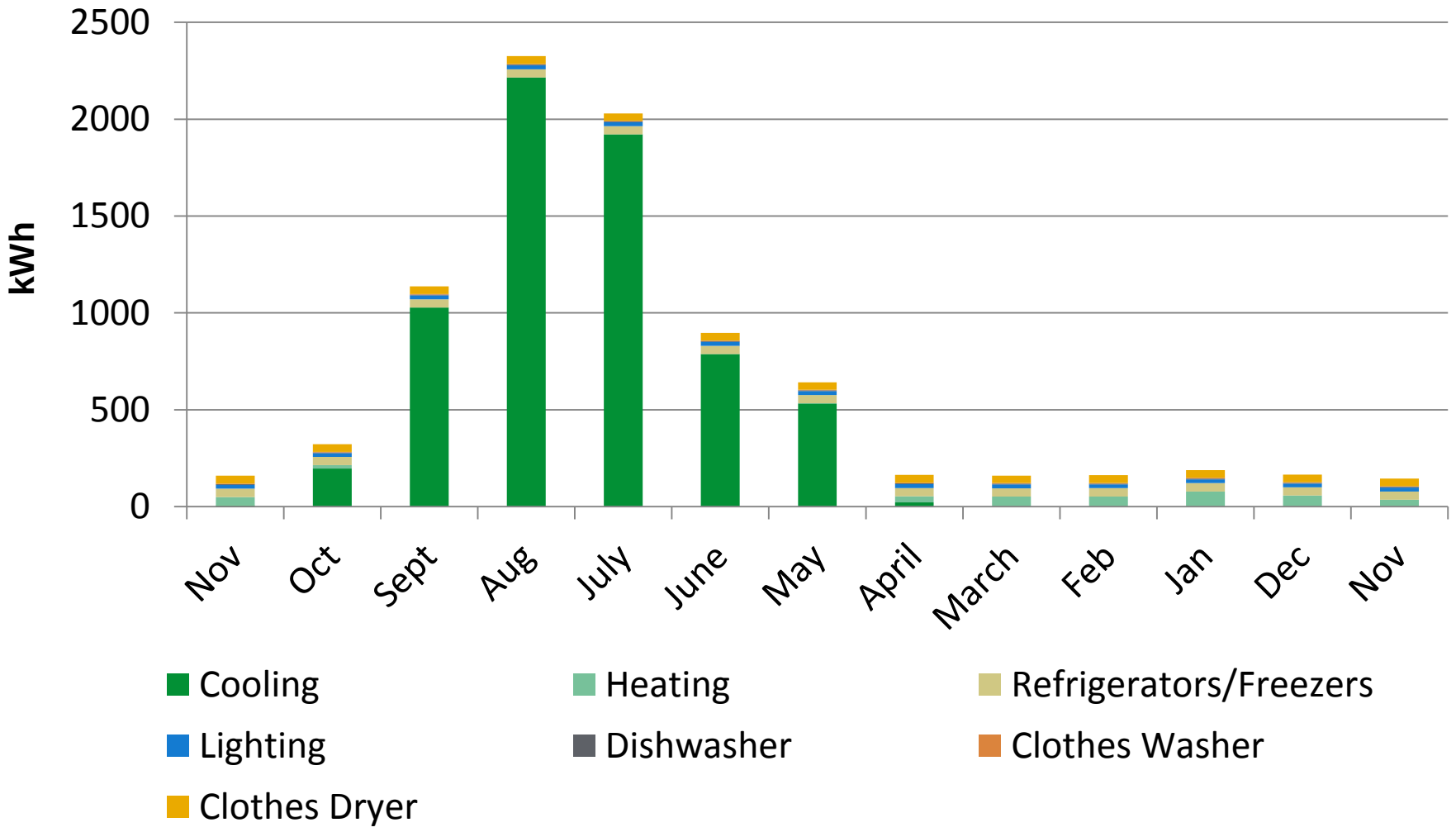


Case Study

	kWh	Electric Costs
Cooling	6,929	$1,142
Heating	498	$73
Refrigerators/Freezers	511	$78
Lighting	288	$44
Dishwasher	49	$7
Clothes Washer	28	$4
Clothes Dryer	469	$72
Elec. Base Charge	N/A	$29
Total Per Year	**8,771**	**$1,450**
Average Per Month	**731**	**$121**

http://c03.apogee.net/clients/?utilityid=pseg

https://www.pseg.com/home/save/manage_costs/tips_tools.jsp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kWh
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Aug
July
June
May
April
March
Feb
Jan
Dec
Nov
Cooling
Heating
Refrigerators/Freezers
Lighting
Dishwasher
Clothes Washer
Clothes Dryer

Solar Panels Factoids & Rule of Thumb

Average sizes

- 39 in. by 65 in.
- 17.5 or 21 sq. ft. per panel
- 40 to 50 pounds per panel
- 3 pounds per sq ft

Panel Efficiencies

- 15-22%
- 250 to 350 watts per panel
- 17 watts per sq. ft.
- 45 sq ft / kW to 60 sq ft / kW

System Capacity Factor

- 14%
- 1,200 kWh per KW per year
- 20 kWh per sq. ft.

Avg NJ SF residential Annual Electricity Usage
9,000 kWh per hh per year (7.5 KW)

Avg NJ residential Annual Electricity Usage
7,200 kWh per hh per year (6 kW)

Avg NJ MF residential Annual Electricity Usage
5,500 kWh / 1,200 kWh/kW = **4.58 kW per resident**

4.58 kW X 50 sq ft/kW = **375 sq ft**

10 Subscribers:

10 x 4.58 kW = 45.8 kW = 3,750 sq ft or 50 x 75 feet

20 Subscribers: 91.6 kW

https://www.solarpowerauthority.com/how-much-does-it-cost-to-install-solar-on-an-average-us-house/

https://realestate.usnews.com/real-estate/articles/what-homebuyers-should-know-about-solar-panels

NREL's solar installation model – PV WATTS
http://pvwatts.nrel.gov/
http://www.njcleanenergy.com/files/file/Renewable_Programs/NJCEPPVWattsCalculatorTraining21815.pdf

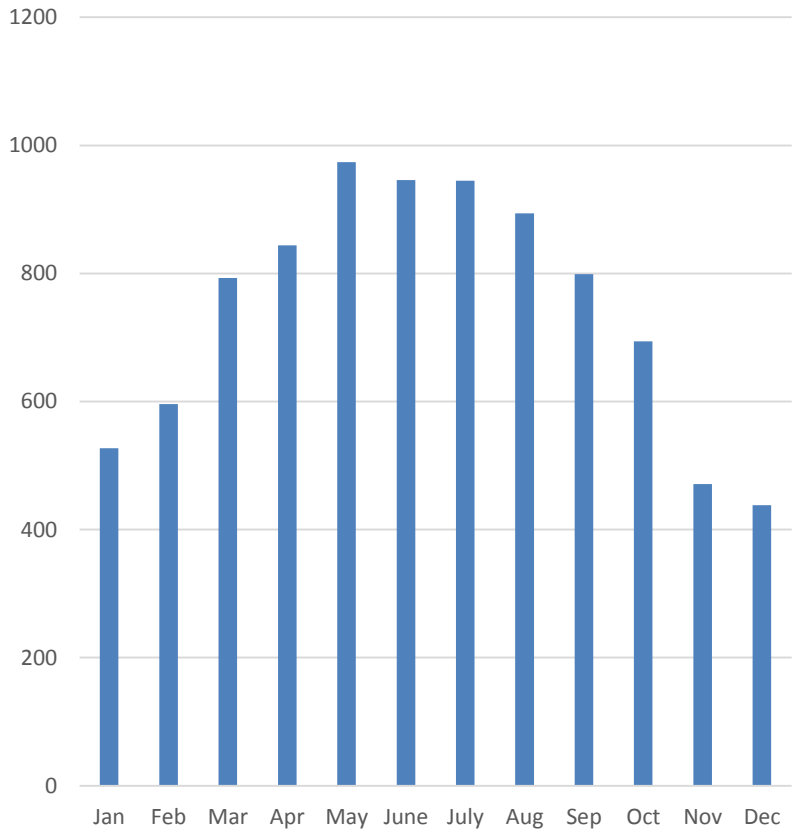
The average residential PV size of 7 kW

DC System Size (kW): 7
Module Type: Standard
Array Type: Fixed (Open Rack)
System Losses (%): 14
Tilt (deg): 20
Azimuth (deg): 180
Draw Your System - Customize your system on a map. (optional)
Average Cost of Electricity Purchased from Utility ($/kWh): 0.165

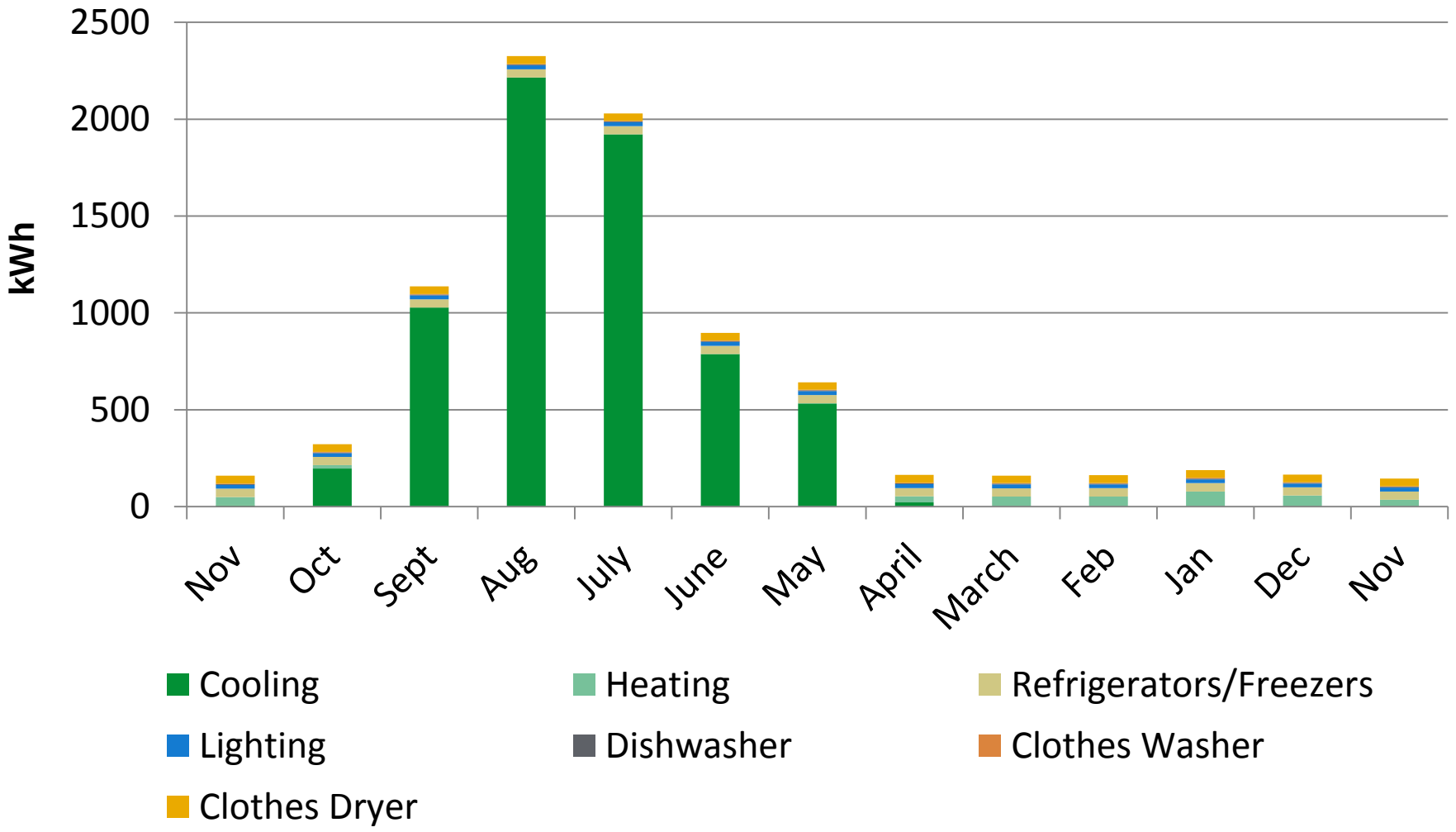
NREL solar installation, performance cost and financing model - System Advisor Model SAM: https://sam.nrel.gov/

7 KW South Facing at 20° Tilt

Month	Solar Radiation (kWh / m2 / day)	AC Energy (kWh)	Energy Value ($)
January	2.78	527	95
February	3.52	596	107
March	4.34	793	143
April	4.95	844	152
May	5.69	974	175
June	5.86	946	170
July	5.73	945	170
August	5.47	894	161
September	4.91	799	144
October	3.99	694	125
November	2.68	471	85
December	2.35	438	79
Annual	**4.36**	**8,921**	**$ 1,606**



NREL's solar installation model – PV WATTS http://pvwatts.nrel.gov/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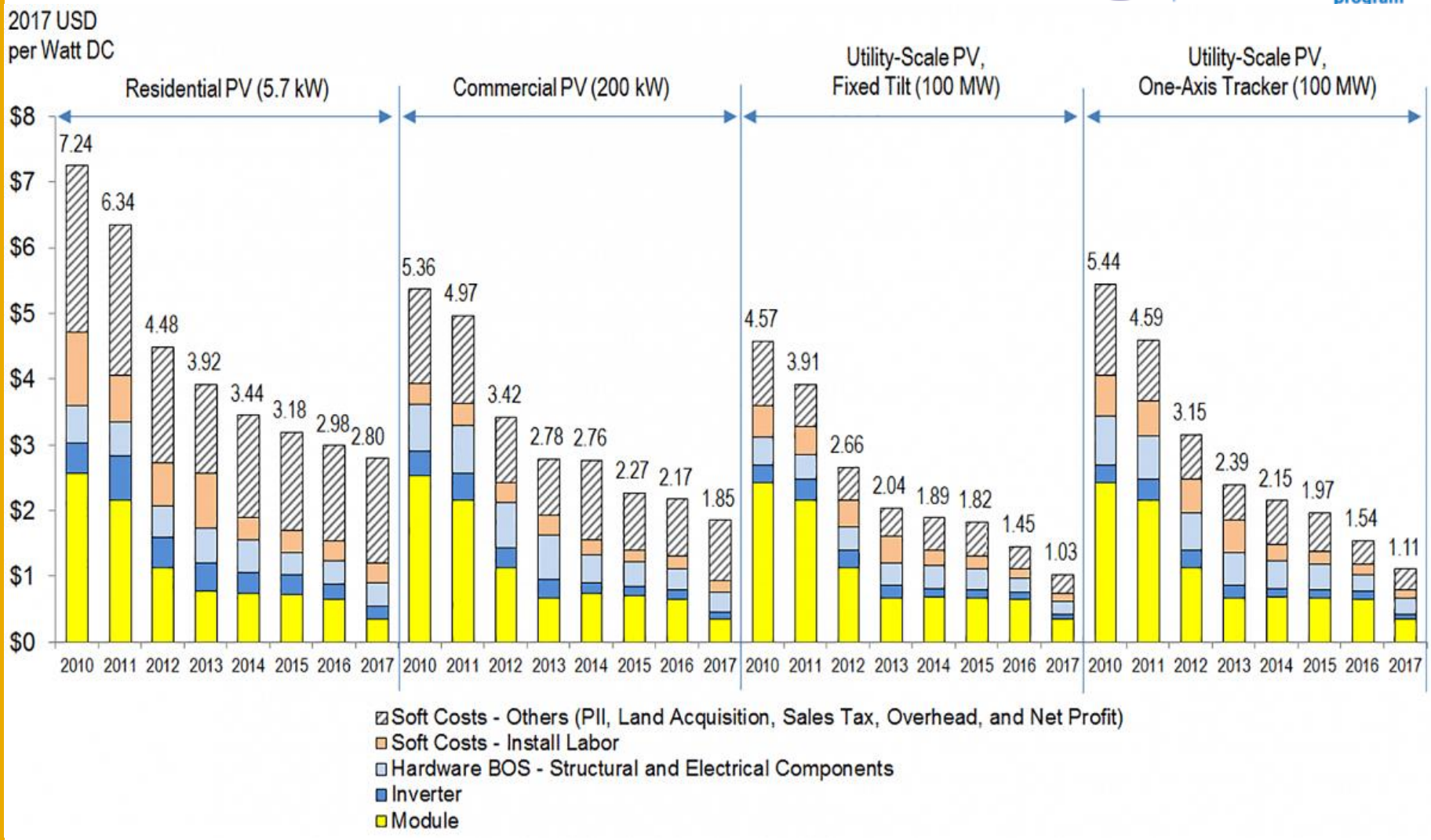
Lighting
Dishwasher
Clothes Washer
Clothes Dryer


2017 USD
per Watt DC
Residential PV (5.7 kW)
Commercial PV (200 kW)
Utility-Scale PV, Fixed Tilt (100 MW)
Utility-Scale PV, One-Axis Tracker (100 MW)
$8
$7
$6
$5
$4
$3
$2
$1
$0
7.24
6.34
4.48
3.92
3.44
3.18
2.98
2.80
5.36
4.97
3.42
2.78
2.76
2.27
2.17
1.85
4.57
3.91
2.66
2.04
1.89
1.82
1.45
1.03
5.44
4.59
3.15
2.39
2.15
1.97
1.54
1.11
2010 2011 2012 2013 2014 2015 2016 2017
Soft Costs - Others (PII, Land Acquisition, Sales Tax, Overhead, and Net Profit)
Soft Costs - Install Labor
Hardware BOS - Structural and Electrical Components
Inverter
Module

Source: NREL

Cost Breakdown

- 7 kW X $3 per watt installed **= $21,000**
  - No Sales Tax, No Property Tax Increase on System Cost
- 30% Federal Investment Tax Credit ITC **= $6,300**

$14,700 is the net cost of the 7 kW solar PV system after accounting for your ITC

Simple Payback Analysis

Avoided Electricity - 8,900 kWh per year @ $0.165/kWh

Annual value for net metering = $1,468 per year

$$\frac{\$21{,}000}{\$1{,}468} \Big/ \text{year} = \textbf{14.3 years}$$

$$\frac{\$14{,}700}{\$1{,}468} \Big/ \text{year} = \textbf{10 years}$$

Payback Analysis

- 7 kW system at $2 per watt = $14,000
- ITC of 30% - $4,200 = $9,800
- Accelerated Depreciation of 30% = $3,570 = $6,230

Avoided Electricity - 8,900 kWh per year @ $0.165/kWh

Annual value for net metering = $ 1,468 per year

$$\frac{\$6,230}{\$1,468} \Big/ \text{year} = \textbf{4.2 years}$$

$$\frac{\$6,230}{\$2,358} \Big/ \text{year} = \textbf{2.7 years}$$

Current Industry Community Solar Subscription Standards

FICO score greater than 680

or

Down payment of at least $5,000

&

Commercial Anchor 40% of the System

Facilitating LMI Customer Participation in a Community Solar Project

Incentives that are equal to or greater than

FICO score greater than 680

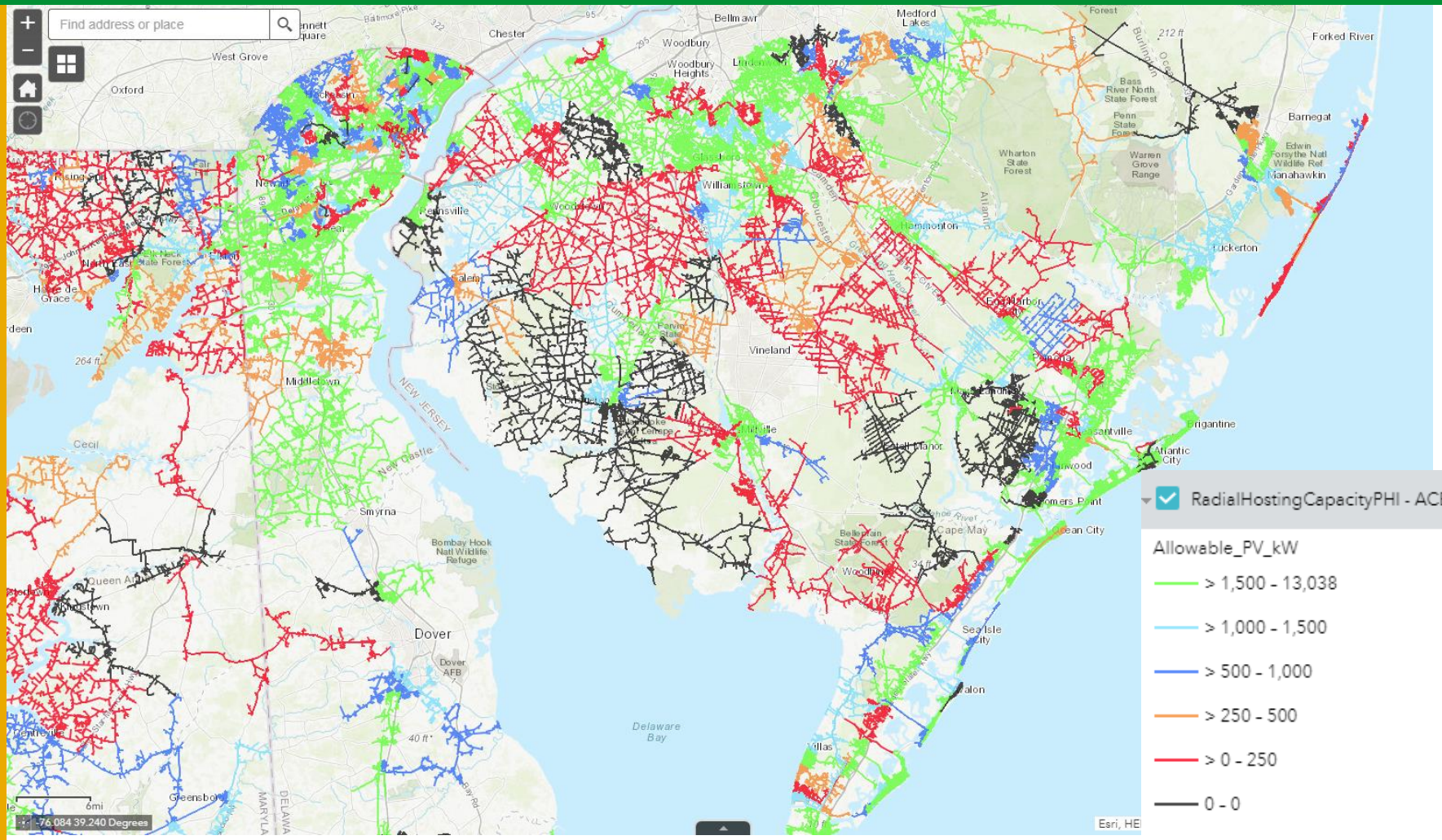
or

Down payment of at least $5,000

&

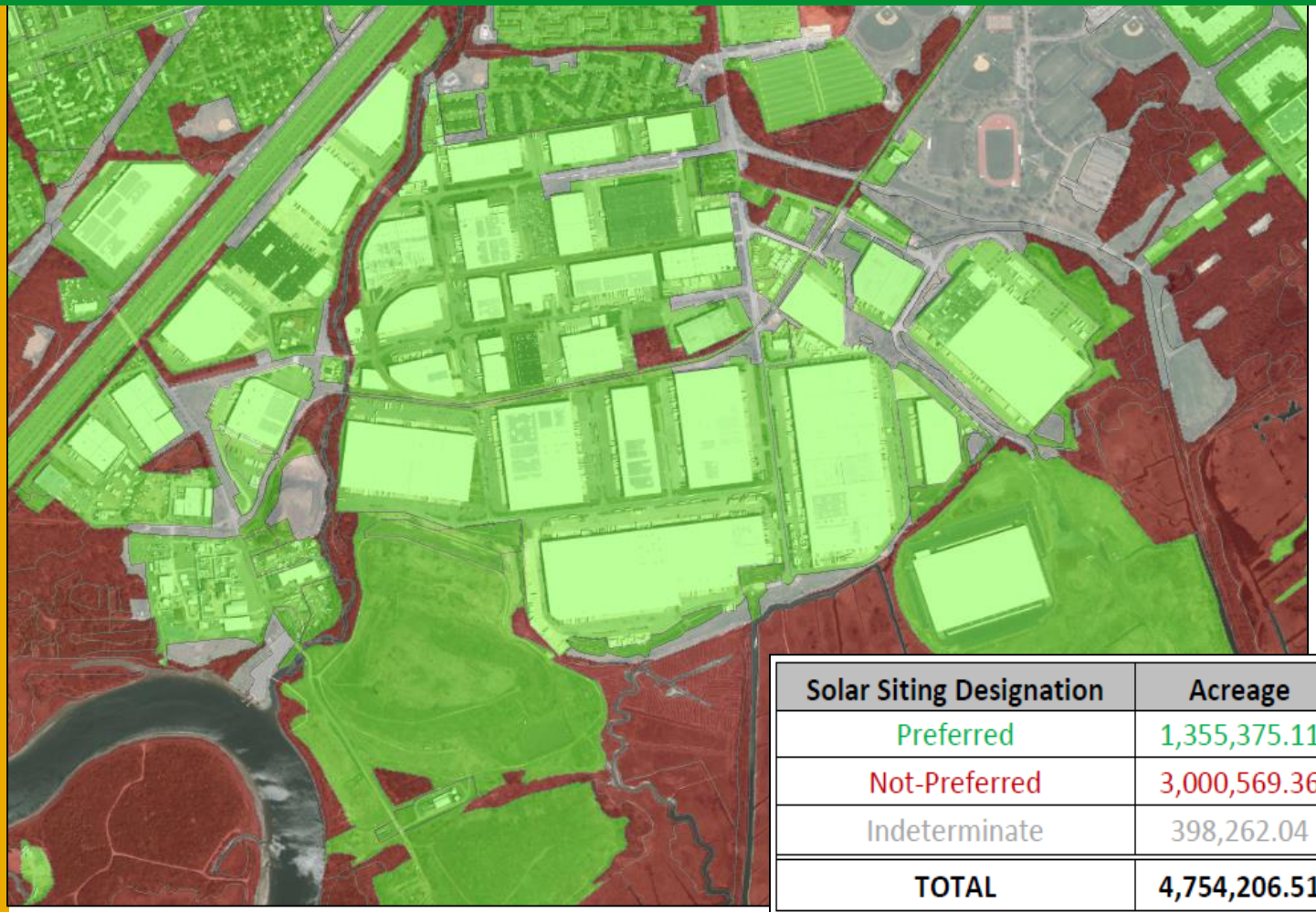
Commercial Anchor 40% of the System

ACE Hosting Capacity



http://pepco.maps.arcgis.com/apps/webappviewer/index.html?id=75725977c664459f84ef31e305490fd4

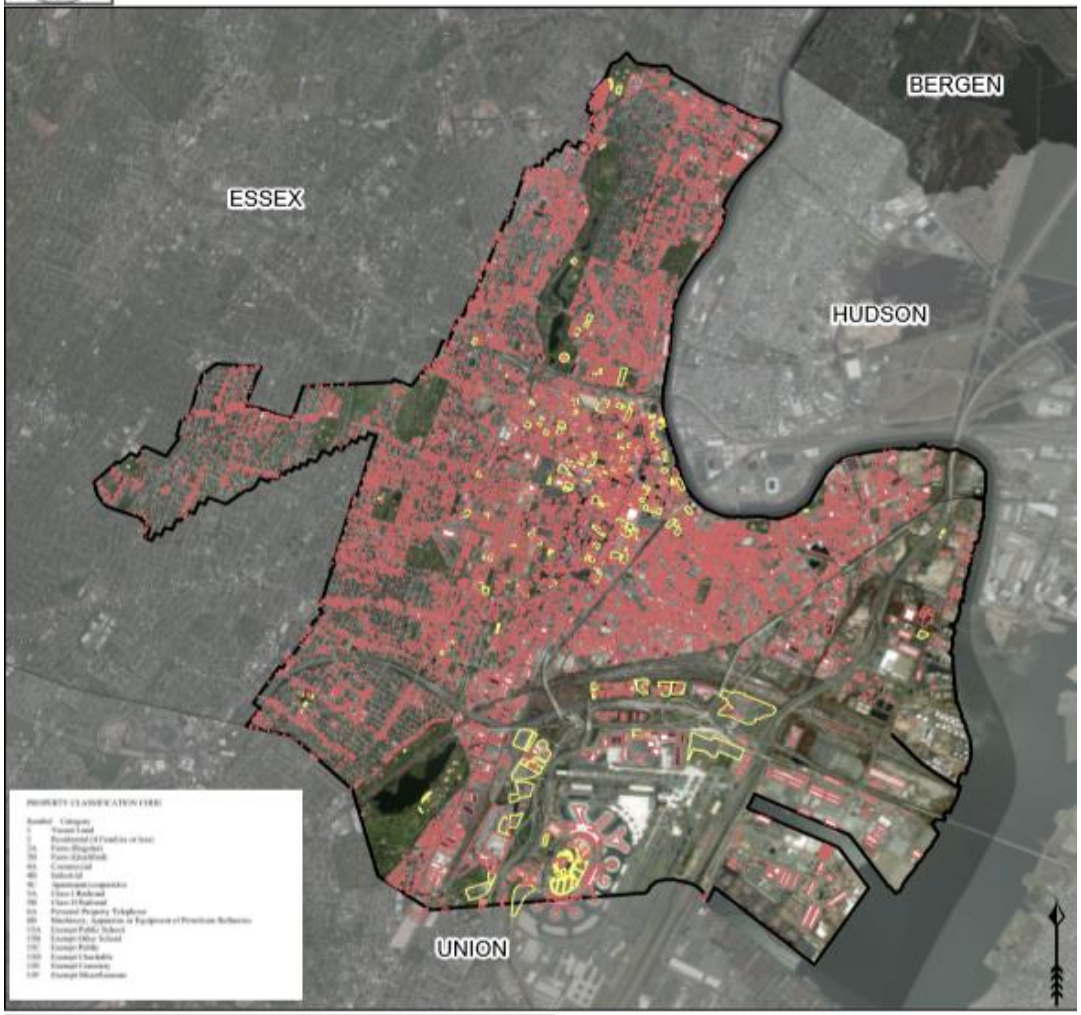
NJDEP Solar Siting Analysis 2017 Update



Solar Siting Designation	Acreage	Sq. Mi	% Total
Preferred	1,355,375.11	2,117.77	29%
Not-Preferred	3,000,569.36	4,688.39	63%
Indeterminate	398,262.04	622.28	8%
TOTAL	**4,754,206.51**	**7,428.44**	**100%**

https://www.state.nj.us/dep/aqes/gis.html

Commercial Parking Areas and Building Footprints
Newark, New Jersey



This static map describes the location and area of commercial parking areas and building footprints that may be useful in the siting of community solar projects in Newark New Jersey. Buildings were selected if they are within parcels classified as vacant, commercial, industrtial, apartments, schools, or public buildings.
Source www.openstreetmap.org

1 Miles

Total Building Count: 12,602
Total Acres:1,800

Total Parking Count: 194
Total Acres:363

Legend

- Buildings
- Parking
- Newark

https://www.state.nj.us/dep/aqes/gis.html

Building Footprints and Parking Areas

Newark, New Jersey

Spatial Statistic Tables

Type	Count	Total Area (acre)	Min. (acre)	Max. (acre)	Mean (acre)
Commercial 4A	5067	617.04	0.004	28.75	0.12
Industrial 4B	1149	537.86	0.002	28.75	0.46
4A & 4B	6093 *	991.91	0.002	28.75	0.16
1, 4A, 4B, 4C, 15	12602	1829.11	0.002	28.75	0.15
Parking	194	363	0.04	45.75	1.87

Table 1. All designated features

Descriptive statistics regarding the area of all available building footprint types other than residential based on parcel classification for Newark, NJ. *Note that some location overlaps during the building type designation occurred. This is due to buildings spanning more than one parcel.

Type	Count	Total Area (acre)	Min. (acre)	Max. (acre)	Mean (acre)
Commercial 4A	83	233.27	1.01	76.19	2.81
Industrial 4B	129	370.47	1.00	76.19	2.87
4A & 4B	171*	447.15	1.00	76.19	2.61
1, 4A, 4B, 4C, 15	295	772.50	1.00	76.19	2.62
Parking	73	304.36	1.02	45.75	4.17

Table 2. Designated features with an area greater than 1 acre

Descriptive statistics regarding the area of all available building footprint types other than residential based on parcel classification for Newark, NJ with an area equal to or greater than 1 acre. *Note that some location overlaps during the building type designation occurred. This is due to buildings spanning more than one parcel.

PROPERTY CLASSIFICATION CODE

Symbol	Category
1	Vacant Land
2	Residential (4 Families or less)
3A	Farm (Regular)
3B	Farm (Qualified)
4A	Commercial
4B	Industrial
4C	Apartment/cooperative
5A	Class I Railroad
5B	Class II Railroad
6A	Personal Property Telephone
6B	Machinery, Apparatus or Equipment of Petroleum Refineries
15A	Exempt Public School
15B	Exempt Other School
15C	Exempt Public
15D	Exempt Charitable
15E	Exempt Cemetery
15F	Exempt Miscellaneous

https://www.state.nj.us/dep/aqes/gis.html

DEP GIS Links

- BES GIS Webpage: https://www.state.nj.us/dep/aqes/gis.html
- BES GIS Data Downloads: https://www.state.nj.us/dep/aqes/gisdownloads.html
- NJDEP Open Data: https://gisdatanjdep.opendata.arcgis.com/

FOR MORE INFORMATION

Visit: NJCleanEnergy.com

Contact: communitysolar@njcleanenergy.com

Stay Informed: Sign up for community solar updates by emailing webmaster@njcleanenergy.com

@NJCleanEnergy

Sustainable Jersey Municipal Sponsors

Program Underwriters

The Geraldine R. Dodge Foundation — Imagine a Better New Jersey

New Jersey's Clean Energy Program — njcleanenergy.com

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GoodEnergy — A Smarter Way to Buy Energy

Jersey Central Power & Light — A FirstEnergy Company

Ørsted

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IMAGINE A BETTER NEW JERSEY

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Banking in *your* best interest.

Bronze

BioShine

Maschio's Food Services, Inc.

gabel associates

Schneider Electric

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A better Tomorrow, One Community at a Time

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1PM-2PM
Registration online

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Ron Reisman, Solar Ombudsman, Sustainable CUNY

- ACCESSolar: Community Solar Gardens at NYCHA
- NYC Solar Partnership

Upcoming Webinars

Moving Up to Silver Certification **January 30, 2019 - 1:00 pm to 2:00 pm**	**Making a Game Plan for Getting Certified** **February 20, 2019 - 1:00 pm to 2:00 pm**
Stay In the Game! Strategize Your Recertification **February 13, 2019 - 1:00 pm to 2:00 pm** **February 13, 2019 - 7:00 pm to 8:00 pm**	**Green Team 2.0: Building Your Capacity & Promoting Your Team** **March 06, 2019 - 1:00 pm to 2:00 pm** **March 06, 2019 - 7:00 pm to 8:00 pm**

Grants Available

Roots for Rivers Reforestation Grant & Technical Assistance

School Districts and Municipalities

- Technical assistance to design restoration projects
- Funding for: trees/shrubs, tree protection tubes, and stakes
- Project costs from $1,000-$20,000

Application Deadline:
Friday, December 14, 2018

The Nature Conservancy
New Jersey

PSEG Funding Cycle

PSEG Municipal Grants

- Four (4) $20,000 grants
- Eight (8) $10,000 grants
- Twenty (20) $2,000 grants

Application Deadline:
Friday, February 15, 2019

PSEG School Grants

- Four (4) $10,000 grants
- Thirty (30) $2,000 grants

Application Deadline:
Friday, March 15, 2019

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A Better Tomorrow, One Community at a Time

FOR MORE INFORMATION

Visit: NJCleanEnergy.com

Contact: communitysolar@njcleanenergy.com

Stay Informed: Sign up for community solar updates by emailing webmaster@njcleanenergy.com

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