

HOW TO ACE YOUR SOLAR FEASIBILITY ANALYSIS

APRIL 9, 2024



AGENDA

INTRODUCTION

- Introduction to Solar One and Basics of Solar
- Local Laws 92/94 & the HPD Solar Where Feasible Mandate

THE **NEW AND IMPROVED** SOLAR FEASIBILITY ANALYSIS

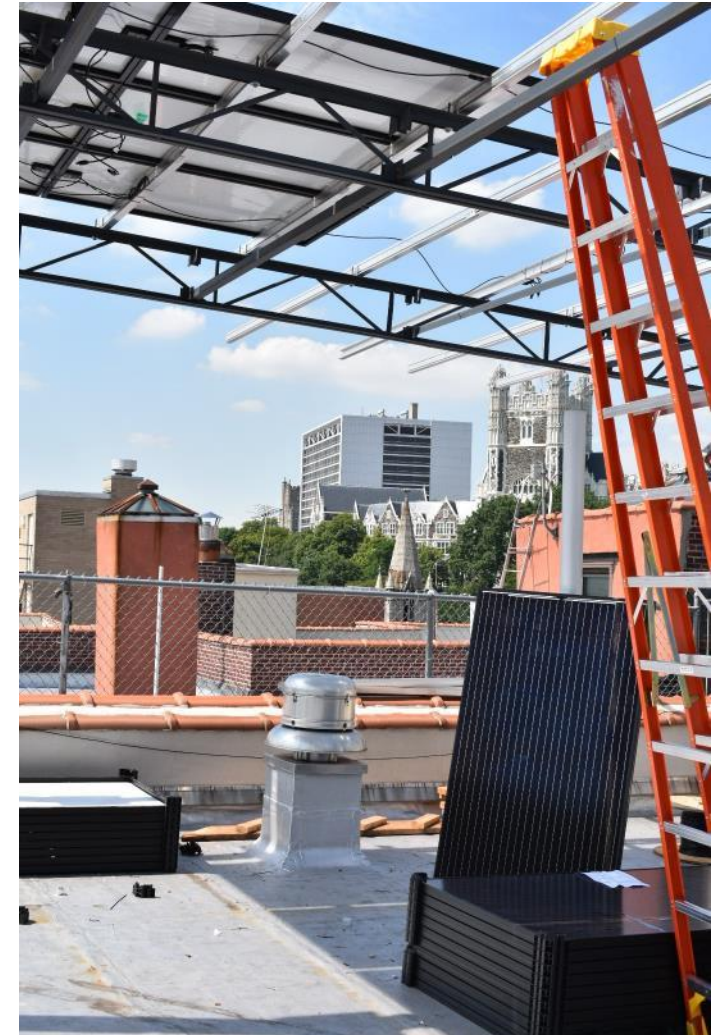
THE SOLAR FEASIBILITY ANALYSIS IN PRACTICE

- Tips

THE SOLAR FEASIBILITY REVIEW PROCESS

- Solar Approval Process Overview
- Phase out of SWF for NC projects
- To Closing and Beyond

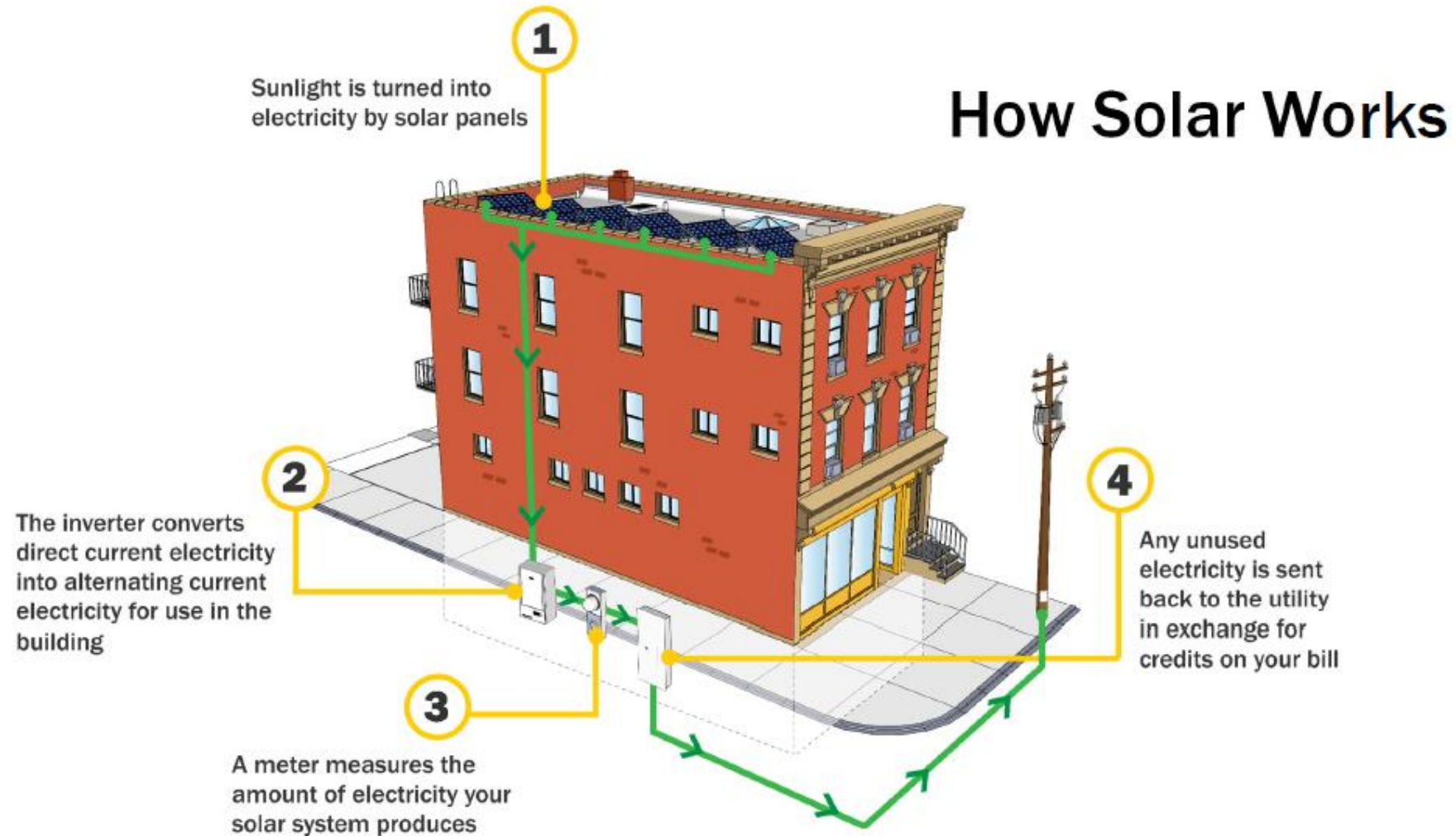
Q&A



A FEW QUESTIONS BEFORE WE BEGIN

1. Have you ever attended an HPD Solar Where Feasible training before?
2. How familiar with going solar are you? On a scale from 1-5, with 1 being not familiar at all, and 5 being extremely familiar?
3. What kinds of buildings do you work with?
4. What is your role?

THE BASICS OF SOLAR TECHNOLOGY



THE BASICS OF SOLAR TECHNOLOGY



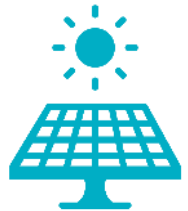
25+ YEAR OPERATING LIFE

→ Best on new roofs



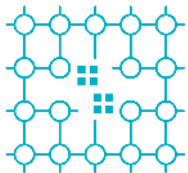
LOW MAINTENANCE

→ No moving parts, extended warranties, online monitoring



REQUIRES DIRECT SUNLIGHT

→ No shading from other buildings or roof obstructions



GRID-CONNECTED

→ No backup power in a blackout without batteries



THE BASICS OF SOLAR TECHNOLOGY



BALLASTED ARRAY



**MECHANICALLY ATTACHED
PLANAR ARRAY**



CANOPY ARRAY

NYC LOCAL LAWS 92 and 94



*Also applies to alterations where “entire existing roof deck or assembly is being replaced”
Check [DOB Website](#) for rule.

As part of the Climate Mobilization Act, Local Laws 92 and 94 **require either green roofs or solar** on all new roofs*.

But until November 2024, **most affordable housing can be exempt if it is financially infeasible**, and only need to comply with the laws to the extent determined by HPD.

HPD SOLAR WHERE FEASIBLE MANDATE



HPD is committed to capturing the benefits of solar for affordable housing by **requiring a solar feasibility analysis and only requiring solar installations when it is financially beneficial** to the building: with a payback of 10 years or less.

- **Saves buildings on operating expenses** while reducing carbon emissions
- **Reduces city subsidy** needed by underwriting to solar savings
- **Provides free technical resources** to owners & HPD to optimize solar and make it accessible to more buildings

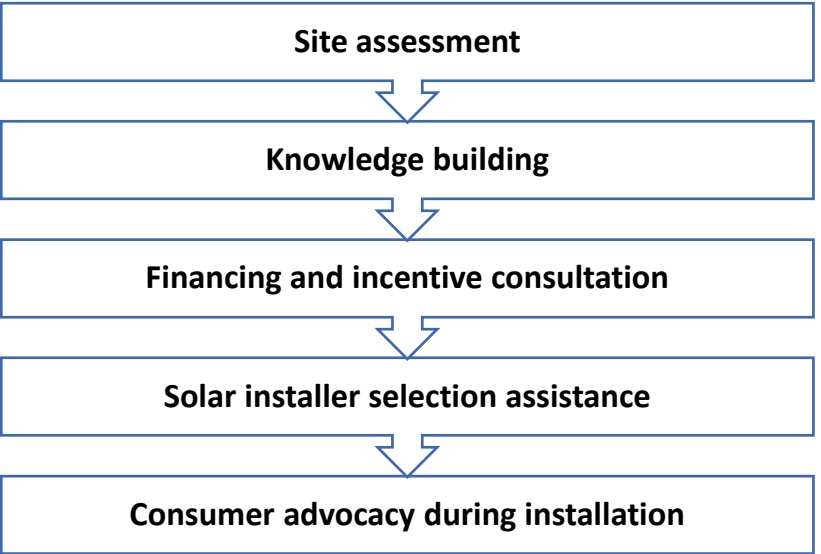
HERE COMES SOLAR

A PROJECT OF SOLAR ONE



NYSERDA funded a partnership to support the **Solar Where Feasible** mandate by providing free services to projects across HPD's New Construction, Preservation & Asset Management programs

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 every step to make solar simple and affordable, including:





THE SOLAR FEASIBILITY ANALYSIS



THE SOLAR FEASIBILITY ANALYSIS

YOUR INPUTS
REQUIRED

YOUR INPUTS
REQUIRED

Optional

APPLICANT
SUBMITS:

NYC SOLARONE
Department of Housing Preservation & Development
Version 2.4, Updated February 2024

USER INPUTS

PROJECT INFORMATION

Please fill in all information on the following site. Please only building info and roof location. Generally, enter only one address or lot address on this form. Use the same address for all buildings or lots. If you have multiple buildings or lots, you may use the same address for all buildings or lots. For multiple addresses, only fill in the table below and use the same address for all buildings or lots. Do not use the same address for multiple buildings or lots.

As of November 12, 2024, the 2024 rules to large-scale PV installation require that the applicant submit a signed and sealed HPD approval form with the solar feasibility analysis and a signed and sealed HPD approval form with the solar feasibility analysis.

Project Details

Project Name: [Blank]
Address: [Blank]
City: [Blank]
State: [Blank]
Zip: [Blank]
County: [Blank]
Lot: [Blank]
Block: [Blank]
Footcandle: [Blank]
Use: [Blank]
Floor Level: [Blank]
Roof Location: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]

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USER INPUTS

BUILDING INFORMATION

Use the address of the building to create a profile from the database. If the address is not in the database, you may enter a new address. If the address is not in the database, you may enter a new address. If the address is not in the database, you may enter a new address.

Project Details

Project Name: [Blank]
Address: [Blank]
City: [Blank]
State: [Blank]
Zip: [Blank]
County: [Blank]
Lot: [Blank]
Block: [Blank]
Footcandle: [Blank]
Use: [Blank]
Floor Level: [Blank]
Roof Location: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]

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USER INPUTS FOR MULTIPLE BUILDINGS

Address	Is Building in a Landmark or Historic District?	Is Building in a Qualified Census Tract?	# of Buildings	Building Height (ft)	Estimated Usable Roof Area for Solar (sq ft)	Roof Condition	Est. Annual Owner Paid Electricity Costs (\$)	Master Metered Building	Generator Building
Building 1									
Building 2									
Building 3									
Building 4									
Building 5									
Building 6									
Building 7									
Building 8									
Building 9									
Building 10									
Building 11									
Building 12									
Building 13									
Building 14									
Building 15									
Building 16									
Building 17									
Building 18									
Building 19									
Building 20									

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ADVANCED INPUTS

ADVANCED INPUTS (OPTIONAL)

Use this section to enter optional information. If you do not have this information, leave the fields blank. If you do not have this information, leave the fields blank. If you do not have this information, leave the fields blank.

Project Details

Project Name: [Blank]
Address: [Blank]
City: [Blank]
State: [Blank]
Zip: [Blank]
County: [Blank]
Lot: [Blank]
Block: [Blank]
Footcandle: [Blank]
Use: [Blank]
Floor Level: [Blank]
Roof Location: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]

Signed HPD Approval Form (PDF):

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Version 2.4, Updated February 2024

HPD SOLAR APPROVAL FORM

APPLICANT INFORMATION

Project Name: [Blank]
Address: [Blank]
City: [Blank]
State: [Blank]
Zip: [Blank]
County: [Blank]
Lot: [Blank]
Block: [Blank]
Footcandle: [Blank]
Use: [Blank]
Floor Level: [Blank]
Roof Location: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]

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ROOF LAYOUT

SOLAR PV SYSTEM LAYOUT ON USABLE ROOF AREA

Use this section to enter optional information. If you do not have this information, leave the fields blank. If you do not have this information, leave the fields blank. If you do not have this information, leave the fields blank.

Project Details

Project Name: [Blank]
Address: [Blank]
City: [Blank]
State: [Blank]
Zip: [Blank]
County: [Blank]
Lot: [Blank]
Block: [Blank]
Footcandle: [Blank]
Use: [Blank]
Floor Level: [Blank]
Roof Location: [Blank]
Roof Orientation: [Blank]
Roof Slope: [Blank]
Roof Material: [Blank]
Roof Area: [Blank]
Roof Condition: [Blank]
Roof Access: [Blank]
Roof Obstructions: [Blank]
Roof Elevation: [Blank]

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SOLAR FEASIBILITY ANALYSIS

PRELIMINARY SOLAR FINANCIAL ANALYSIS: HPD Project Name

Solar energy 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. Payback Period is estimated using the costs, savings and incentives shown in this analysis, and may not reflect the actual payback of the system as underwritten by HPD.

PROJECTED SYSTEM PERFORMANCE

Solar Energy System Size (kW-DC)	36.00
Est. Year One Solar Production (kWh)	41,400
Year One Electricity Savings	\$ 6,790
NY-Sun \$/Watt	\$ 1.60
Total Cost (\$/Watt-DC)	\$ 3.63

ESTIMATED UPFRONT COSTS

Est. Total System Cost	\$ 130,680
NY-Sun Incentive	- \$ 57,600
Upfront Cost Estimate	= \$ 73,080

AVAILABLE TAX INCENTIVES

Federal Tax Credit %	30%
Federal Tax Credit	\$ 39,204
Bonus Federal Tax Credits %	0%
Bonus Federal Tax Credits	\$ -
Federal Taxes Due to State Incentives	\$ (12,096)
Additional LIHTC From Solar	\$ -
NYC Property Tax Abatement	\$ -
State Residential Income Tax Credit	\$ -
Historic Tax Credit	\$ -
Total Tax Incentives	\$ 27,108

FEASIBILITY REPORT SUBMITTED BY

Name	Carly Ayukawa
Company	Solar One
Email	carly@solar1.org
HPD ID	12345

NEXT STEPS

1. Submit to HPD using the button below
2. Await results from Solar 1 and HPD's Sustainability Office
3. Save HPD Approval Form in project records

SOLAR FEASIBILITY ANALYSIS

NYC SOLARONE
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SOLAR FEASIBILITY ANALYSIS RESULTS

PRELIMINARY SOLAR FINANCIAL ANALYSIS: HPD Project Name

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Total Tax Incentives	\$ 27,108

FEASIBILITY REPORT SUBMITTED BY

Name	Carly Ayukawa
Company	Solar One
Email	carly@solar1.org
HPD ID	12345

NEXT STEPS

1. Submit to HPD using the button below
2. Await results from Solar 1 and HPD's Sustainability Office
3. Save HPD Approval Form in project records

TAKEAWAYS

Internal Rate of Return	15%
Payback Period	7 years
Lifetime Net Savings	\$ 163,954

Cumulative Cash Flow (25 Years)

VIEW 25 YEAR CASH FLOW

SUBMIT SOLAR FEASIBILITY ANALYSIS

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.

INSTRUCTIONS & ASSUMPTIONS

SOLAR FEASIBILITY ANALYSIS



SOLAR FEASIBILITY ANALYSIS
Version 2.4, Updated February 2024



Instructions

The Solar Feasibility Analysis tool can be used to complete a preliminary assessment of solar financial viability for a New York City affordable housing property. This tool was developed by the New York City Department of Housing Preservation and Development (HPD), with support from non-profit Solar One, as part of the agency's efforts to increase the deployment of solar energy systems on affordable housing properties participating in HPD programs. Completing this Solar Feasibility Analysis is an HPD requirement for all New Construction, Substantial Rehabilitation, and Preservation projects. Due to the success of our program and the phase-out of the affordable housing exemption of Local Laws 92/94 on November 15, 2024, HPD will no longer require Solar Feasibility Analyses on HPD New Construction projects as of July 1, 2024. Solar One can provide free and comprehensive solar technical assistance to all applicants. Contact affordable@solar1.org with any inquiries.

- User Inputs:** populate all blue fields on the Project Info and Building Info tabs. Please confirm that all fields are populated.
- Advanced Inputs (Optional):** if you have verified information regarding the project, such as a detailed solar design with a specific price, you can enter this information in the Advanced Inputs tab. All fields on the Advanced Inputs tab are optional, and values provided in the Advanced Inputs tab will override the calculator's default assumptions.
- Roof Layout:** Provide image/s of roof plan(s) with solar layout or the Sustainable Roofing Zone. Please include an existing or planned equipment (e.g. HVAC systems, electrification equipment, cell towers, antennas, roof decks, LLL1 rigging equipment, etc.). Please note in the comments section if green roof is being incorporated to satisfy DEP requirements. Identify key features on image or within the Roof Layout comments section.
- Results:** review this tab, which is read-only, for a summary of financial benefits of solar at the site, calculated based on user inputs. Results include key financial metrics such as the Upfront Cost Estimate, Year One Electricity Savings, and Payback Period.
- 25 Year Cashflow:** to view a 25 year cash flow analysis of the solar energy system, click "VIEW 25 YEAR CASH FLOW" on the Results tab. This will display another page which includes a breakdown of costs and benefits by year over a 25 year analysis period.
- Submission:** once you have completed the HPD Solar Feasibility Analysis for your project, submit it along with the Roof Plan and any additional documentation by clicking "SUBMIT SOLAR FEASIBILITY ANALYSIS" on the Results tab.

SOLAR FEASIBILITY ANALYSIS
Version 2.4, Updated February 2024



Assumptions

outline assumptions included in the Solar Feasibility Analysis. Disclaimer: Solar One is providing this tool on an as-is basis and makes no claims regarding the accuracy of calculations, assumptions and figures or technical feasibility, installation costs, incentives, energy generation, and electricity bill savings may vary.

System Costs

estimates the total cost of the solar energy system via Advanced Inputs, the cost is estimated based on user inputs. Factors accounted for in the tool include system size (in kilowatts-DC), mounting method, building height, and permitting and metering.

Costs are estimated based on system size:

kW-DC	System Price Estimate (\$/Watt-DC)		Price (\$/Watt-DC)
	Min. (kW-DC)	Max. (kW-DC)	
4.00	9.99	5	5.50
10.00	19.99	5	4.68
20.00	29.99	5	3.96
30.00	44.99	5	3.63
45.00	64.99	5	3.41
65.00	79.99	5	3.25
80.00	99.99	5	3.14
100.00	149.99	5	2.97
150.00	249.99	5	2.75
250.00	499.99	5	2.53
500.00	749.99	5	2.42
750.00	-	5	2.31

The default base prices in this tool are informed by the publicly available NYSERDA solar project dataset which includes system size and pricing for all solar projects that received incentives from NYSERDA.


Note: The base prices may be overridden using the Total Solar Energy System Price (\$/Watt-DC) located in Advanced Inputs. The base price and/or the Turnkey Cost may be further adjusted using the Total Price Adjustment % input located in Advanced Inputs. The Total Price Adjustment is used to estimate a percentage increase or decrease due to inflation, high-end materials, or other factors. A positive decimal will increase the price by that percentage (i.e. 0.5 is +50%) and a negative decimal will decrease the price by that percentage (i.e. -0.5 is -50%).

FIND ANSWERS TO QUESTIONS ABOUT

- How to use the tool
- Assumptions and calculations for how tool determines:
 - Costs
 - Tax Incentives
 - Solar energy production estimates
 - Electrical tariffs
 - Value of solar
 - And more


PROJECT INFORMATION

SOLAR FEASIBILITY ANALYSIS



USER INPUTS

Version 2.4, Updated February 2024



PROJECT INFORMATION

Please fill in all information on the following tabs: Project Info, Building Info, and Roof Layout. Optionally, enter only verified information in the Advanced Inputs tab. S1 will provide feedback to Applicant or send its recommendation to HPD for approval, and HPD will generate the signed Solar Approval Form. For portfolio submissions, only fill in the Multiple Buildings tab and note that the Results tab will not be populated until S1 completes a portfolio analysis.

**As of November 15 2024, the DOB will no longer accept HPD exemption letters for financial infeasibility. Projects with new roofs/new roof assemblies subject to LL92/94 will need to comply with the DOB requirement. Contact affordable@solar1.org for further instructions or questions.*

Project Details	
Project Name (per HPD)	HPD Project Name
Site Address/es	123 HPD Road, NY, NY 11101
Construction Type	Sub Rehab
Project Design Phase	Scoping
# of Buildings in Project	1
# of Buildings Proposing Solar	1
Roof Condition	Roof is getting resurfaced or replaced as part of scope
Does project propose electrification/energy efficiency work that may affect solar/roof design?	No
Is project subject to DEP Stormwater rules and will need to use a green roof to comply?	No
Applicant Information	
Submission Date	4/9/2024
Applicant Name	Carly Ayukawa
Applicant Company	Solar One
Applicant Email	carly@solar1.org
Owner/Developer Name	Ayukawa Development
Owner/Developer Email	carly@solar1.org
HPD Information	
HPD Project ID (5 digits)	12345
HPD Project Manager	Your Assigned HPD Project Manager
HPD Project Manager Email	Project Manager@hpd.nyc.gov
HPD Program	ELLA
Agency Approvals	
Is project planning to incorporate solar?	Yes - project proposing solar
Seeking DOB LL92/94 Exemption Letter?	No - project design complies with LL92/94
Applicant Comments	
<i>Please write any comments on project explaining why Applicant believes project should include solar or be exempt from including solar.</i>	
The roof is being replaced as part of the SOW	

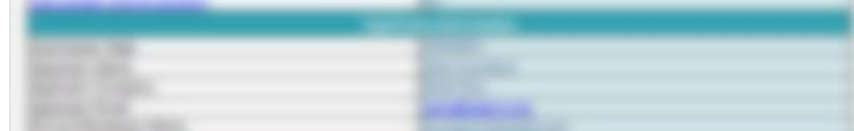
USER INPUTS PAGE 1: PROJECT INFORMATION

- All fields necessary to generate accurate HPD Solar Approval Form

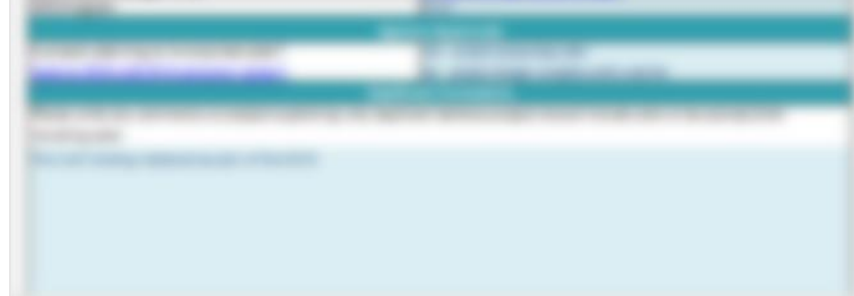
PROJECT INFORMATION



Project Details	
Project Name (per HPD)	HPD Project Name
Site Address/es	123 HPD Road, NY, NY 11101
Construction Type	Sub Rehab
Project Design Phase	Scoping
# of Buildings in Project	1
# of Buildings Proposing Solar	1
Roof Condition	Roof is getting resurfaced or replaced as part of scope
Does project propose electrification/energy efficiency work that may affect solar/roof design?	No
Is project subject to DEP Stormwater rules and will need to use a green roof to comply?	No



Agency Approvals	
Is project planning to incorporate solar?	Yes - project proposing solar
Seeking DOB LL92/94 Exemption Letter?	No - project design complies with LL92/94



PROJECT DETAILS


- **# of buildings** refers to the total number of buildings in the project, regardless of how many are proposing solar.
- Use the ***NEW* Multiple Buildings tab** to complete intake for projects with more than one building

AGENCY APPROVALS

- **Is Project Planning Solar** answer should be based off of the Results of the Feasibility Analysis. Dropdown menu provides insight into when you must include solar.
- **Seeking DOB LL92/94 Exemption Letter** is required for new construction projects, or projects replacing the entire roof assembly, that cannot support at least 4kW of solar or are not financially feasible.


BUILDING INFORMATION

SOLAR FEASIBILITY ANALYSIS



USER INPUTS

Version 2.4, Updated February 2024



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 Assumptions tab, and email affordable@solar1.org if you need help completing this form, have questions about incentives, or for free solar consultation & technical assistance.

Project Details	
Project Name (per HPD)	HPD Project Name
Site Address/es	123 HPD Road, NY, NY 11101
Construction Type	Sub Rehab
Ownership Type	For-Profit Rental
Estimated Project Completion Year	2025
Prevailing Wages Required	No
Number of Dwelling Units in Project	35
Building Height (ft)	60
Estimated Usable Roof Area for Solar (sq ft)	3,000
Solar Canopy Design Proposed	No
Incentives Eligibility	
Is project eligible for the Federal Solar Tax Credit?	Yes (owner is a taxable entity)
Is this a Low Income Housing Tax Credit (LIHTC) Project?	No
If yes, can solar be included in the LIHTC Basis?	No
Is project eligible for NYC Solar Property Tax Abatement?	No
Is project in a Landmark or Historic District?	No
Is project in a Qualified Census Tract?	No
Does project receive funding from a federal housing program?	Yes
Owner-Paid Electricity Information	
Electric Utility	Con Edison
Est. Annual Owner-Paid Electricity Costs	\$20,000.00
Master-Metered Building	No
Elevator Building	Yes

ADVANCED INPUTS (OPTIONAL)

The advanced inputs are completely optional. Answering these additional inputs will increase the accuracy of your feasibility analysis. Please only populate cells with confirmed information.

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.

BUILDING INFORMATION – USER INPUTS PAGE 2

- All fields are necessary to generate reliable solar and financial feasibility analysis on “Results Tab”
- First three lines auto-fill with information provided on Project Information Page
- Rest of fields in blue need to be filled in

BUILDING INFORMATION

TAX CREDITS AND INCENTIVES

- **Solar Tax Credit** – Yes/No + *justification*
- **LIHTC Project** - If the project is receiving LIHTCs, choose either 4% or 9%
 - For 9% deals, eligible basis is likely not available
 - For 4% deals, eligible basis likely available
- **NYC Solar Property Tax Abatement**
 - **Yes** if building expects to pay some property taxes.
 - **No** if building is going to get their property taxes fully abated or exempt. (e.g, they are applying for an Article XI tax exemption)

Tax Incentive Resources available on HPD webpage:

- [Incentive table](#)
- [Detailed incentive matrix](#)

Incentives Eligibility	
Is project eligible for the Federal Solar Tax Credit?	Yes (owner is a taxable entity)
Is this a Low Income Housing Tax Credit (LIHTC) Project?	No
If yes, can solar be included in the LIHTC Basis?	No
Is project eligible for NYC Solar Property Tax Abatement?	No
Is project in a Landmark or Historic District?	No
Is project in a Qualified Census Tract?	No
Does project receive funding from a federal housing program?	Yes

BUILDING INFORMATION

METERING CONFIGURATION AND VALUE OF SOLAR

- **Owner Paid Electricity Costs** - If you don't have a number yet, use HDC's current M&O Cost Estimate. ([2024 estimate is \\$200/room/yr](#))
- The value of solar for a building depends on building type

Building Type	Utility Tariff	Value of Solar
Walk-up	Small Commercial	\$0.30/kilowatt-hour
Elevator	Large Commercial	\$0.16/kilowatt-hour
Master-Metered	Master-Metered	\$0.16/kilowatt-hour

Owner-Paid Electricity Information	
Electric Utility	Con Edison
Est. Annual Owner-Paid Electricity Costs	\$20,000.00
Master-Metered Building	No
Elevator Building	Yes

ROOF LAYOUT

NYC
Department of
Housing Preservation
& Development

ROOF LAYOUT
Version 2.4, Updated February 2024



S¹
SOLARONE

SOLAR PV SYSTEM LAYOUT OR USABLE ROOF AREA

Provide image/s of roof plan(s) with solar layout or Sustainable Roofing Zone. Please include any existing or planned equipment (e.g. HVAC systems, electrification equipment, cell towers, antennas, roof decks, LL11 rigging equipment, etc.). Please note in the comments section if green roof is being incorporated to satisfy DEP requirements. 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

Roof Condition: Roof is getting resurfaced or replaced as part of scope



Comments on System Layout or Roof Area

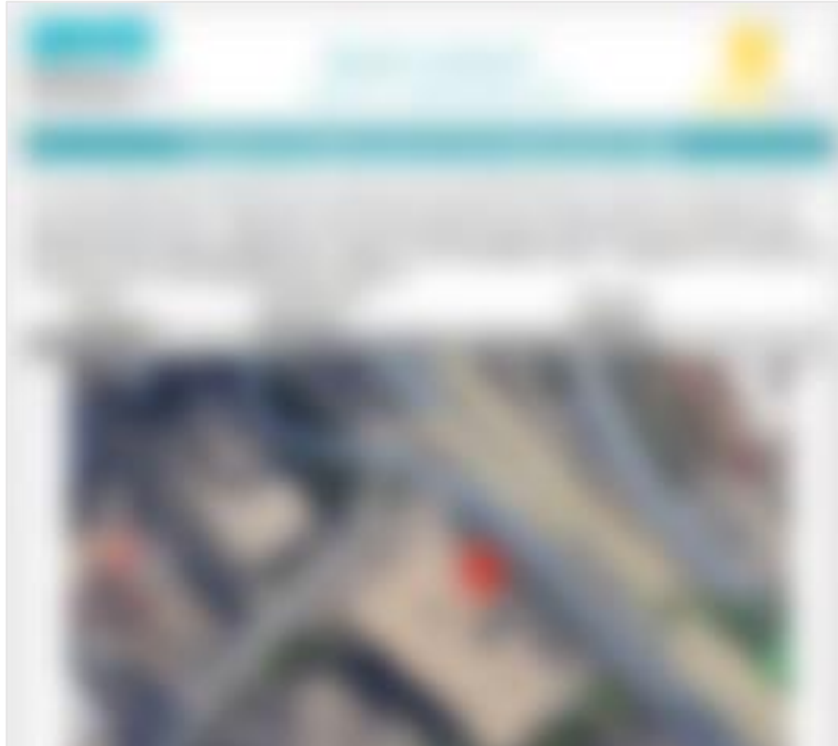
Note unique design features, such as canopies, green roofs, architectural details or other aspects to demonstrate why solar is or is not included in design. Please also note if additional drawings are separately attached.

This low-profile solar array will leave room for the mechanical equipment to be installed

ROOF LAYOUT PAGE - VISUAL IMAGES OF ROOF PLAN

- **Include images** that show roof plan, indicate usable roof area, or if available, solar layout
 - Roof plans and comments should indicate any updated location of mechanicals, obstructions, LL11 rigging equipment, etc.

ROOF LAYOUT



ROOF LAYOUT PAGE – COMMENTARY ON ROOF

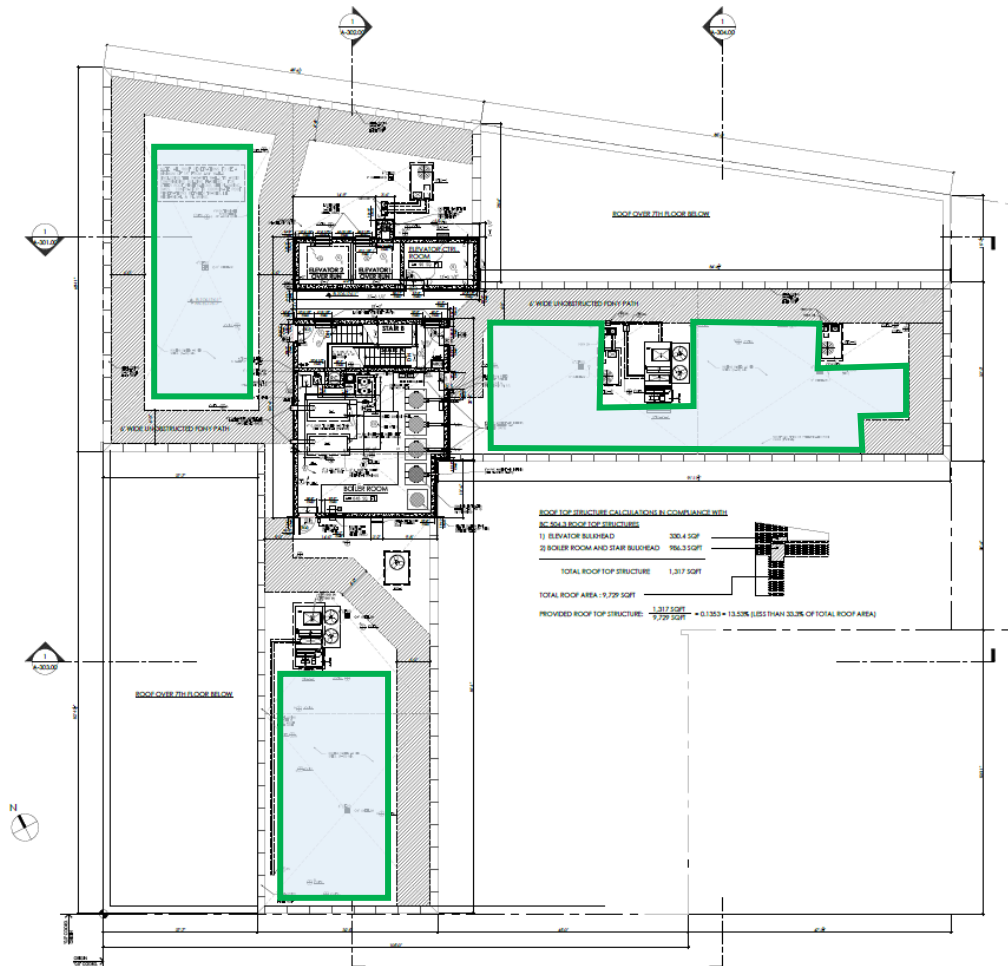
- **Include images** that show roof plan, indicate usable roof area, or if available, solar layout
 - Preservation projects should indicate any updated location of mechanicals and obstructions
- **Comments Section** –short summary of design used and considerations for the solar layout or usable roof area.
 - *“raised canopy design used to locate solar over HVAC systems or roof deck”*
 - *“green roof on north section”*

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.

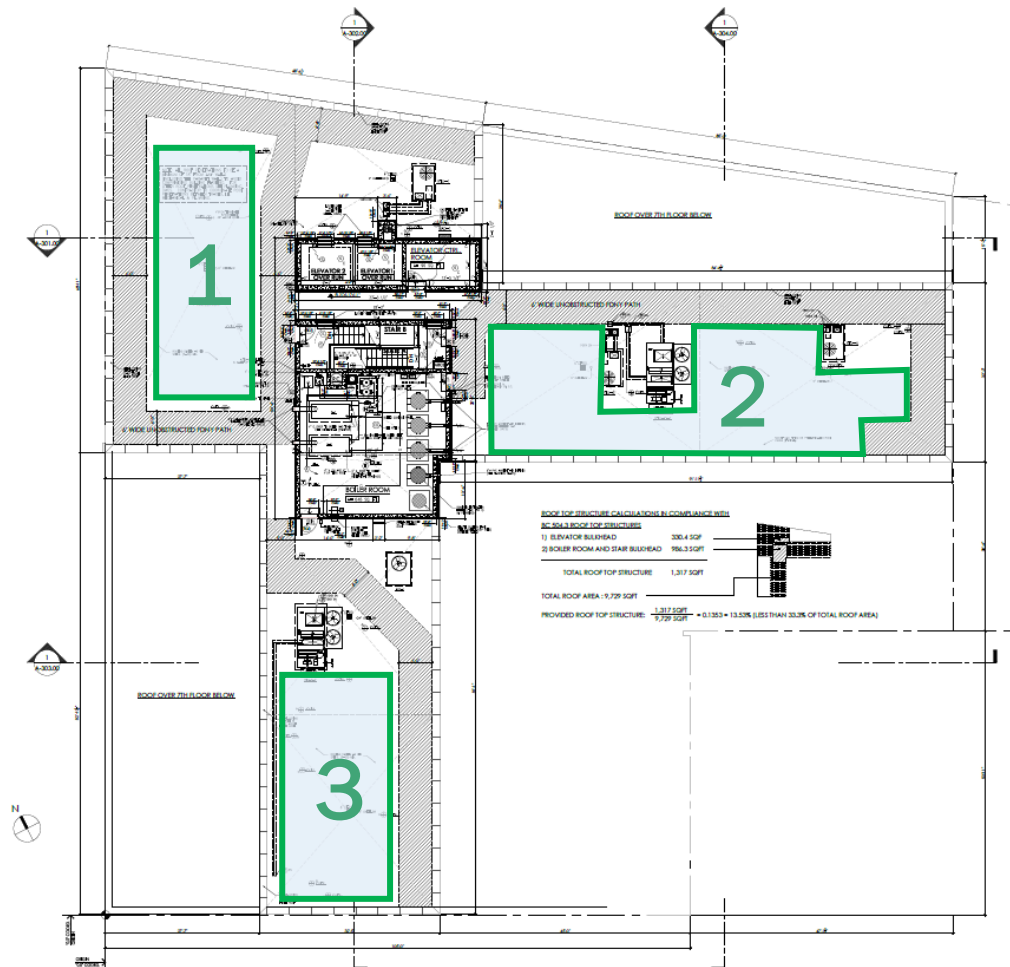
FINDING USABLE ROOF AREA FOR SOLAR



SOLAR POTENTIAL BASED ON USABLE ROOF AREA

- [LL 92 & 94](#): “Usable Roof Area for Solar” aka “Sustainable Roofing Zone” is any contiguous area on the roof that is:
 - 200 square feet or greater
 - Not obstructed by rooftop structures, mechanical equipment, etc.
 - Not used for fire access pathways
 - Not used as recreational space “integral to the principal use of the building”

FINDING USABLE ROOF AREA FOR SOLAR

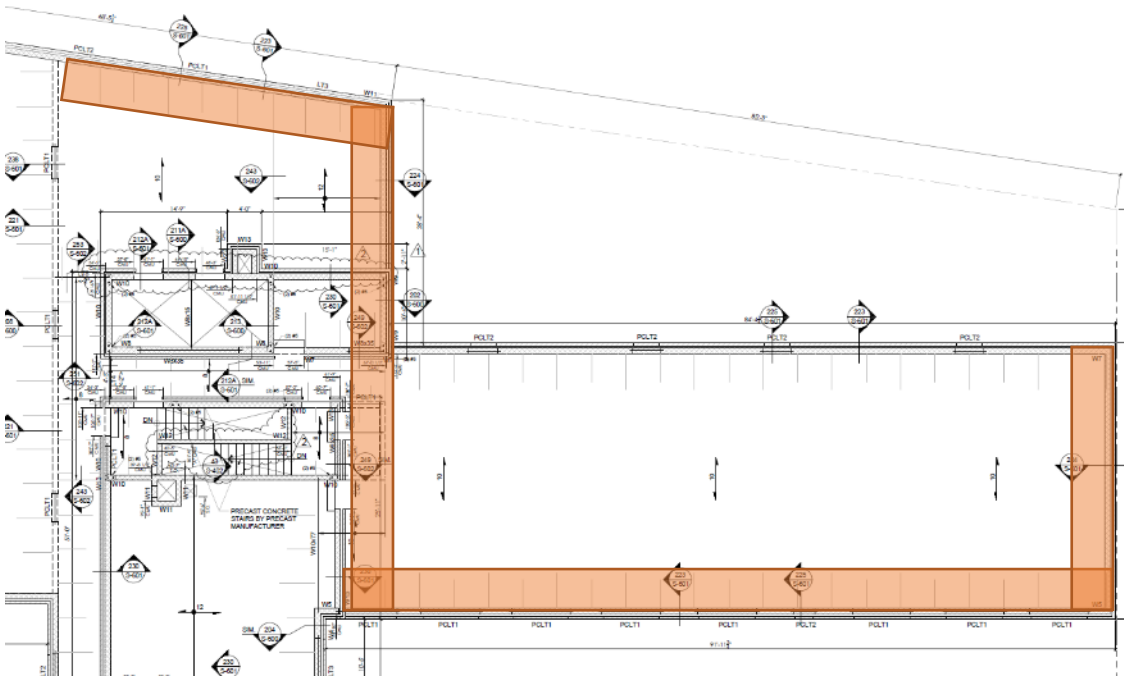


- Add up the square footage of the sustainable roofing zones and fill in the *Estimated Usable Roof Area for Solar* field in the Screening Tool

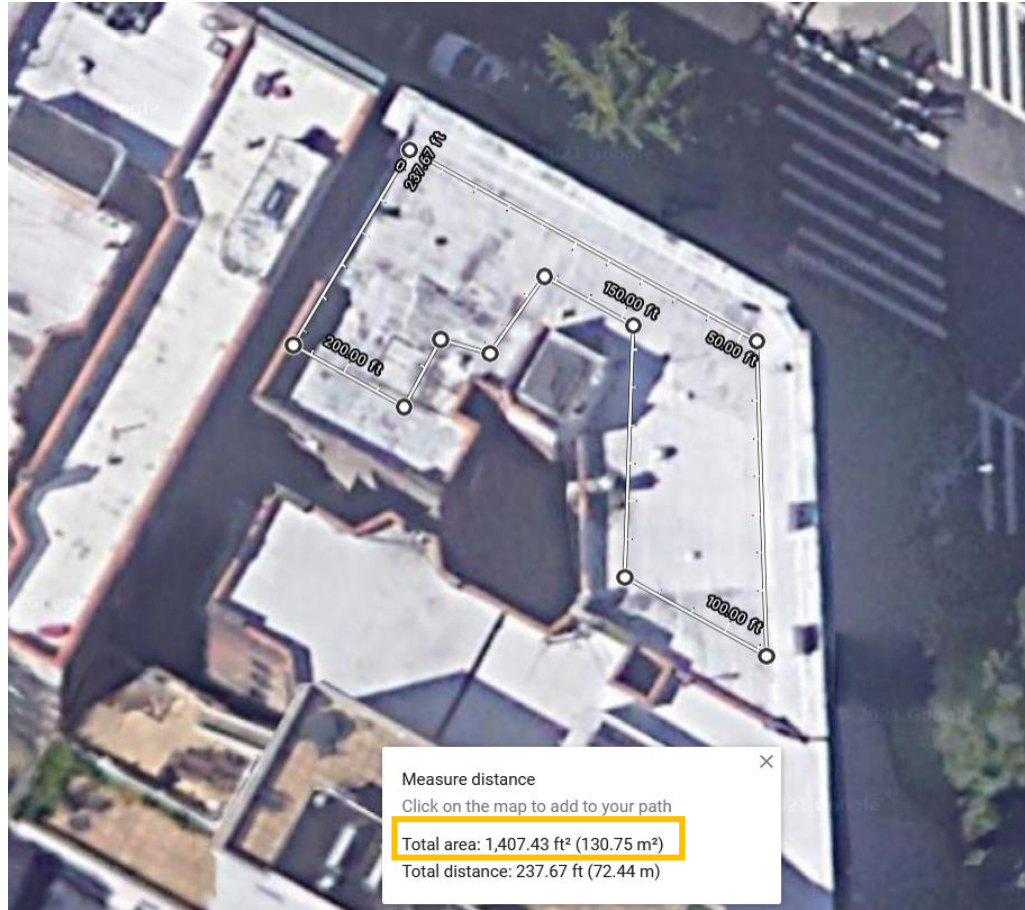
TIP: FIRE PATH PLACEMENT

FIRE PATH PLACEMENT

- 6' Fire paths must be:
 - Along each street-facing side of a building
 - From front to back, and from side to side of the roof
 - All roof exits (bulkhead doors, fire escapes, etc.) must connect to a fire path
- Where possible:
 - Fire paths should be placed along perimeter of building to allow for unobstructed open space
 - Fire paths should make use of already shaded space




TIP: MEASURE WITH GOOGLE MAPS



For existing buildings, google maps can be used to measure the usable roof area

- In “satellite view”, right click the map and select *Measure distance*
- Click the shape you want to measure (slightly less than the perimeter of the roof)
- Close the shape and input the Total Area calculated into the Feasibility Analysis

RESULTS TAB



SOLAR FEASIBILITY ANALYSIS RESULTS

Version 2.4, Updated February 2024



PRELIMINARY SOLAR FINANCIAL ANALYSIS: HPD Project Name

Solar energy 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. **Payback Period is estimated using the costs, savings and incentives shown in this analysis, and may not reflect the actual payback of the system as underwritten by HPD.**

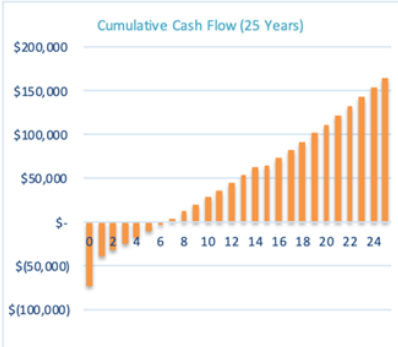
PROJECTED SYSTEM PERFORMANCE	
Solar Energy System Size (kW-DC)	36.00
1st Year One Solar Production (kWh)	41,400
Year One Electricity Savings	\$ 6,790
NY-Sun \$/Watt	\$ 1.60
Total Cost (\$/Watt-DC)	\$ 3.63

ESTIMATED UPFRONT COSTS	
1st. Total System Cost	\$ 130,680
NY-Sun Incentive	- \$ 57,600
Upfront Cost Estimate	= \$ 73,080

AVAILABLE TAX INCENTIVES	
Federal Tax Credit %	30%
Federal Tax Credit	\$ 39,204
Local Federal Tax Credits %	0%
Local Federal Tax Credits	\$ -
Federal Taxes Due to State Incentives	\$ (12,096)
Additional LIHTC From Solar	\$ -
NYC Property Tax Abatement	\$ -
State Residential Income Tax Credit	\$ -
Historic Tax Credit	\$ -
Total Tax Incentives	\$ 27,108

FEASIBILITY REPORT SUBMITTED BY	
Name	Carly Ayukawa
Company	Solar One
Email	carly@solar1.org
HPD ID	12345

TAKEAWAYS	
Internal Rate of Return	15%
Payback Period	7 years
Lifetime Net Savings	\$ 163,954



Cumulative Cash Flow (25 Years)

NEXT STEPS	
1. Submit to HPD using the button below	
2. Await results from Solar 1 and HPD's Sustainability Office	
3. Save HPD Approval Form in project records	

VIEW 25 YEAR CASH FLOW

SUBMIT SOLAR FEASIBILITY ANALYSIS

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.

RESULTS TAB SHOWS SOLAR FEASIBILITY

- Results update automatically from user inputs tabs
- Results tab can be used to quickly to compare how toggling inputs on/off on Building Information Tab impacts feasibility
- This button allows you upload the Feasibility Analysis directly.

RESULTS TAB

PROJECTED SYSTEM PERFORMANCE	
Solar Energy System Size (kW-DC)	36.00
Est. Year One Solar Production (kWh)	41,400
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State Residential Income Tax Credit	\$ -
Historic Tax Credit	\$ -
Total Tax Incentives	\$ 27,108

USING THE RESULTS

- **Year One Electricity Savings**
 - Subtract this from estimated M&O costs
 - This will be used by HPD in the project's underwriting
- **Upfront Cost Estimate**
 - Include this cost in the project budget
 - Upfront Cost Estimate = After NY-Sun Incentive
 - Installer cost, not GC cost
- **Payback Period**
 - If **10 years** or less, solar is feasible and required
 - If **over 10 years**, but still provides good savings, solar may still be recommended



THE SOLAR FEASIBILITY ANALYSIS IN PRACTICE



FAVORABLE CONDITIONS FOR SOLAR



Minimal Shading

Large Available
Roof Area

New Roof


Obstructions
clustered in North

Low Rise Building

Housing Works Community Health Center in Brooklyn

SOLAR FEASIBILITY ANALYSIS TIPS

- **Fill in all the fields** so you get an accurate result
- **Explore impact of different inputs** to see if there are ways to optimize feasibility
- **Make your case in the narrative sections** on Project Information page and Roof Layout page to explain what you are planning and why
- **Read the comments and links** embedded within the document for help
- **Reach out to affordable@solar1.org** with any questions



If the project changes throughout the process, the solar feasibility analysis can be re-run, and the solar determination may be revised

SUMMARY OF FACTORS THAT IMPACT FEASIBILITY

Building Input	Impact on Results
Property Tax Abatement	Property Tax Abatement Eligible
Include some Tenant electricity costs	Larger-system size with improved economics
Canopy System	Larger-system size with improved economics
New Construction (NC) with 9% LIHTC	Tax Credit Investors can take Solar Tax Credit
Building over 100 ft	Total System Cost is higher for taller buildings
New Construction with 4% LIHTC + Solar as eligible Basis	Improves project economics
Master Metering	Impacts Value of Solar and increases solar system size for improved economics
Co-op taking Solar Tax Credit	Tax Credit distributed to Shareholders
Co-op with Historic District + Qualifying Census Tract	Co-op can take Historic Tax Credit

HPD SOLAR APPROVAL RUBRIC

PROJECT WITH 10-YEAR PAYBACK OR LESS		OUTCOMES
All Projects	Required	HPD will require solar in scope
PROJECT WITH 11-15 YEAR PAYBACK		
LL 92-94 Compliant	Recommend	<p>HPD will work with borrower to determine if solar can be accommodated – based on overall project budget, owner interest, subsidy impact, etc.</p> <p>If solar is not included in the budget, HPD recommends making the building “solar ready” to facilitate future solar installation.</p>
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	<p>HPD will not recommend solar and exclude it from project.</p> <p>If borrower is very interested, they may revise and resubmit to reduce cost.</p>
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	<p>HPD signs a DOB Exemption letter if needed.</p> <p>If solar looks feasible, HPD may recommend a free consultation and redesign.</p>
Financially Infeasible (can't meet 10-year payback)	Approve Exemption or Recommend re-design	



QUESTIONS?





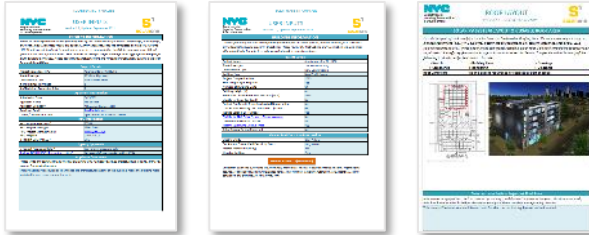
THE REVIEW PROCESS



SOLAR APPROVAL PROCESS: OVERVIEW

1

Solar Feasibility Analysis

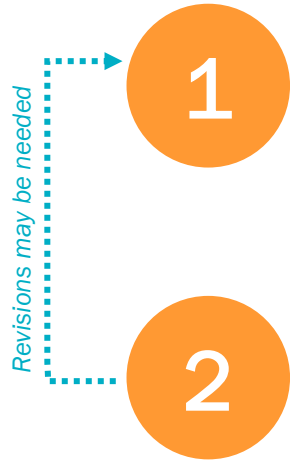


SOLAR FEASIBILITY ANALYSIS (Applicant)

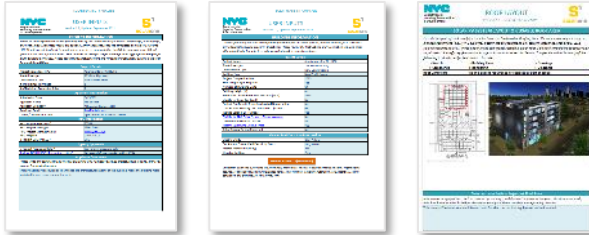
Applicant - borrower or consultant - completes and uploads **Solar Feasibility Analysis (3 pages)** to the [Solar One intake portal](#).

- Solar One can assist with this step

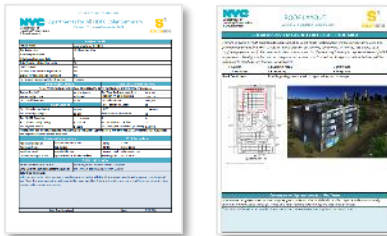
SOLAR APPROVAL PROCESS: OVERVIEW



Solar Feasibility Analysis



Solar One Solar Summary



SOLAR FEASIBILITY ANALYSIS (Applicant)

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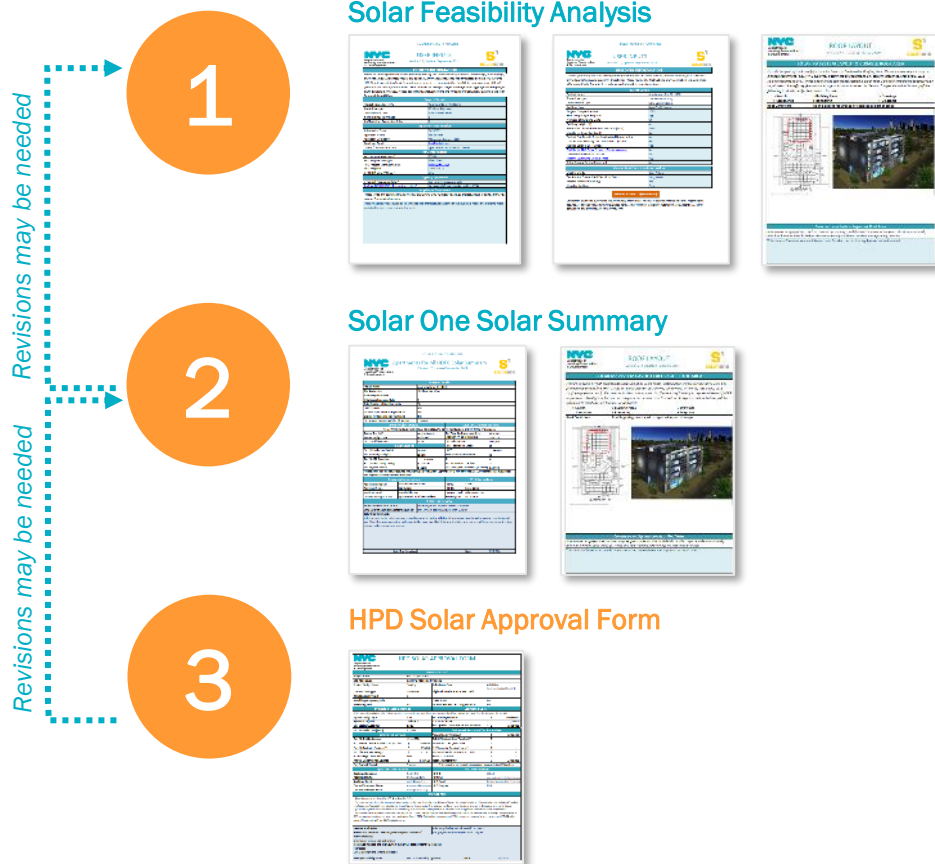
- Solar One can assist with this step

REVIEW (Solar One)

Solar One reviews the Solar Feasibility Analysis and sends **Solar Summary** with recommendations to HPD.

- Solar One may reach out to applicant if there are questions

SOLAR APPROVAL PROCESS: OVERVIEW



SOLAR FEASIBILITY ANALYSIS (Applicant)

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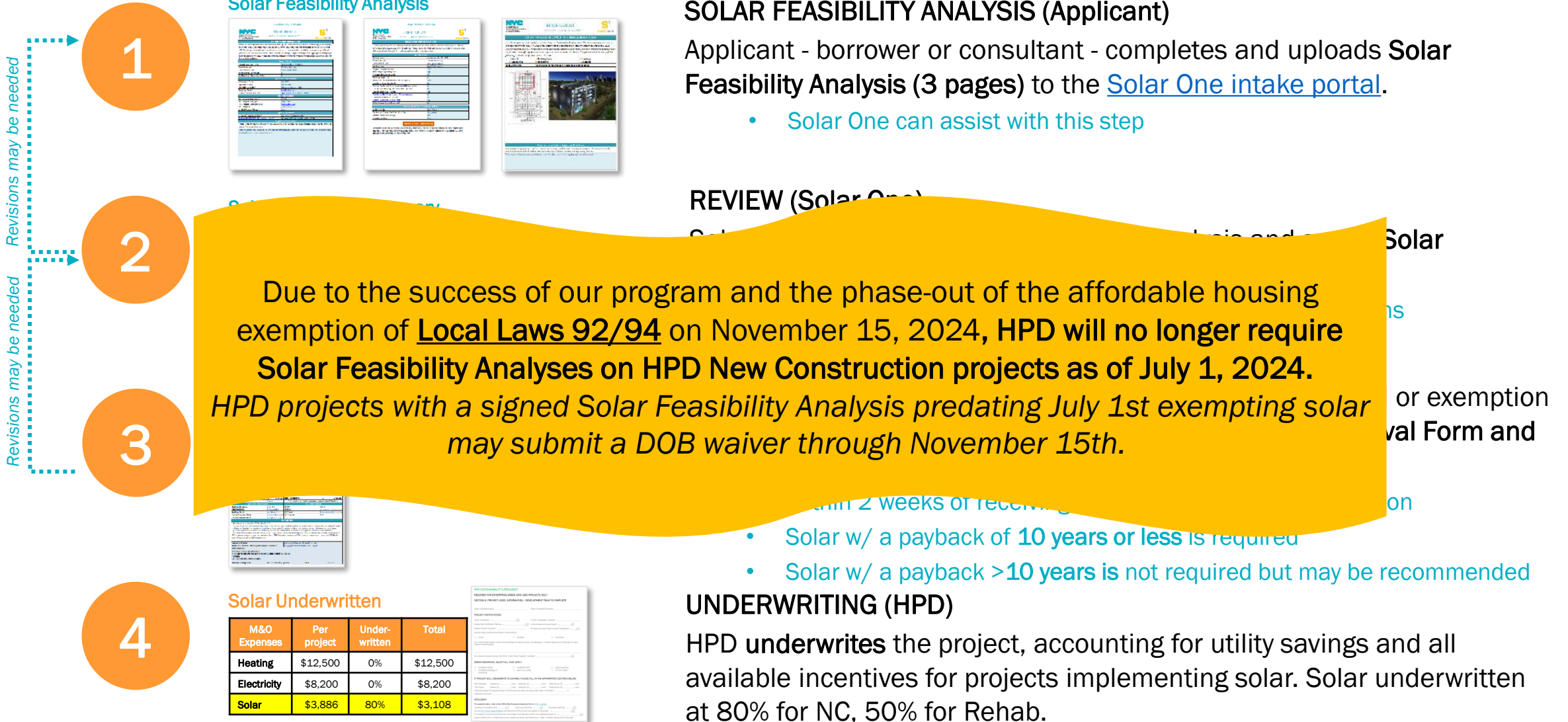
- Solar One may reach out to applicant if there are questions

APPROVAL (HPD)

HPD PM and Sustainability Unit determines if solar required or exemption granted and HPD Sustainability sends a signed **Solar Approval Form and Analysis** to the applicant & HPD PM.

- Within 2 weeks of receiving a final and complete submission
- Solar w/ a payback of **10 years or less** is required
- Solar w/ a payback **>10 years** is not required but may be recommended

SOLAR APPROVAL PROCESS: OVERVIEW



HPD SOLAR TECHNICAL REQUIREMENTS

TO ENSURE OPTIMUM PERFORMANCE WHILE MINIMIZING MAINTENANCE AND OPERATING EXPENSES, HPD PROJECTS MUST:



Use a NY-Sun Participating Contractor: in full compliance with NYSERDA's NY-Sun Residential/Small Commercial program rules and have a satisfactory average quality assurance (QA) inspection score in the NY-Sun program.

Comply with all applicable codes: The solar energy system design and installation shall comply with all applicable codes and AHJ requirements.

Comply with HPD's Solar Technical Requirements: The solar energy system design and installation shall comply with HPD's Solar Technical Requirements, including all specifications and warranties.

Pursue all available NY-Sun incentives: All available incentives must be pursued and must be passed to the customer. This incentive gets paid by NYSERDA when the solar project is completed.

HPD Solar Where Feasible: Solar Technical Requirements

All solar electric installations subject to the New York City Department of Housing Preservation and Development's (NYC HPD) review/approval must meet the following technical requirements.

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.

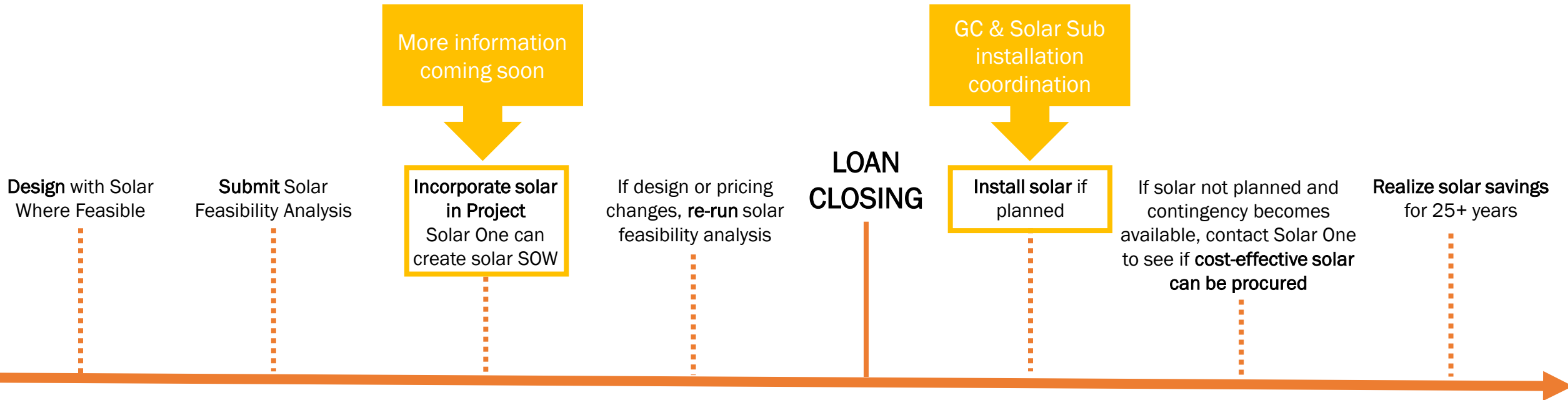
WARRANTIES

- **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.

INSTALLER 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 average quality assurance (QA) inspection score in the NY-SUN program. If eligible, the solar energy system must receive the NY-SUN incentive.

TO CLOSING AND BEYOND



Solar One can provide free & comprehensive solar technical assistance to all building owners, applicants, and HPD Project Managers from IPNAs through construction!
Contact Solar One at affordable@solar1.org for support or questions.

IN SUMMARY

- **The Solar Feasibility Analysis must include:**
 - **Project Information and Building Information** Input pages with Results page generated
 - **A Roof Plan** for each building in project (if new or substantially altered roof)
- **The Solar Approval Form can take up to 2 weeks to be generated after HPD receives a completed analysis from S1**
- **HPD Sustainability will send project team a Solar Approval Form after reviewing.**
- **Projects with a 10-year payback or less are considered “feasible” and will be required.**
- **Projects with a 11-15-year payback (and/or other benefits) are “recommended” and can be included with HPD permission.**
- **The Solar Feasibility Analysis can help designers optimize design for solar.**
- **[Solar One](#) can provide free technical assistance throughout the process.**



QUESTIONS?





**Department of
Housing Preservation
& Development**

THANK YOU!



**S1 Contact: affordable@solar1.org
[HPD's Solar Where Feasible Webpage](#)**

SOLARone