Incorporating Solar Into Multifamily Buildings

June 23, 2022

Agenda

1. Here Comes Solar Technical Assistance
2. Solar Technology and Viability
3. Solar Costs and Savings
4. Procuring a Solar Installer
5. Solar Installation Contracts
6. HPD Solar Where Feasible Process and Specs

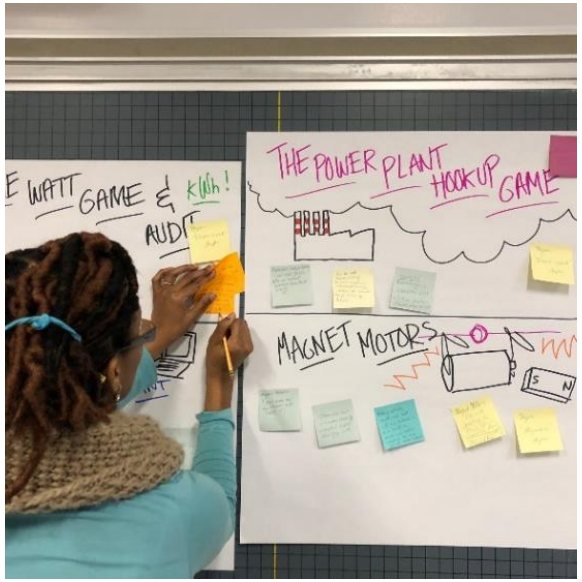
Who Is In The Room?

- GC or Contractor?
- Engineer?
- Other Building Trades?
- Developer?
- Architect/Designer?
- Energy Consultant?
- Financier?

Solar One: Who We Are

Solar One is an NYC environmental education non-profit established in 2004 with the belief that all New Yorkers can help overcome our environmental challenges.

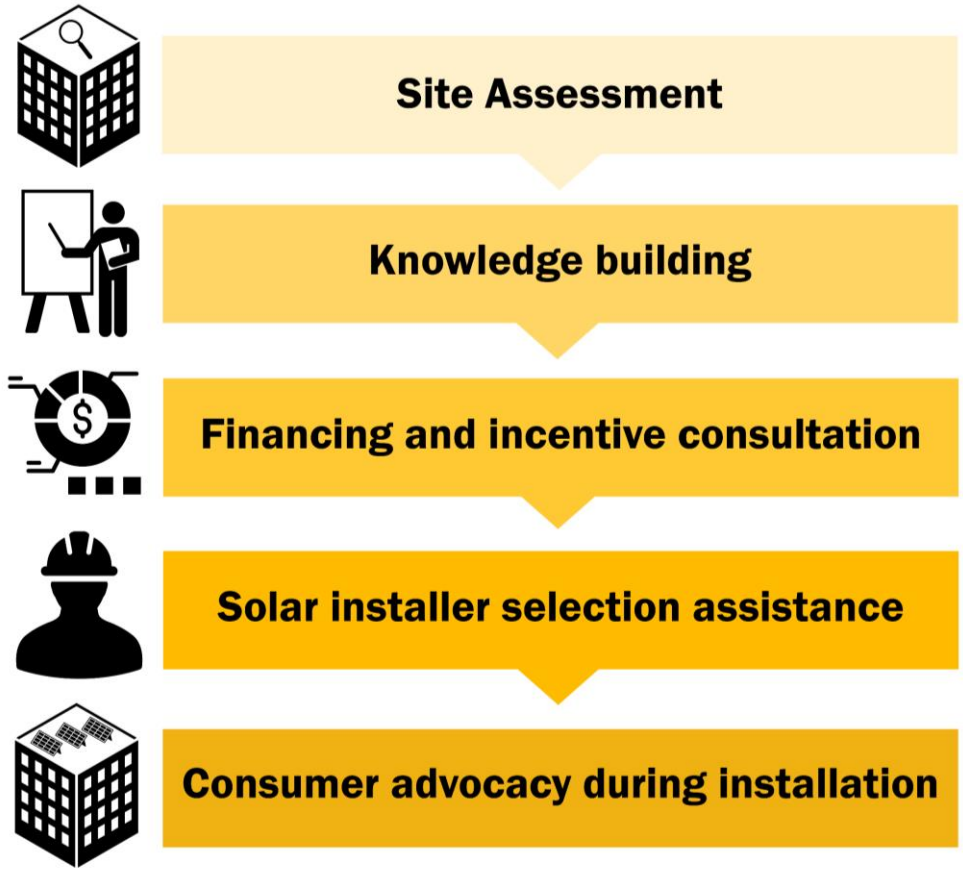
SOLARone
SOLAR1.ORG



HERE COMES SOLAR

A PROJECT OF SOLAR ONE

- Here Comes Solar is an initiative of nonprofit Solar One, with a mission to make solar accessible to historically high-barrier sectors, particularly affordable housing.
- We offer free technical assistance at every step to make solar simple and affordable.



NYSERDA funded a partnership with Solar One + HPD for the **Solar Where Feasible mandate** to provide free services HPD New Construction, Preservation & Asset Management programs

Solar Where Feasible + LL92/94

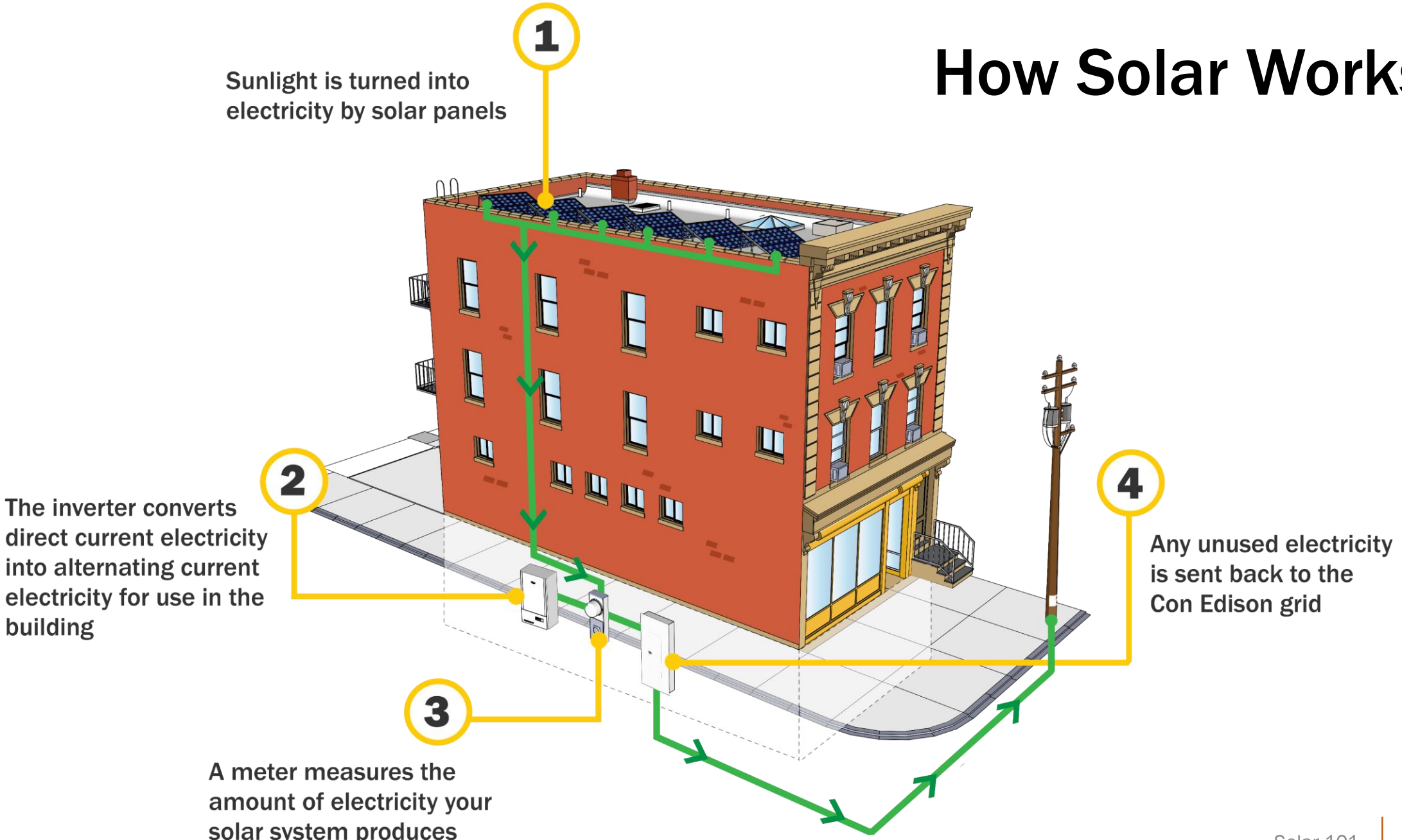
- Local Laws 92 and 94 of the Climate Mobilization Act require either green roofs or solar on all new roofs and new roof assemblies.
- HPD Solar Where Feasible Mandate requires Affordable Housing to go Solar only when it is financially beneficial to the building: with a payback of 10 years or less.
- Starting In November 2024, all new roofs will be subject to LL92/94 regardless of affordable housing status.

Solar Technology

The Basics of Solar Technology

- 25+ year operating life, best on new roofs
- Almost no maintenance for solar arrays and inverters
- Requires direct sunlight, free from shading from buildings and trees
- Grid-connected, shuts off in a blackout

How Solar Works



How To Measure Solar Energy: kW vs. kWh

Kilowatts (kW)

- Solar PV system capacity measured in Watts, or kilowatts, like lightbulbs
- Solar capacity is amount of power system could produce in ideal conditions
- Multifamily solar arrays are typically 15-50 kilowatts

How To Measure Solar Energy: kW vs. kWh

Kilowatt-hours (kWh)

- Energy produced by solar systems over time
- One kilowatt hour of solar energy offsets the need to buy one kilowatt hour from the utility

Three Types of Solar Installations in NYC

Ballasted

- Low profile
- Limited roof penetrations
- Least expensive, best on low buildings

Mechanically Attached

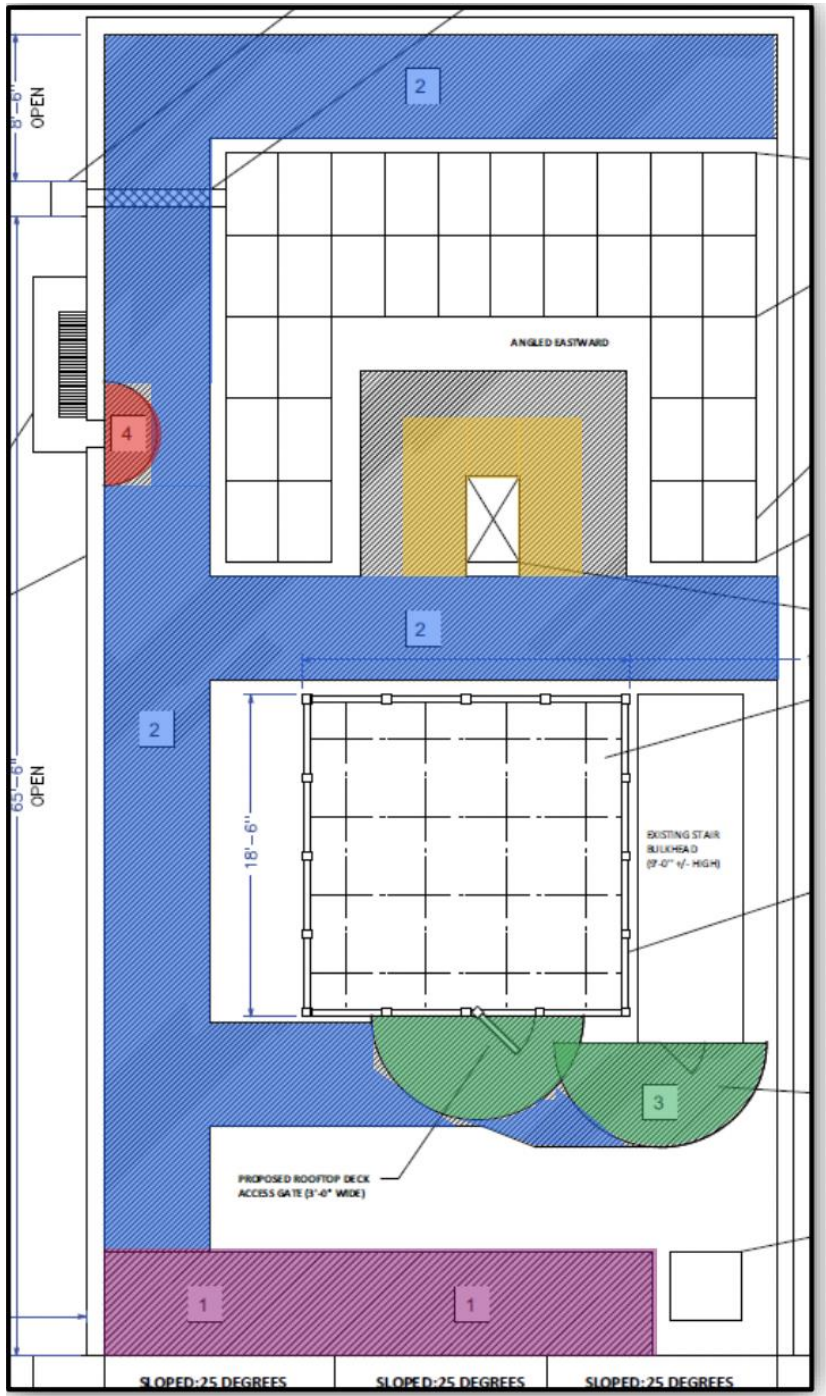
- More solar production
- No inter-row spacing
- Best for space-constrained roofs

Canopy

- Raised at least 9’ above roof
- Can cover entire roof area
- Most expensive, but has co-benefits

FDNY Clear Path Requirements

- Street-facing sides must have 6-ft clear path
- 6-ft clear path must run side to side and front to back
- All access points (bulkhead door, fire escapes, skylights, etc.) must connect to the clear path



- Clear Path
- Fire Escape
- Door Clearance
- Skylight Clearance
- Perimeter Access

Image Source: FDNY

NYC Zoning for Solar: Zone Green

Article II, Chapter 3: Permitted Obstructions

(m) Solar energy systems:

(1) on the roof of a *building*, up to four feet in height, as measured from the maximum height limit, or the finished level of the roof, whichever is higher;

(2) on the roof of a *building*, greater than four feet in height, as measured from the maximum height limit, or the finished level of the roof, whichever is higher, provided that all such portions above four feet are set back at least six feet from a *street wall*, limited to a *lot coverage* not greater than 25 percent of the *lot coverage* of the roof and do not exceed:

(i) in R1 through R5 Districts, a height of six feet;

(ii) in R6 through R10 Districts, a height of 15 feet; and

(iii) when located on a bulkhead or other obstruction pursuant to paragraph (g) of this Section, a height of six feet;

(3) on walls existing on April 30, 2012, projecting no more than 10 inches and occupying no more than 20 percent of the surface area of the *building* wall (as viewed in elevation) from which it projects.

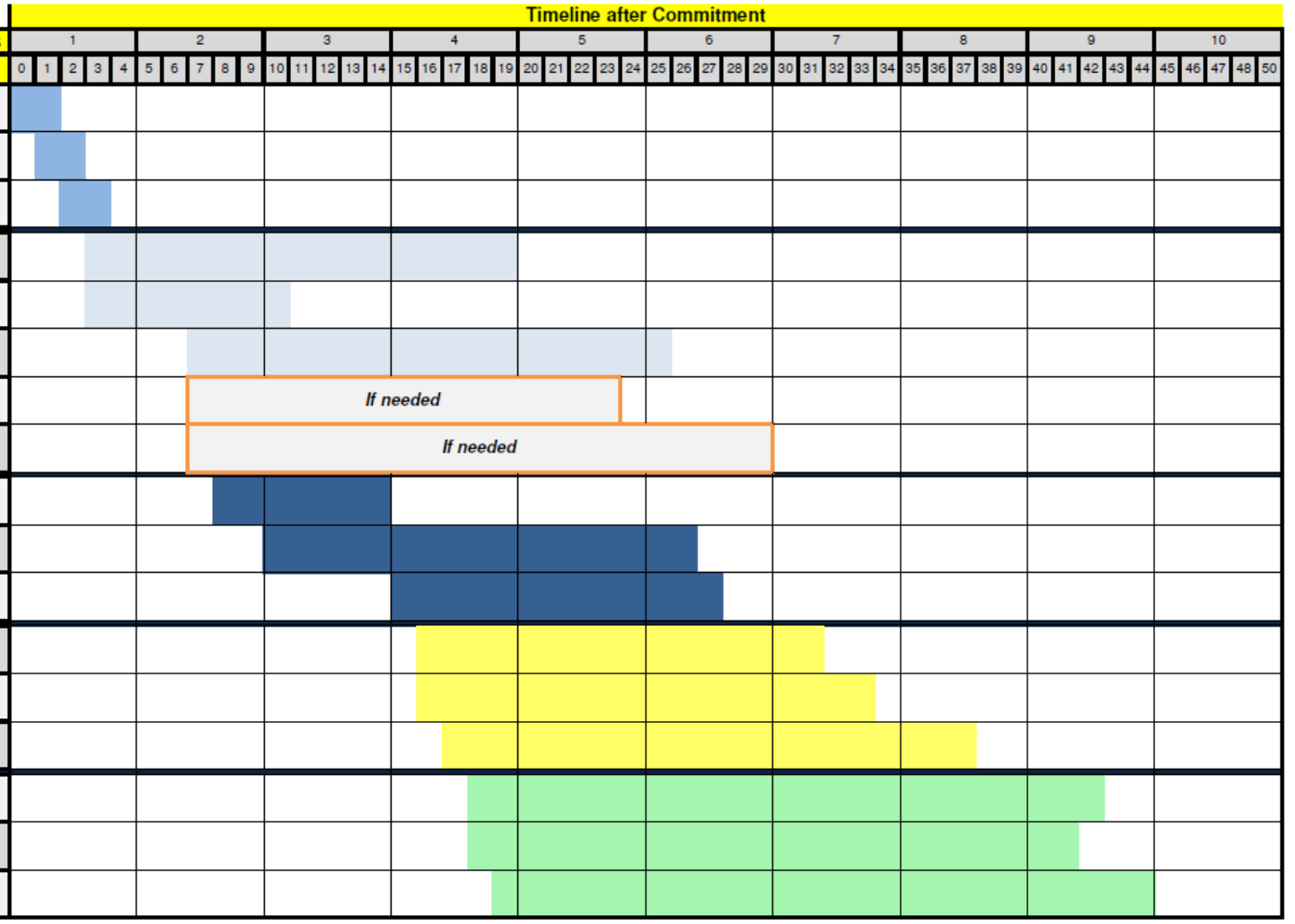
- Department of City Planning passed Zone Green Text Amendment to remove zoning impediments to sustainability
- Solar panels are considered permitted obstruction: can penetrate max height limit or sky exposure plane up to 4 ft
- Solar panels can be located anywhere below the parapet, regardless of building height

Coordinating Solar and Roofs

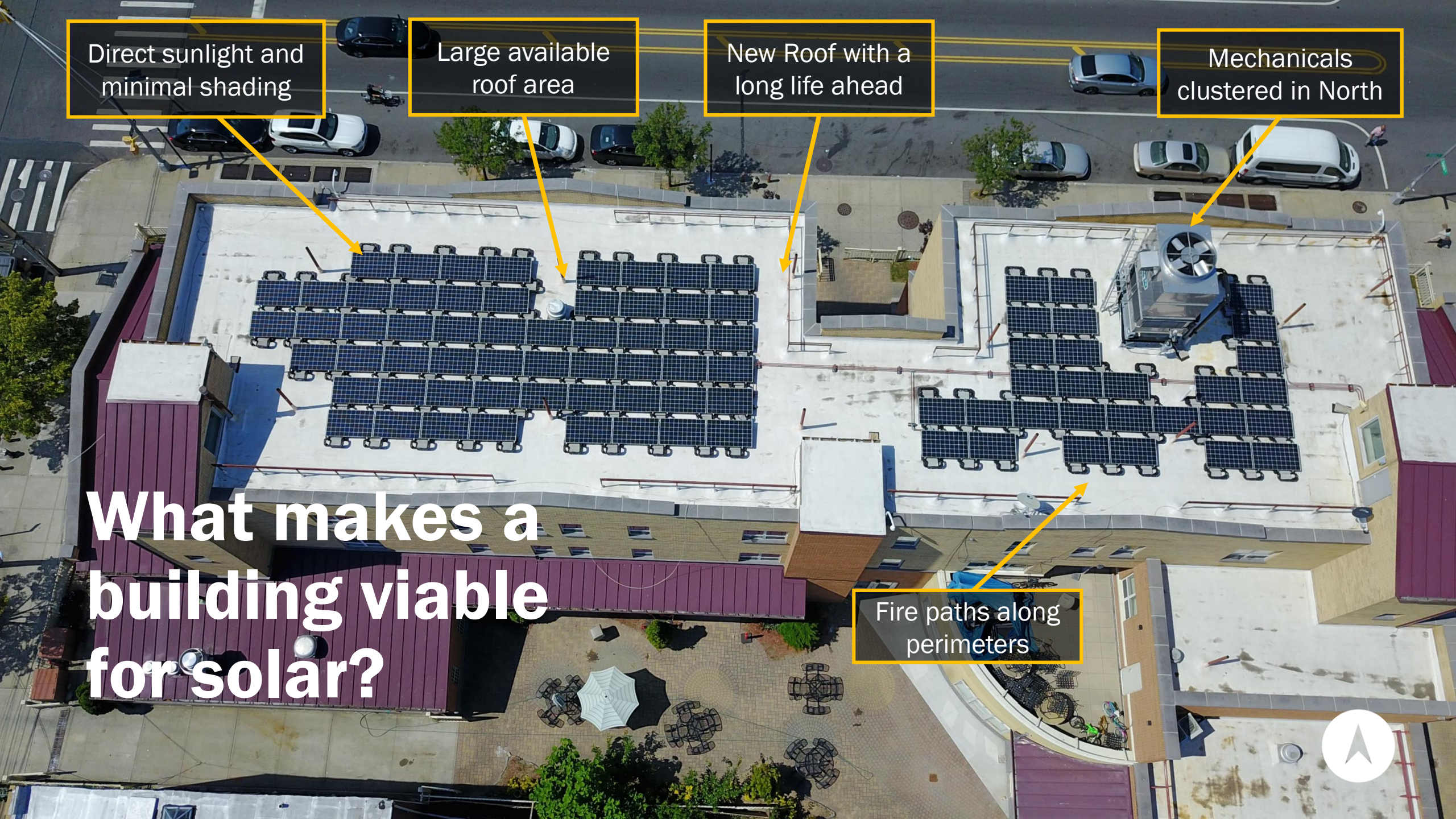
- All Solar Installers will include flashing if necessary after installation
- Solar installers will always coordinate to ensure no roof warranty is voided
- If roof replaced in conjunction with solar, best for solar attachments to be installed before roof membrane placed

The Solar Installation Process

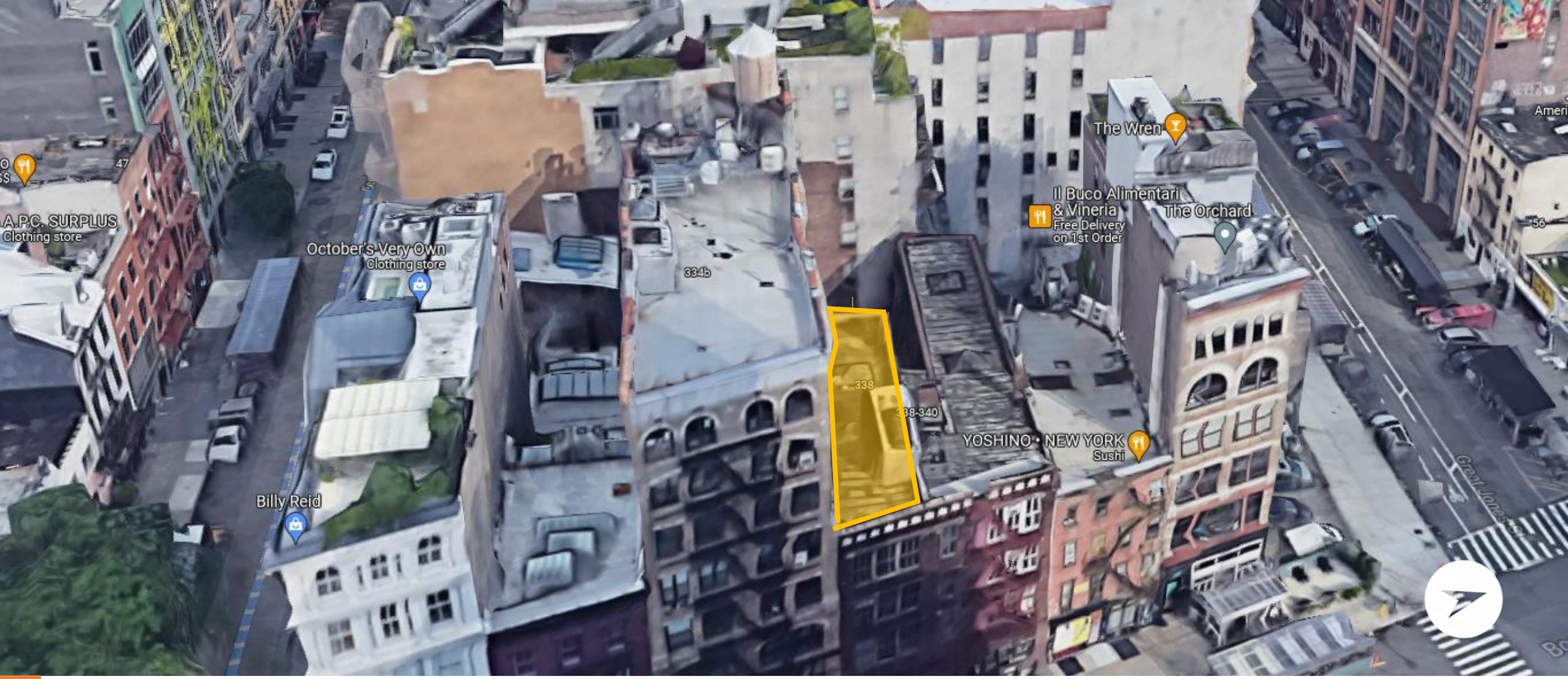
	Activity Name	Activity Start Time	Activity Duration
Contract and Screening	1. Site visit	1-2 weeks after Commitment	1-2 hours
	2. Contract creation & signing	1-2 weeks after site visit completed	1-2 weeks to draft contract
	3. Asbestos test (if needed)	1-2 weeks after executed contract	1 hour
Final Design and Application Submission	4. NYSERDA incentive application submission	1-2 weeks after asbestos test	4-12 weeks
	5. System design and engineering of final planset	1-2 week after asbestos test	4-6 weeks
	6. ConEd interconnection application submission	1-2 weeks after design and plan-set finalized	3-6 weeks
	7. Landmarks Preservation Commission submission (if needed)	1-2 weeks after design and plan-set finalized	2-4 weeks
	8. Fire Department variance submission (if needed)	1-2 weeks after design and plan-set finalized	3-8 weeks
Permit Submission	9. DOB permits submission	1-2 weeks after system design, final planset, LPC FDNY approval	1-3 days
	10. DOB electrical and construction permit approval	1-2 week after permit request filed	6-12 weeks
	11. Electrical permit request	1-2 weeks after DOB permit granted	2-7 days
System Installation	12. Equipment procurement and installation scheduling	1-2 weeks after DOB approval granted	1-4 weeks
	13. System installation	<1 week after equipment delivery	1-2 weeks
	14. Con Ed final interconnection approval and net meter switch	<1 week after installation completed	Commissioning: 1-4 weeks Meter Swap: <1 day
Final Project Inspection and Sign-off	15. Electrical inspection	<1 week after ConEd approval and meter swap	4-6 weeks
	16. DOB construction inspection	<1 week after ConEd approval and meter swap	1-5 weeks
	17. Project sign-off/PTA application submission	<1 week after DOB inspection	2-3 weeks



Solar Viability

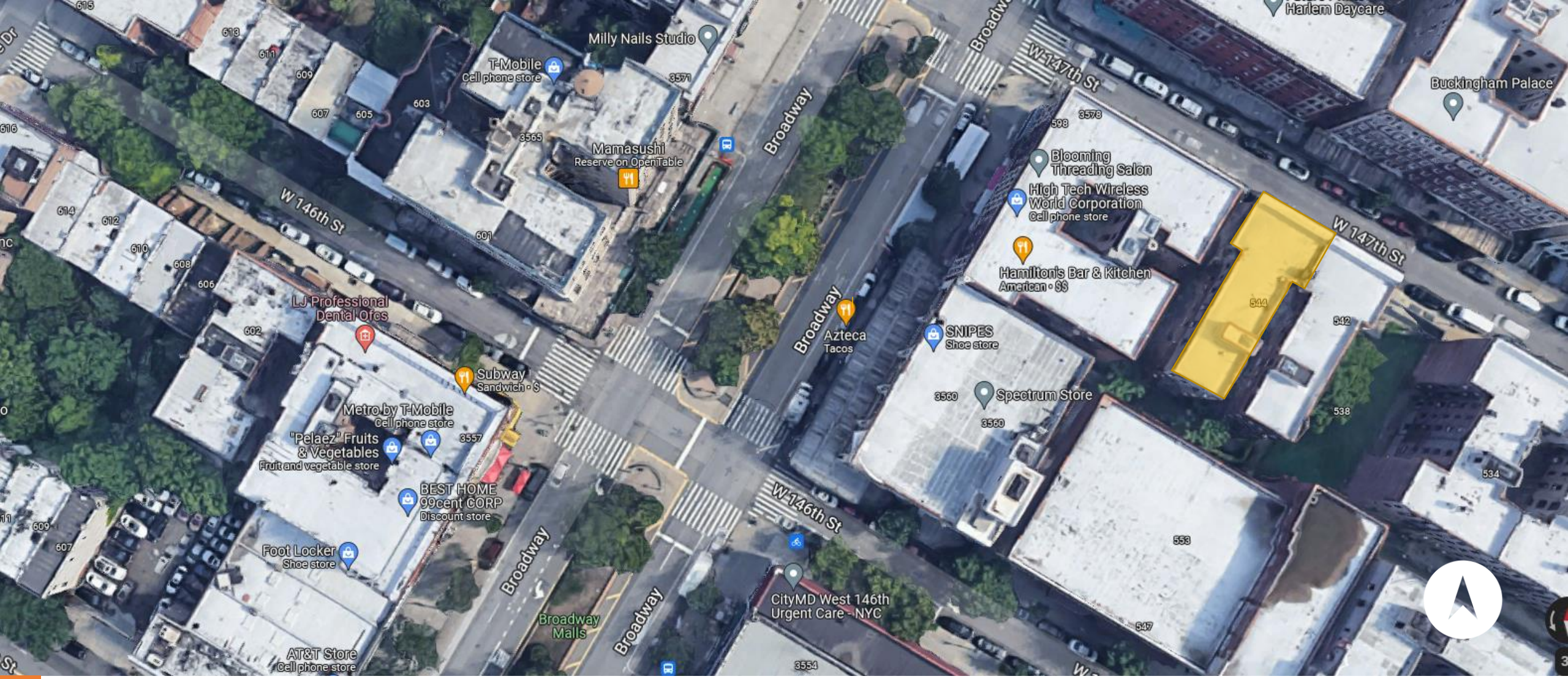


What makes a building viable for solar?

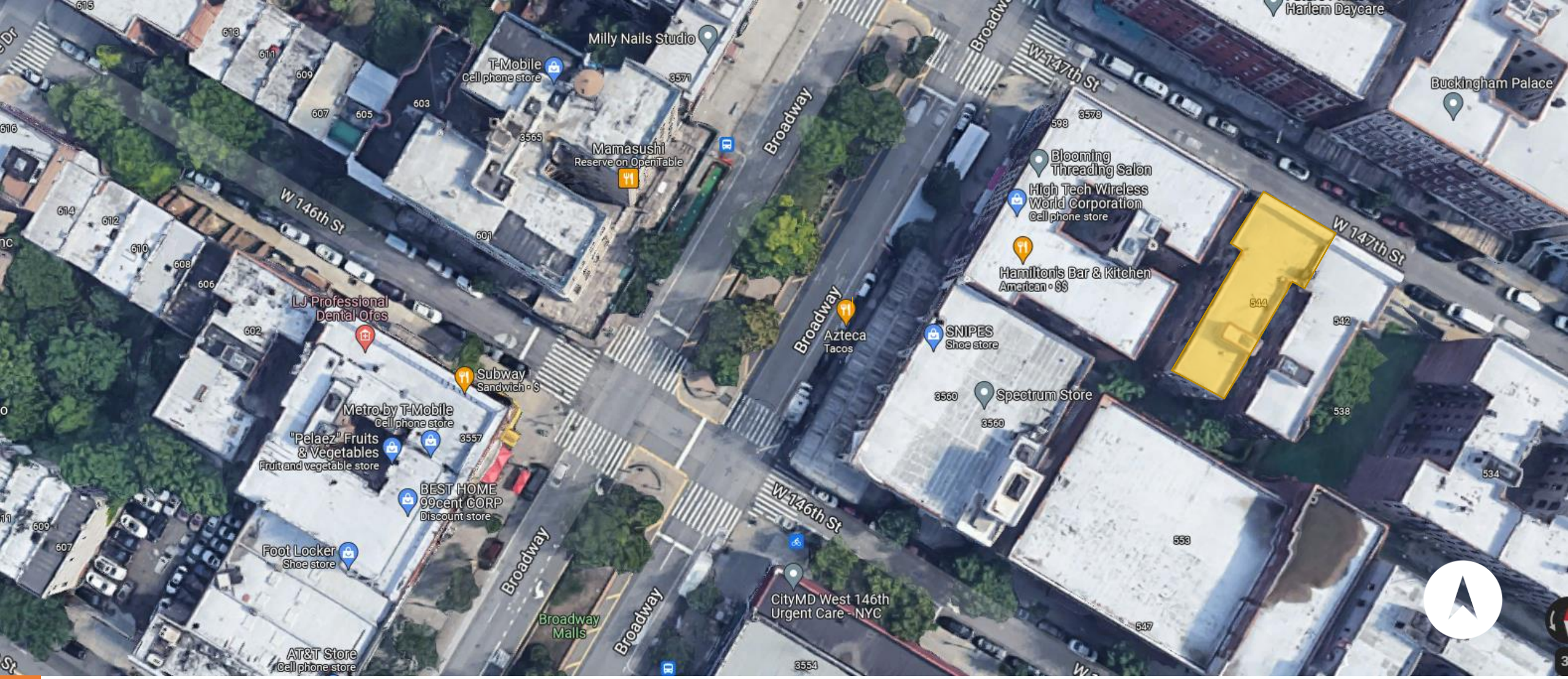


Viability Quiz 1: Is this building viable for solar?

No, it's a small roof shaded by a building to the South



Viability Quiz 2: Is this building viable for solar?



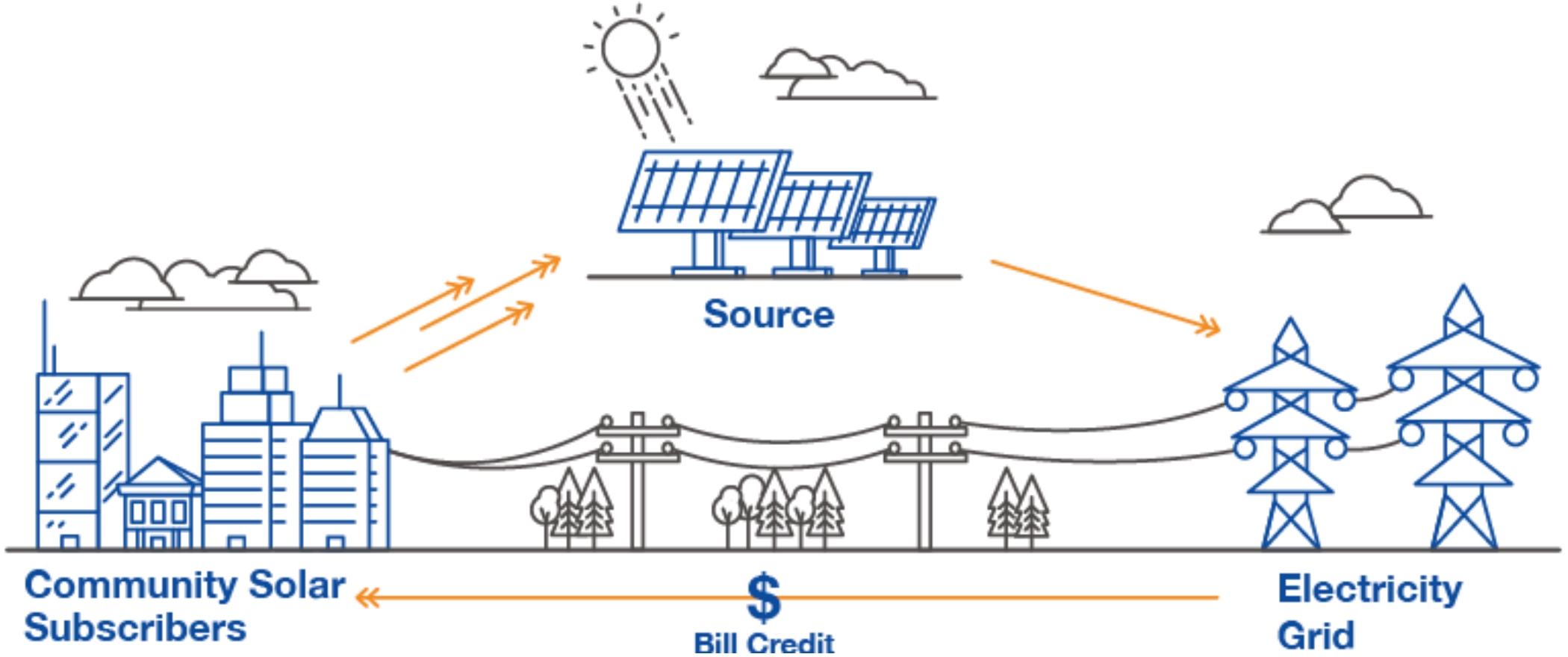
Maybe, roof evaluation required for shading and space for fire paths

Viability Quiz 3: Is this building viable for solar?

Yes! Strong Candidate for Solar with open roof and minimal obstructions

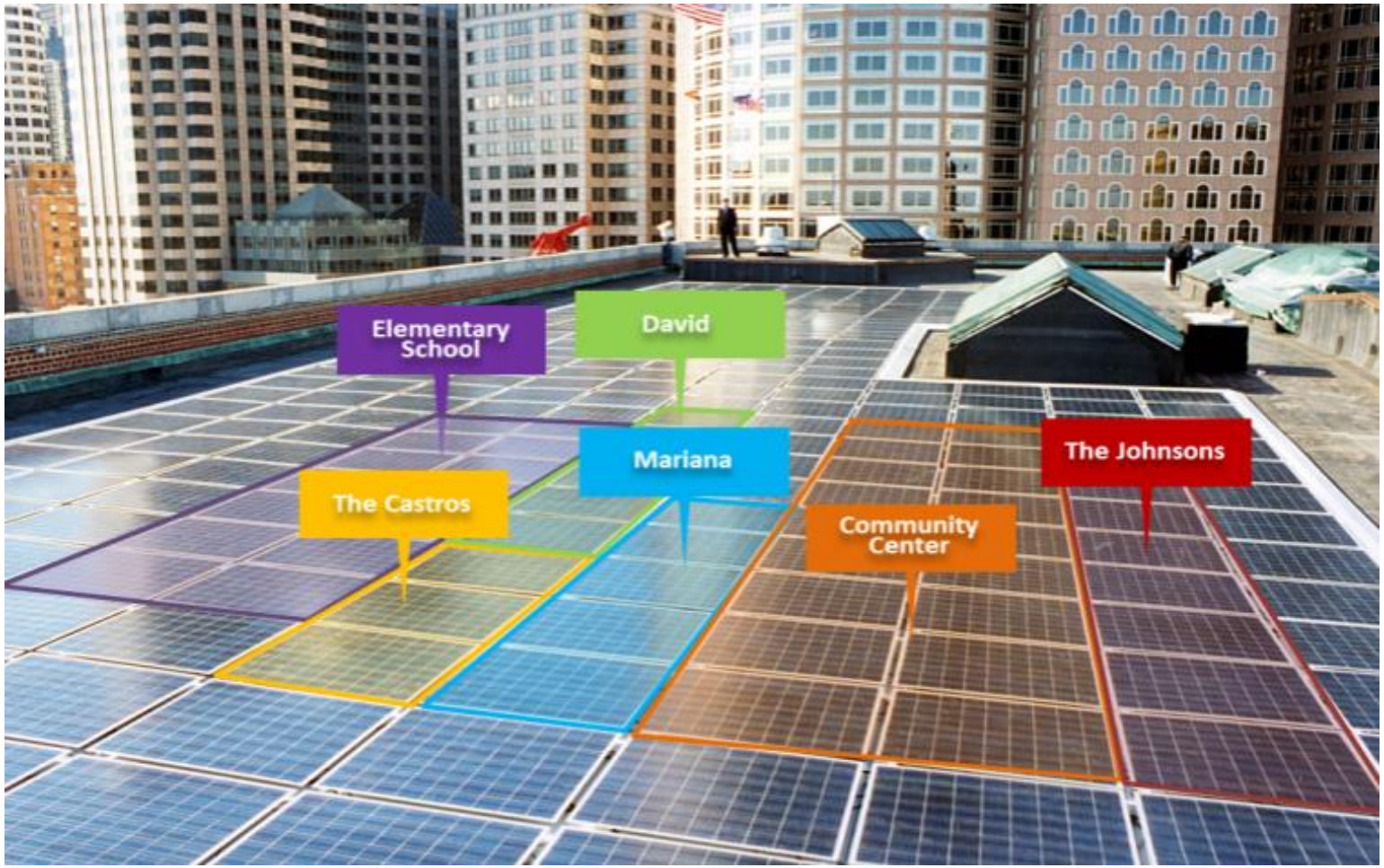
Not Viable? Sign up for Community Solar!

A form of solar energy that allows individual households to share one large solar energy system and reduce their energy bill through solar credits.



Not Viable? Sign up for Community Solar!

- Subscribe to local installation and save up to 10% on your electricity bill
- Free to sign up
- 12 month term
- Auto-renewal
- Moves with you if you move within NYC
- No cancellation fee
- Learn more by emailing affordable@solar1.org




Questions?

Solar Costs and Savings

What is included in the cost of going solar?

- Contract and Screening
  - Site Visit
  - Contract Creation & Signing
- Final Design and Application Submission
  - System Design, Structural Analysis & Engineering
  - ConEd, NYSERDA, FDNY, LPC submissions
- Permit Submission
  - NYC DOB and Electrical Permit submissions
  - Construction and Electrical Permit Approvals
- System Installation
  - Equipment Procurement
  - Installation & ConEd Interconnection Approval
- Final Project Inspection and Sign-Off

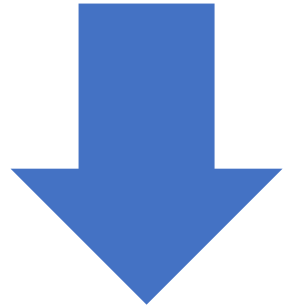
Variables That Impact the Cost of Solar

$/Watt price increases when…

- Smaller system
- Taller buildings (>7 stories)
- Prevailing Wage
- Mechanically integrated system or canopy

$/Watt price decreases when…

- Larger system
- Ballasted installation
- Competitive and bulk procurement
- Solar-ready design



Cost of Solar Projects

Sample System Costs				
System Size	**Mounting Method**	**$/Watt**	**Turnkey Price**	**Annual Savings**
8 kW	Mechanically attached	$5.00	$40,000	$2,000
30 kW	Ballasted	$3.50	$105,000	$8,000
40 kW	Canopy	$4.50	$116,000	$11,000

Note that if GC subcontracts Solar Installer, GC will include a markup

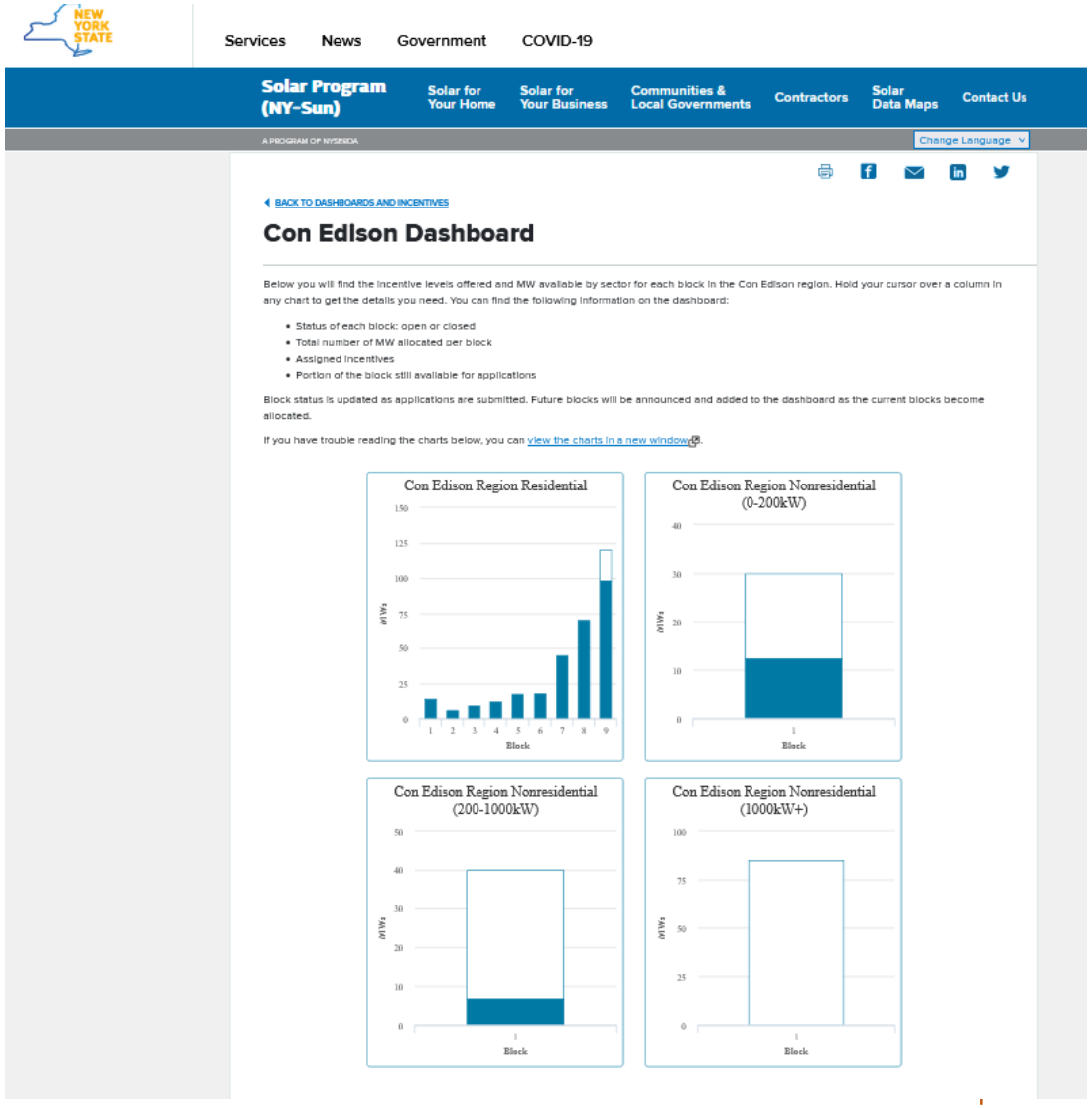
Solar Rebates and Tax Incentives

Building Type	NYSERDA NY-SUN Incentive (paid directly to installer)	Federal Tax Credit* (26% of system cost)	State Tax Credit (25% of system cost)	Accelerated Depreciation (100% Year 1 Bonus Depreciation)	Property Tax Abatement (20% of system cost)
OWNER-OCUPIED COOP/CONDO	$1.60-$2/Watt-DC for affordable housing	Likely distributed to shareholders	Must be distributed to shareholders	Only available to businesses	Only eligible if taxes are owed, not compatible with some other abatements
FOR-PROFIT RENTAL	$1.60-$2/Watt-DC for affordable housing	Commercial Tax Credit can be taken	N/A (homeowners only)	Available, pending owners' income tax liability	Only eligible if taxes are owed, not compatible with some other abatements
NON-PROFIT RENTAL	$1.60-$2/Watt-DC for affordable housing	Tax Credit can only be monetized if project has LIHTC investor	N/A (homeowners only)	No tax liability	No tax liability

**Federal Investment Tax Credit is 26% in 2022, 22% in 2023, 10% in 2024 (pending changes to federal policy)*

NYSERDA'S NY-SUN Rebate

- Typically paid directly to installer upon completion of installed solar system.
  - Could be paid to owner instead in order to increase Federal tax credit
- Brings down up-front cost to the owner
- Covers 30-60% of the total cost of the solar installation
- Installers may front-load milestone payments to compensate
- Incentive levels change over years, contract needs to be signed and interconnection application submitted to lock in incentives



Example Milestone Payments With NY-SUN

Project Phase	% of Owner Payment	Milestone	Milestone Payment	% of Total Project Cost to Installer	Cumulative %
Contract & Screening	**10%**	1. Due upon contract Signing	$4,000	4%	4%
Design	**20%**	2. Due Upon Interconnection Approval	$8,000	8%	12%
Permit Submission	**20%**	3. Due upon DOB Approval	$8,000	8%	20%
Equipment Procurement, Installation, Interconnection approval	**22.5%**	4. Due Upon Delivery of Materials	$9,000	9%	29%
	22.5%	5. Due at Construction Substantially Complete	$9,000	9%	38%
Final Project Inspection, Sign-off	**5%**	6. Due at Final Completion, project operational	$2,000	2%	40%
	100%	**Total paid by Owner**	**$40,000**	**40%**	**40%**
		Total paid by NYSUN when system approved	**$60,000**	**60%**	**60%**

Questions?

Procuring a Solar Installer

Installer Procurement Assistance

Three ways to procure an installer:

A. GC procures an installer

B. Solar One runs an RFP, BLDS or Project Team selects installer

C. GC runs RFP, Solar One consults

Reducing Costs: Bundled RFPs

- Bundling multiple small projects together reduces costs for all buildings involved.
- HPD and Solar One release four quarterly Requests for Proposals for projects nearing loan closing.
- One installer is selected for all projects in the RFP.

Solar One RFP Process

Installer Proposal Evaluation

HERE COMES SOLAR	Installer 1	Installer 2	Installer 3	Installer 4
Pricing				
Fully loaded EPC price ($/W-dc-DC)	$3.00	$3.20	$3.70	$3.50
Upfront Payment Amount (after NY-SUN incentive)	$64,000	$75,240	$116,100	$93,500
Payback Period	4 years	5 years	6 years	7 years
Year 1 savings	$4,032	$3,560	$4,500	$3,404
Lifetime Net Savings	$83,200	$97,812	$150,930	$121,550
Internal Rate of Return	15%	13%	12%	13%
Project Size				
Total W-DC proposed	**32,000**	**34,200**	**43,000**	**37,400**
Solar production factor (> 1,000 kWh/kW-DC but also in line with designs)	1,120.00	1,116.96	1,170	1,070.86
Estimated Annual Energy Production (kWh)	35,840	38,200	50,300	40,050
Experience and references				
Year of 1st installation	2010	2013	2020	2012
Headquarters	New York City, NY	New York City, NY	New York City, NY	New York City, NY
# of projects/kW-DC installed '17-'20	208 projects / 2977 kW-DC	54 projects / 1,176 kW-DC	7 projects/626 kW-DC	3,200 Projects /16,000 kW-DC
Overall operational capacity	7 in-house staff, 4 installation crews.	5 in-house staff. Capacity for very large projects.	4 senior staff, 12 in-house staff	70 member team with marketing, sales, and closeout in house; and electrical work.
Year of 1st installation in NYC	2010	2016	2020	2017
# NYC projects/kW-DC installed '17-'20	108 projects / 2,013 kW	37 projects / 974 kW	7 projects/626 kW-DC	793 Projects /5,600 kW-DC
NYC-specific multifamily installation experience	Strong experience with multifamily solar. Official installer for the Solar Uptown Now and Co-ops Go Solar campaigns. Responsive and good communication.	Commercial focus, New York, New Jersey, Connecticut.	Strong knowledge of multifamily affordable housing and commercial projects.	Experience working on a variety of building types: 1-4 family homes with pitched roofs, multifamily buildings, and commercial buildings. They also have professional knowledge and experience with roofing.
Experience working with City agencies	Significant experience with city agencies. Good track record of moving projects through quickly.	track record of large projects in the area.	Experienced team with significant relevant experience, including LIHTC projects.	Large solar company that has experience working with a number of different building typologies in New York and New Jersey.
Implementation plan quality				

- Notify Solar One of loan closing timeline
- Solar One creates and releases RFP
- Solar One prepares a bid-comparison form
- Hold installer interviews
- Solar One provides developer/owner with recommendations
- Project Team or BLDS selects solar company and notifies borrowers

How to Pick an Installer

Qualifications

- Insurance, Licensure, NYSERDA-Approval
- Corporate Track Record/Longevity
- NYC Project Experience
- Multifamily Affordable Housing Experience
- Operational Capacity
  - Size of team
  - Elements done in-house vs subcontracted

Proposal Quality

- Solar Design
  - Thoughtful use of roof space
- Equipment Quality
  - High production factor at Year 25
- Warranties
  - 25 Year Manufacturer
  - 12 Year Inverter
  - 5+ Year Workmanship
- Implementation Plan
  - Thorough, fits with other work being done
  - Roofing Coordination accounted for

Pricing, Interview, Etc.

- Pricing
  - Compare $/Watt Pricing
- Interview and Communications
- References

Solar Installation Contracts

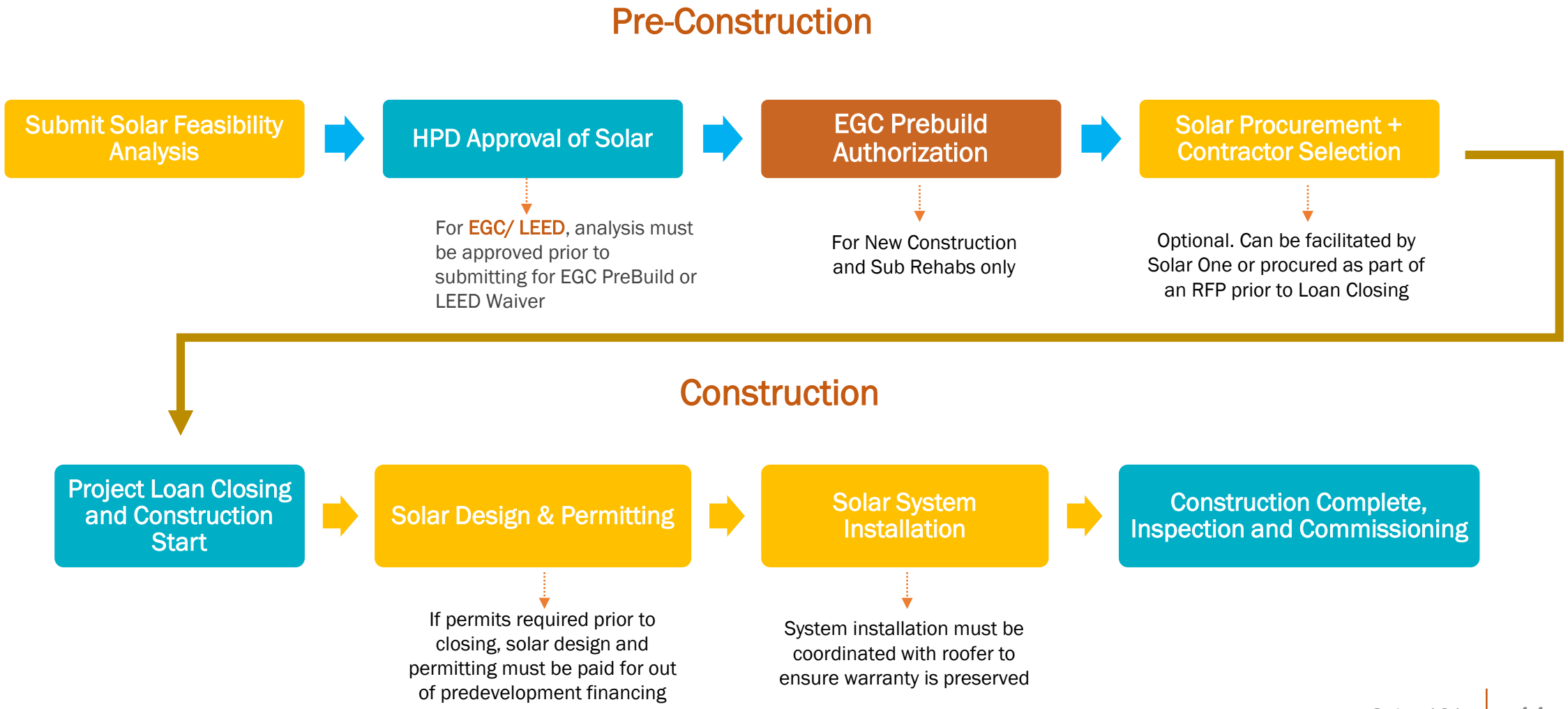
Solar Contracts

Solar contracts, like all construction contracts, can vary. However, at a minimum, all solar contracts should include:

- System size and type of solar panels
- Type of inverters and monitoring system
- Interconnection method (behind the meter or new meter installed)
- Contracted cost (post-NYSERDA rebate) and total amount paid to installer including NYSERDA rebate for reference
- Detailed workmanship warranty
- Commitment to maintain roof warranty (if necessary)

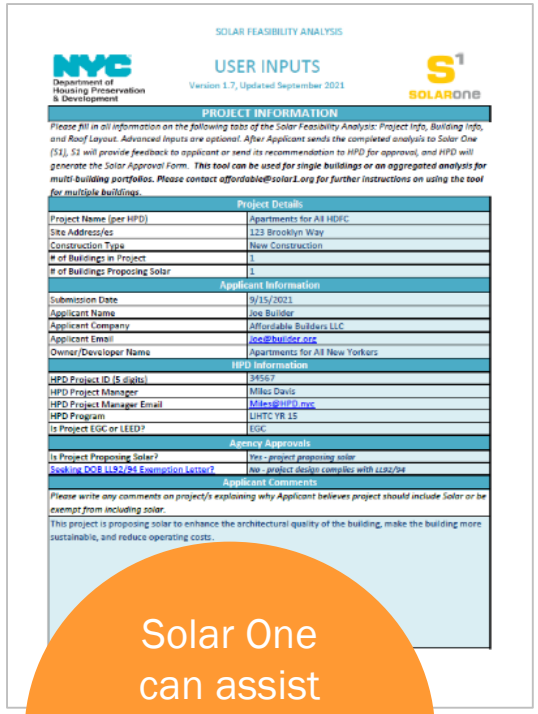
HPD Solar Feasibility Analysis and Solar Approval Process

How Solar Fits Within the HPD Process



The Solar Feasibility Analysis

YOUR INPUTS REQUIRED



SOLAR FEASIBILITY ANALYSIS

NYC Department of Housing Preservation & Development

USER INPUTS

Version 1.7, Updated September 2021

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PROJECT INFORMATION

Please fill in all information on the following tabs of the Solar Feasibility Analysis: Project Info, Building Info, and Roof Layout. Advanced inputs are optional. After Applicant sends the completed analysis to Solar One (S1), S1 will provide feedback to applicant or send its recommendation to HPD for approval, and HPD will generate the Solar Approval Form. ***This tool can be used for single buildings or an aggregated analysis for multi-building portfolios. Please contact affordable@solar1.org for further instructions on using the tool for multiple buildings.***

Project Details	
Project Name (per HPD)	Apartments for All HDFC
Site Address/es	123 Brooklyn Way
Construction Type	New Construction
# of Buildings in Project	1
# of Buildings Proposing Solar	1
Applicant Information	
Submission Date	9/15/2021
Applicant Name	Joe Builder
Applicant Company	Affordable Builders LLC
Applicant Email	Joe@builder.org
Owner/Developer Name	Apartments for All New Yorkers
HPD Information	
HPD Project ID (5 digits)	34567
HPD Project Manager	Miles Davis
HPD Project Manager Email	Miles@HPD.nyc
HPD Program	LIHTC YR 15
Is Project EGC or LEED?	EGC
Agency Approvals	
Is Project Proposing Solar?	*Yes - project proposing solar*
Seeking DOB LL92/94 Exemption Letter?	*No - project design complies with LL92/94*

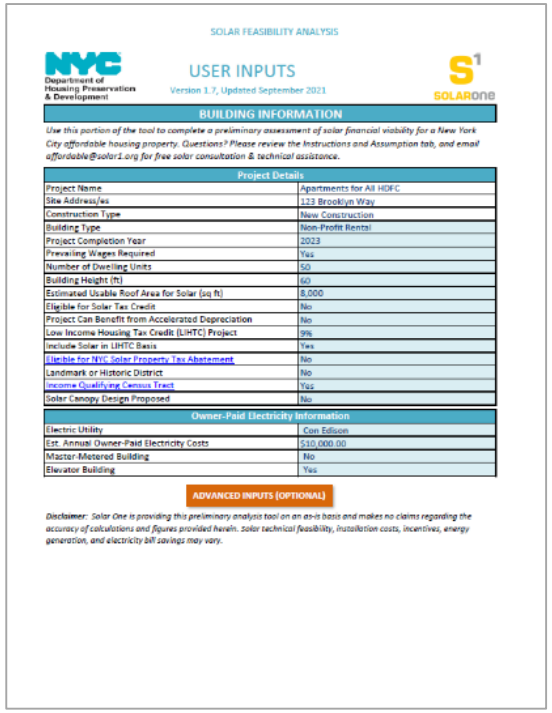
Applicant Comments

Please write any comments on project/s explaining why Applicant believes project should include Solar or be exempt from including solar.

This project is proposing solar to enhance the architectural quality of the building, make the building more sustainable, and reduce operating costs.

Solar One can assist with Solar Feasibility Analysis

YOUR INPUTS REQUIRED



SOLAR FEASIBILITY ANALYSIS

NYC Department of Housing Preservation & Development

USER INPUTS

Version 1.7, Updated September 2021

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BUILDING INFORMATION

Use this portion of the tool to complete a preliminary assessment of solar financial viability for a New York City affordable housing property. Questions? Please review the Instructions and Assumption tab, and email affordable@solar1.org for free solar consultation & technical assistance.

Project Details	
Project Name	Apartments for All HDFC
Site Address/es	123 Brooklyn Way
Construction Type	New Construction
Building Type	Non-Profit Rental
Project Completion Year	2023
Prevailing Wages Required	Yes
Number of Dwelling Units	50
Building Height (ft)	60
Estimated Usable Roof Area for Solar (sq ft)	8,000
Eligible for Solar Tax Credit	No
Project Can Benefit from Accelerated Depreciation	No
Low Income Housing Tax Credit (LIHTC) Project	9%
Include Solar in LIHTC Basis	Yes
Eligible for NYC Solar Property Tax Abatement	No
Landmark or Historic District	No
Income Qualifying Census Tract	Yes
Solar Canopy Design Proposed	No
Owner-Paid Electricity Information	
Electric Utility	Con Edison
Est. Annual Owner-Paid Electricity Costs	$10,000.00
Master-Metered Building	No
Elevator Building	Yes

ADVANCED INPUTS (OPTIONAL)

Disclaimer: Solar One is providing this preliminary analysis tool on an as-is basis and makes no claims regarding the accuracy of calculations and figures provided herein. Solar technical feasibility, installation costs, incentives, energy generation, and electricity bill savings may vary.

YOUR INPUTS REQUIRED

SOLAR FEASIBILITY ANALYSIS

NYC Department of Housing Preservation & Development

ROOF LAYOUT

Version 1.7, Updated September 2021

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SOLAR PV SYSTEM LAYOUT OR USABLE ROOF AREA

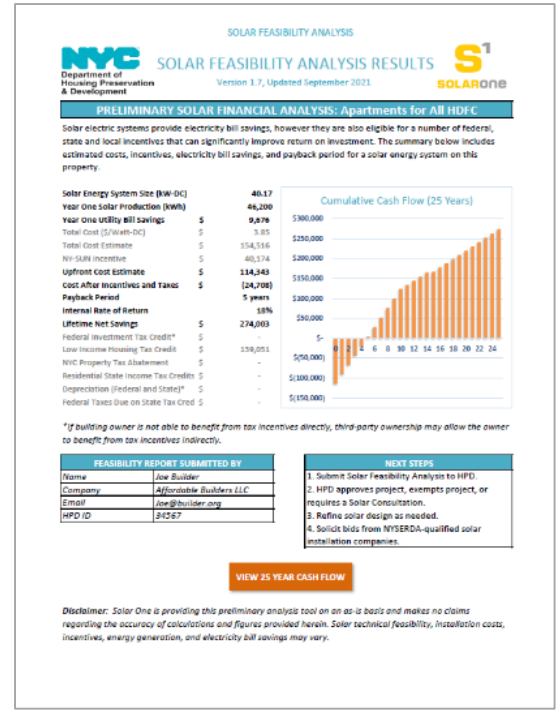
Provide image/s of roof plan with solar layout or usable roof area. Identify key features on image or in comments section below. Images should include any of the following to clarify design features or obstacles:

> Sketch > Building Plans > Drawings
> Screenshot > Rendering > Diagrams

Comments on System Layout or Roof Area

Note unique design features, such as canopies, green roofs, architectural details or other aspects to demonstrate why solar is or is not included in design. Please also note if additional drawings are separately attached.

This low-profile solar will leave plenty of room for residents to enjoy the roof space, it will also leave space for mechanicals.



SOLAR FEASIBILITY ANALYSIS

NYC Department of Housing Preservation & Development

SOLAR FEASIBILITY ANALYSIS RESULTS

Version 1.7, Updated September 2021

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PRELIMINARY SOLAR FINANCIAL ANALYSIS: Apartments for All HDFC

Solar electric systems provide electricity bill savings, however they are also eligible for a number of federal, state and local incentives that can significantly improve return on investment. The summary below includes estimated costs, incentives, electricity bill savings, and payback period for a solar energy system on this property.

Solar Energy System Size (kW-DC)		**40.17**
Year One Solar Production (kWh)		**46,200**
Year One Utility Bill Savings	$	**9,876**
Total Cost ($/Watt-DC)	$	3.85
Total Cost Estimate	$	154,516
NY-SUN Incentive	$	40,174
Upfront Cost Estimate	$	**114,343**
Cost After Incentives and Taxes	$	**(24,708)**
Payback Period		**5 years**
Internal Rate of Return		**18%**
Lifetime Net Savings	$	**274,003**
Federal Investment Tax Credit*	$	-
Low Income Housing Tax Credit	$	159,051
NYC Property Tax Abatement	$	-
Residential State Income Tax Credits	$	-
Depreciation (Federal and State)*	$	-
Federal Taxes Due on State Tax Cred	$	-

Cumulative Cash Flow (25 Years)

**If building owner is not able to benefit from tax incentives directly, third-party ownership may allow the owner to benefit from tax incentives indirectly.*

FEASIBILITY REPORT SUBMITTED BY	
Name	Joe Builder
Company	Affordable Builders LLC
Email	Joe@builder.org
HPD ID	34567

NEXT STEPS

1. Submit Solar Feasibility Analysis to HPD.
2. HPD approves project, exempts project, or requires a Solar Consultation.
3. Refine solar design as needed.
4. Solicit bids from NYSERDA-qualified solar installation companies.

VIEW 25 YEAR CASH FLOW

Disclaimer: Solar One is providing this preliminary analysis tool on an as-is basis and makes no claims regarding the accuracy of calculations and figures provided herein. Solar technical feasibility, installation costs, incentives, energy generation, and electricity bill savings may vary.

The Solar Feasibility Analysis

SOLAR FEASIBILITY ANALYSIS

NYC Department of Housing Preservation & Development

SOLAR FEASIBILITY ANALYSIS RESULTS

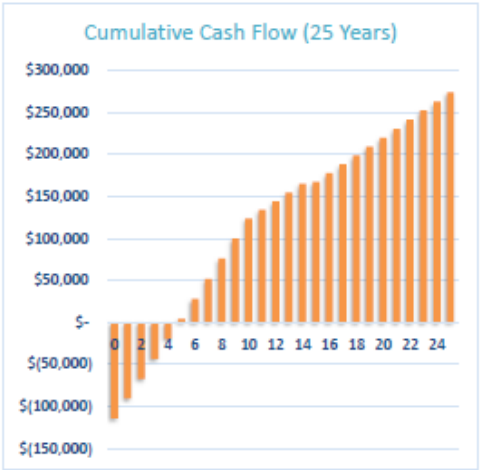
Version 1.7, Updated September 2021

S1 SOLARone

PRELIMINARY SOLAR FINANCIAL ANALYSIS: Apartments for All HDFC

Solar electric systems provide electricity bill savings, however they are also eligible for a number of federal, state and local incentives that can significantly improve return on investment. The summary below includes estimated costs, incentives, electricity bill savings, and payback period for a solar energy system on this property.

Solar Energy System Size (kW-DC)		**40.17**
Year One Solar Production (kWh)		**46,200**
Year One Utility Bill Savings	**$**	**9,676**
Total Cost ($/Watt-DC)	$	3.85
Total Cost Estimate	$	154,516
NY-SUN Incentive	$	40,174
Upfront Cost Estimate	**$**	**114,343**
Cost After Incentives and Taxes	**$**	**(24,708)**
Payback Period		**5 years**
Internal Rate of Return		**18%**
Lifetime Net Savings	**$**	**274,003**
Federal Investment Tax Credit*	$	-
Low Income Housing Tax Credit	$	139,051
NYC Property Tax Abatement	$	-
Residential State Income Tax Credits	$	-
Depreciation (Federal and State)*	$	-
Federal Taxes Due on State Tax Cred	$	-



**If building owner is not able to benefit from tax incentives directly, third-party ownership may allow the owner to benefit from tax incentives indirectly.*

FEASIBILITY REPORT SUBMITTED BY	
Name	*Joe Builder*
Company	*Affordable Builders LLC*
Email	*Joe@builder.org*
HPD ID	*34567*

NEXT STEPS

1. Submit Solar Feasibility Analysis to HPD.
2. HPD approves project, exempts project, or requires a Solar Consultation.
3. Refine solar design as needed.
4. Solicit bids from NYSERDA-qualified solar installation companies.

VIEW 25 YEAR CASH FLOW

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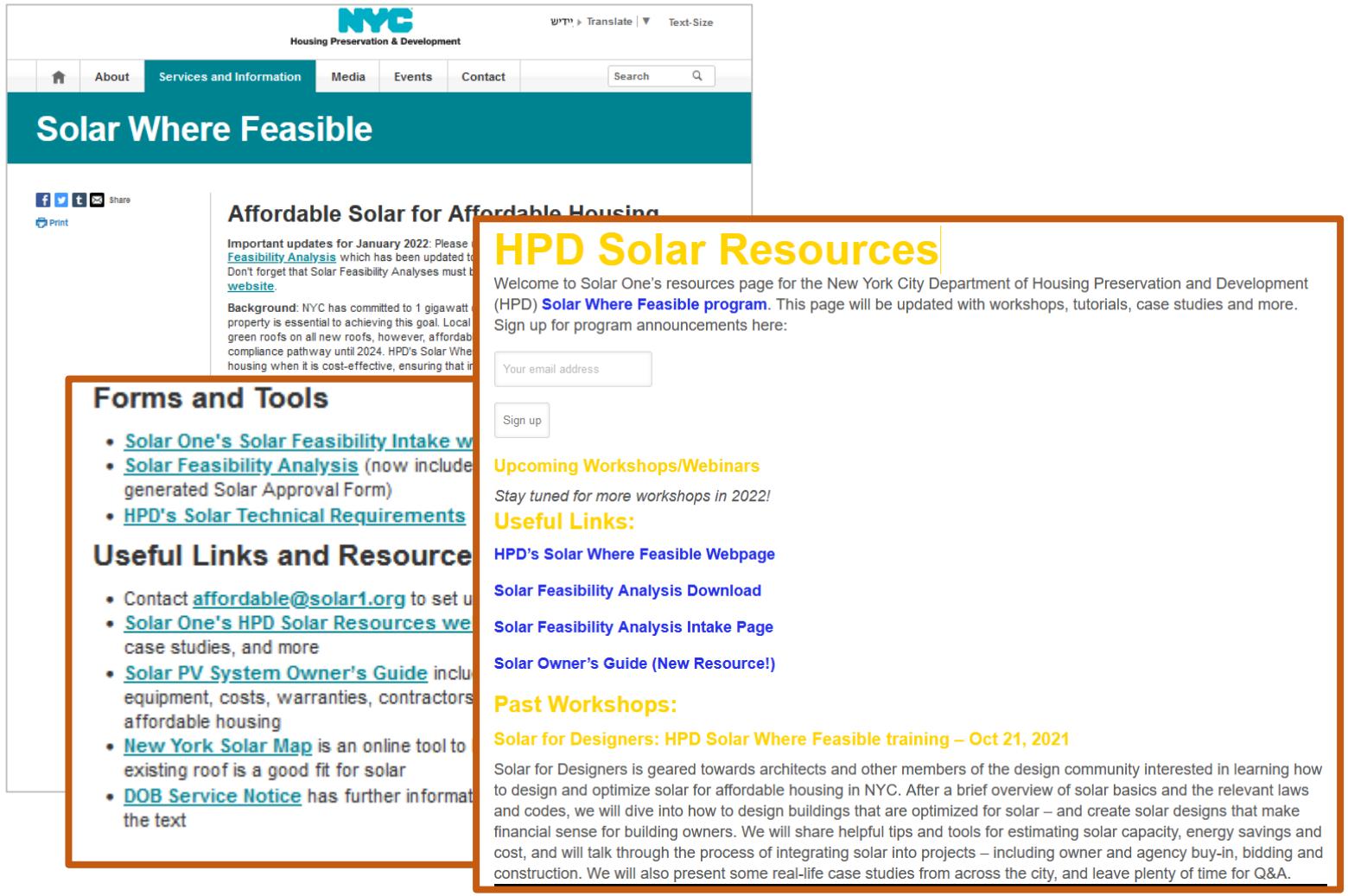
HPD Approval: Rubric for Solar Review

PROJECT WITH < 10-YEAR PAYBACK		OUTCOMES
All Projects	Required	HPD will require solar in scope
PROJECT WITH 10-15 YEAR PAYBACK		
LL 92-94 Compliant	Recommend	HPD will work with borrower to determine if solar can be accommodated – based on overall project budget, owner interest, subsidy impact, etc. If solar is not included in the budget, HPD recommends making the building "solar ready" to facilitate future solar installation.
Has Co-Benefits (e.g. covered deck, community solar)	Recommend	
Has minimal subsidy impact	Recommend	
Includes more than one of the above	Strongly Recommend	
PROJECTS WITH > 15-YEAR PAYBACK		
LL 92-94 Compliant	Not recommended/Consider redesign	HPD will not recommend solar and exclude it from project. If borrower is very interested, they may revise and resubmit to reduce cost.
Has Co-Benefits (e.g. covered deck, community solar)	Not recommended/ Consider redesign	
Has minimal subsidy impact	Not recommended/ Consider redesign	
Includes more than one of the above	Recommend as noted	
PROJECTS SEEKING DOB EXEMPTION LETTER		
Can't accommodate 4kW system	Exemption Approved	HPD signs a DOB Exemption letter if needed. If solar looks feasible, HPD may recommend a free consultation and redesign.
Financially Infeasible (can't meet 10-year payback)	Approve Exemption or Recommend re-design	

Solar Resources for HPD Projects

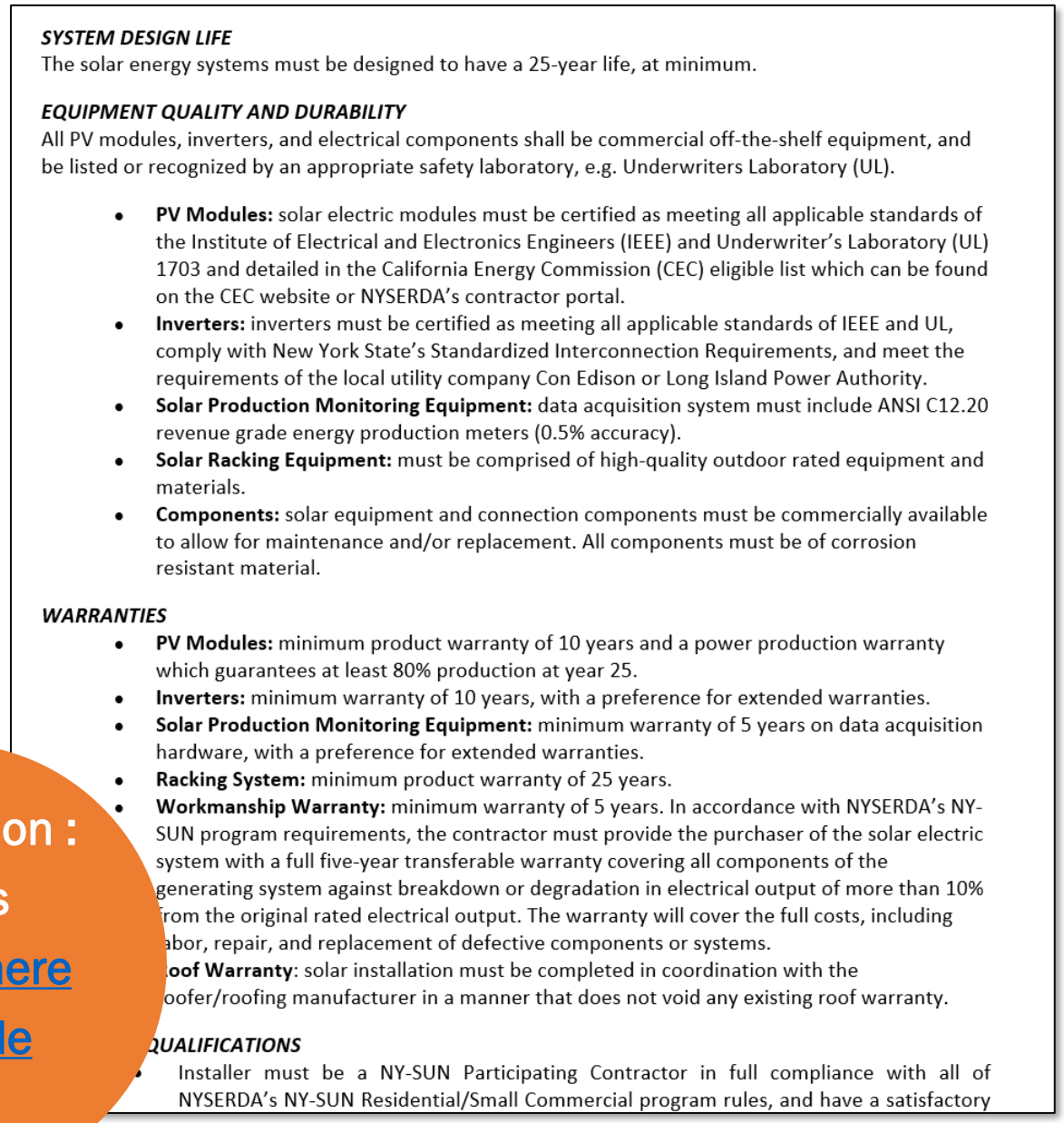
Visit the HPD Solar Where Feasible Page and the Here Comes Solar Resource Page for:

- **Trainings** like *How to Ace your Solar Feasibility Analysis,* and *Solar for Designers*
- **Links** to the Solar Feasibility Analysis and the Intake Portal
- Solar PV System Owner's Guide



HPD Solar Requirements

- Use a NYSERDA NY-SUN Participating Contractor
- Comply with all applicable codes
- Comply with HPD's Solar Technical Requirements
- Pursue all available NY-Sun incentives



SYSTEM DESIGN LIFE
The solar energy systems must be designed to have a 25-year life, at minimum.

EQUIPMENT QUALITY AND DURABILITY
All PV modules, inverters, and electrical components shall be commercial off-the-shelf equipment, and be listed or recognized by an appropriate safety laboratory, e.g. Underwriters Laboratory (UL).

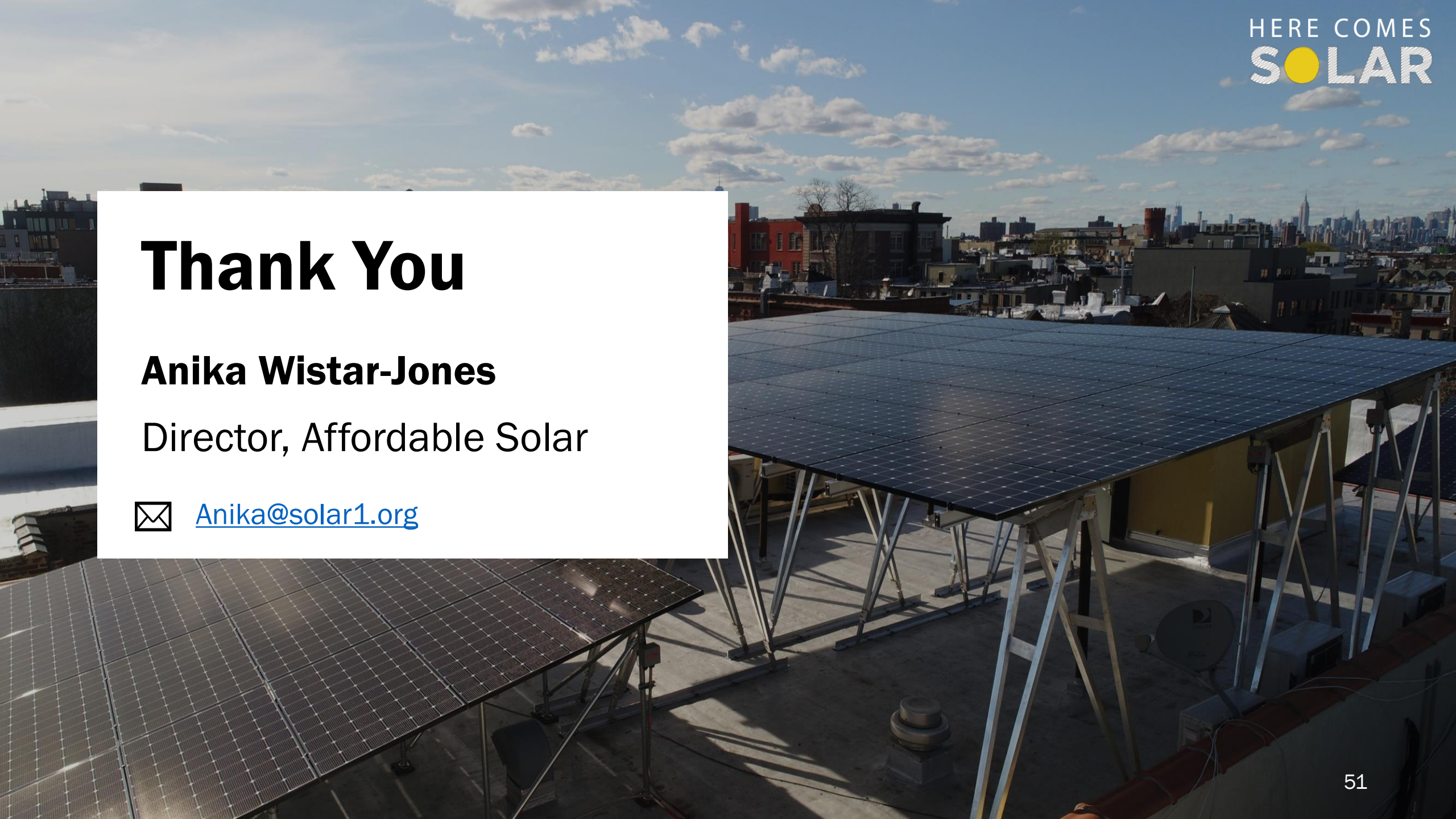
- **PV Modules:** solar electric modules must be certified as meeting all applicable standards of the Institute of Electrical and Electronics Engineers (IEEE) and Underwriter's Laboratory (UL) 1703 and detailed in the California Energy Commission (CEC) eligible list which can be found on the CEC website or NYSERDA's contractor portal.
- **Inverters:** inverters must be certified as meeting all applicable standards of IEEE and UL, comply with New York State's Standardized Interconnection Requirements, and meet the requirements of the local utility company Con Edison or Long Island Power Authority.
- **Solar Production Monitoring Equipment:** data acquisition system must include ANSI C12.20 revenue grade energy production meters (0.5% accuracy).
- **Solar Racking Equipment:** must be comprised of high-quality outdoor rated equipment and materials.
- **Components:** solar equipment and connection components must be commercially available to allow for maintenance and/or replacement. All components must be of corrosion resistant material.

WARRANTIES
- **PV Modules:** minimum product warranty of 10 years and a power production warranty which guarantees at least 80% production at year 25.
- **Inverters:** minimum warranty of 10 years, with a preference for extended warranties.
- **Solar Production Monitoring Equipment:** minimum warranty of 5 years on data acquisition hardware, with a preference for extended warranties.
- **Racking System:** minimum product warranty of 25 years.
- **Workmanship Warranty:** minimum warranty of 5 years. In accordance with NYSERDA's NY-SUN program requirements, the contractor must provide the purchaser of the solar electric system with a full five-year transferable warranty covering all components of the generating system against breakdown or degradation in electrical output of more than 10% from the original rated electrical output. The warranty will cover the full costs, including labor, repair, and replacement of defective components or systems.
- **Roof Warranty**: solar installation must be completed in coordination with the roofer/roofing manufacturer in a manner that does not void any existing roof warranty.

QUALIFICATIONS
- Installer must be a NY-SUN Participating Contractor in full compliance with all of NYSERDA's NY-SUN Residential/Small Commercial program rules, and have a satisfactory

Find this on : HPD's Solar Where Feasible Page


Questions?



Thank You

Anika Wistar-Jones

Director, Affordable Solar

Anika@solar1.org

Case Studies

Case Study: Arthur Avenue Senior Apartments

Arthur Avenue Senior Apartments – Foxy Management

Location	Bronx, New York
Building Type	New Construction, 4% LIHTC
Solar Installer	Accord Power
Payment Method	HPD Financing + 4% LIHTC
Solar System Size	68.64 kW-DC
Installation Method	Canopy
System Price	$4.15/Watt
Prevailing Wage	Yes
Payback Period	7 years
Lifetime Net Savings	$171,000
Solar energy is offsetting energy costs for common area for this New Construction Affordable Housing Building. Because of LIHTC + 4% Combination the post-incentive cost was very low.	

Case Study: 15 Stratford Road

Location	Brooklyn, NY
Building Type	Mid-size rental building
Solar Installer	Solar Energy Systems
Payment Method	HPD GHPP Loan
Solar System Size	34.6 kW-DC
Upfront Cost	$80,500
Payback Period	7 years
Annual savings	$5,436
Lifetime Net Savings	$190,000
Installation Method	Dual Tilt Ballasted
Solar energy is offsetting energy costs for common area as well as a portion of tenants' bills. Because of tax credits and HPD financing, the building owner benefitted from expanding the system and sharing solar savings with the tenants.	