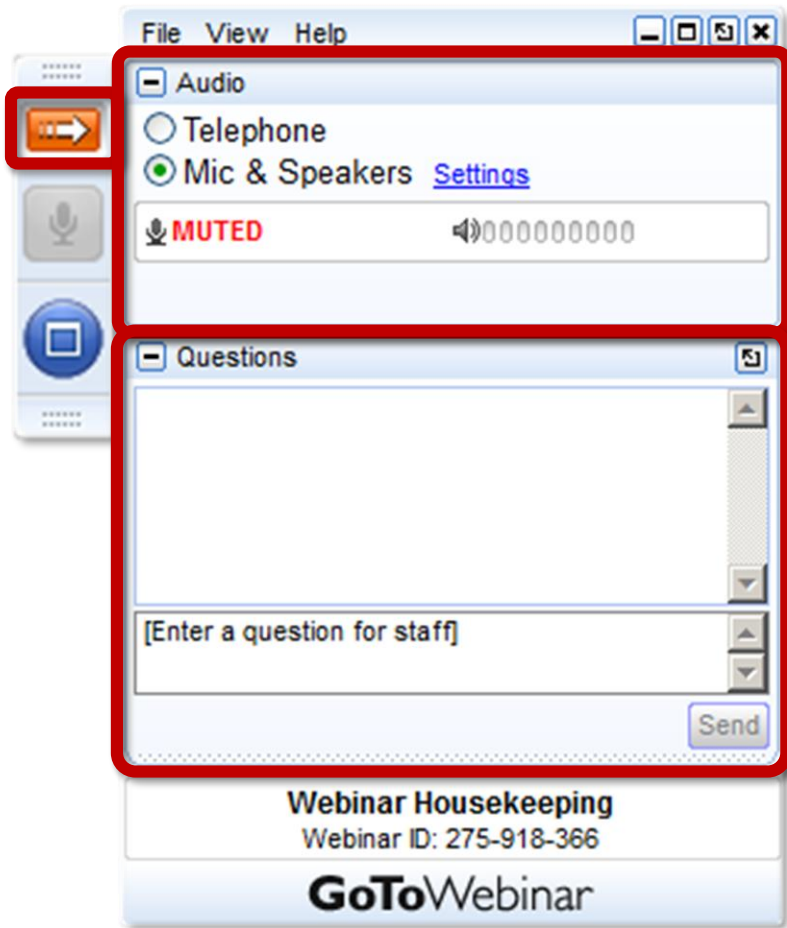




New Financing & Ownership Strategies for Solar+Storage in Low-Income Communities

March 29, 2018

Housekeeping



Use the red arrow to open and close your control panel

Join audio:

- Choose Mic & Speakers to use VoIP
- Choose Telephone and dial using the information provided

Submit questions and comments via the Questions panel

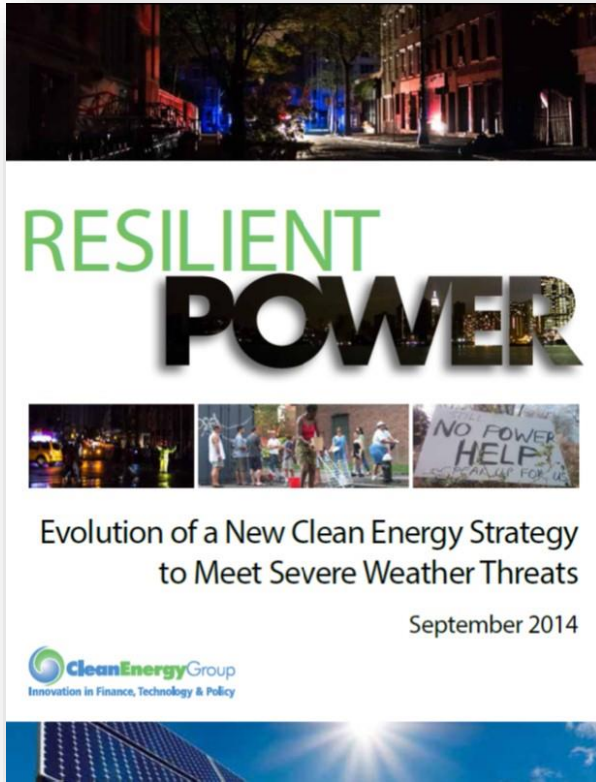
This webinar is being recorded. We will email you a webinar recording within 48 hours. Resilient Power Project webinars are archived online at: www.resilient-power.org

New Financing & Ownership Strategies for Solar+Storage in Low-Income Communities

- **Low Milford**, President, Clean Energy Group
- **Rob Sanders**, Senior Finance Director, Clean Energy Group
- **Bracken Hendricks**, CEO, Urban Ingenuity
- **Jared Lang**, AVP, Sustainability, National Housing Trust



Who We Are



www.cleanegroup.org

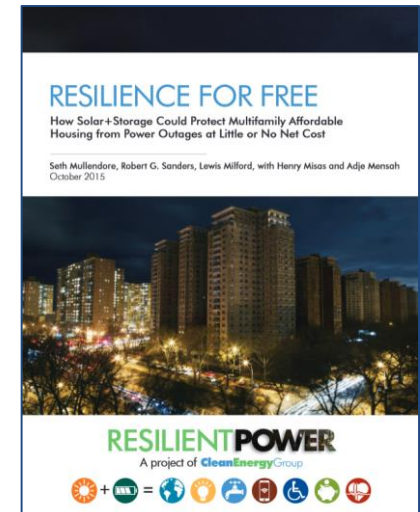
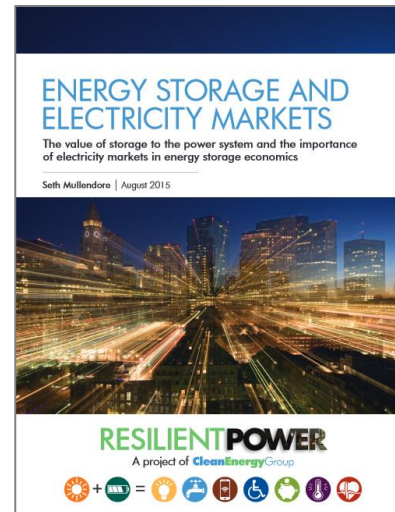
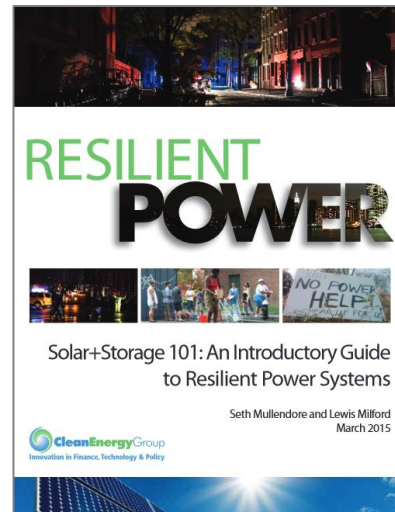
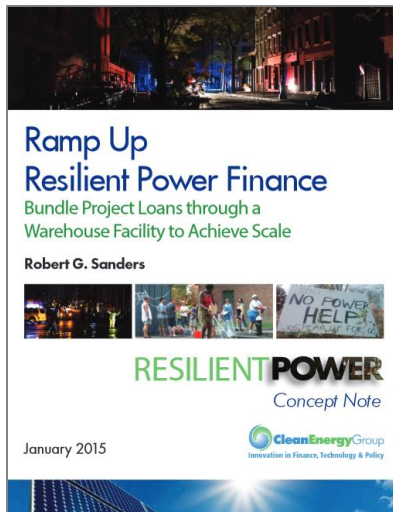
www.resilient-power.org



SURDNA FOUNDATION
Fostering sustainable communities in the United States

Resilient Power Project

- Increase public/private investment in clean, resilient power systems
- Engage city officials to develop resilient power policies/programs
- Protect low-income and vulnerable communities
- Focus on affordable housing and critical public facilities
- Advocate for state and federal supportive policies and programs
- Technical assistance for pre-development costs to help agencies/project developers get deals done
- See www.resilient-power.org for reports, newsletters, webinar recordings



Resilient Power Project: Supporting More than 50 Projects Across the Country

Leadership and Technical Assistance Grant Awardees

- ★ Leadership Awardee
- Affordable Housing
- Critical Facilities
- Both



Chicago Housing Authority: 1,900 public housing units; senior, childcare, and health centers

Massachusetts Community Clean Energy Resiliency Initiative: 11 communities, 28 projects



California Multifamily Affordable Housing: AB 693 150,000 units

City of Boulder: emergency center, shelter, wildfire center, wastewater treatment, public housing



New York/New Jersey: 9 multifamily affordable housing projects, community shelter

The Clean Energy Divide



- Hundreds of solar and storage projects
- Mainly to reduce electric bills
- Tesla/SolarCity and others target this sector
- Will grow exponentially like solar



- Too few projects in housing/communities
- Need greater than in high end
- Unequal distribution of incentives
- Need targeted LMI strategies

Marcus Garvey Apartments (East Brooklyn)

- *Year Commissioned:* 2017
- *Services Provided:* Demand management, Demand response, Backup power
- *Solar:* 400kW
- *Storage:* 300kW/1200kWh
- *Project Partners:* L+M Development Partners, NYCEEC, Demand Energy, Con Edison
- *Revenue from Con Edison:*
 - Capacity payments
 - Performance payments (demand response events)




NYCEEC Financing (Marcus Garvey)

- *Borrower:* Demand Energy SPE
- *Loan Amount:* \$1.25 million (total battery project: \$1.32 million)
- *Loan type:* Construction/term loan
- *Loan Term:* 10.5 years
- *Use of proceeds:* Battery storage equipment purchase & installation
- *Collateral:* Battery storage equipment, storage-related incentives
- *Primary sources of repayment:* BQDM incentives (ConEd), demand response payments, peak shaving utility savings

Parkway Overlook (DC Housing Authority)

- *Largest solar+storage project in multifamily affordable housing in U.S.*
- *Services provided:* Frequency regulation, back-up power
- *Public-private financing* closed in February 2018
- \$82MM redevelopment, 220 units in 8 buildings, plus community center
- LIHTCs, solar+storage ITCs, tax-exempt bond, solar RECs, Housing Production Trust Fund loan, DC solar+storage grant


- 717 kW solar PV, 600 kW of battery storage
- Produces a third of electricity to be used by the housing complex
- *Energy resilience:* Back-up power for on-site community center and leasing office (2 buildings)



DC HOUSING AUTHORITY PROJECT
PARKWAY OVERLOOK
2841 ROBINSON PLACE SE

220 AFFORDABLE UNITS
11 PERMANENT SUPPORTIVE HOUSING UNITS
AT UP TO 30% AMI
209 UNITS AT UP TO 50% AMI

\$20.1 MILLION
HOUSING PRODUCTION TRUST FUND
\$29.6 MILLION EQUITY
4% LOW INCOME HOUSING TAX CREDITS

 GOVERNMENT OF THE DISTRICT OF COLUMBIA
DC MURIEL BOWSER, MAYOR

A Resilient Power Capital Scan

- Commissioned by The Kresge Foundation, Surdna Foundation and The JPB Foundation
- Identified 5 key barriers and more than 50 recommended grant, PRI, and MRI investment opportunities in the resilient power solar and storage space.

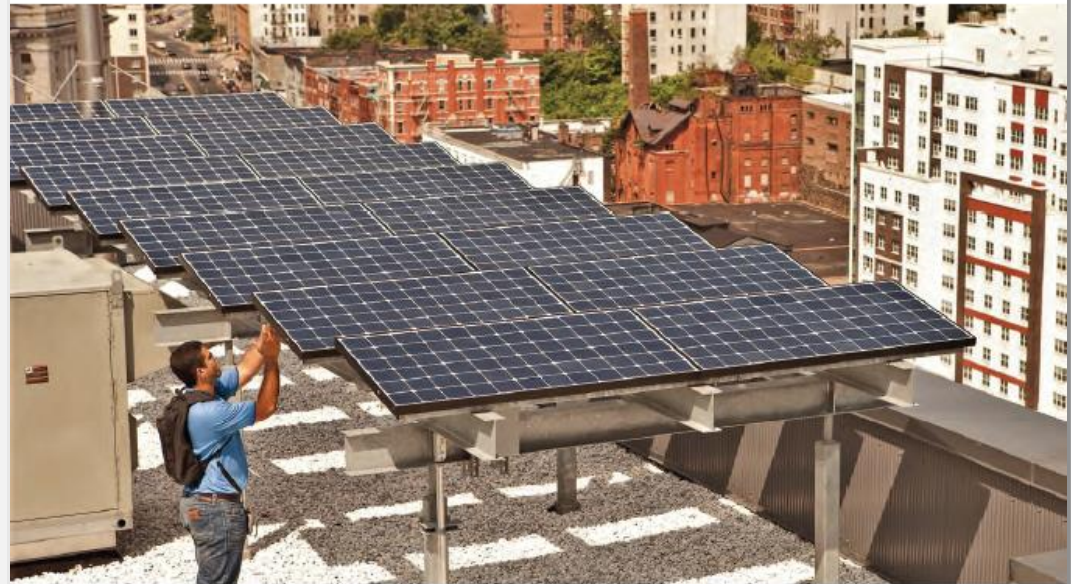


A REPORT TO THE KRESGE FOUNDATION, SURDNA FOUNDATION, AND THE JPB FOUNDATION

A RESILIENT POWER CAPITAL SCAN

How Foundations Could Use Grants and Investments to Advance Solar and Storage in Low-Income Communities

Robert G. Sanders and Lewis Milford, Clean Energy Group
February 2017



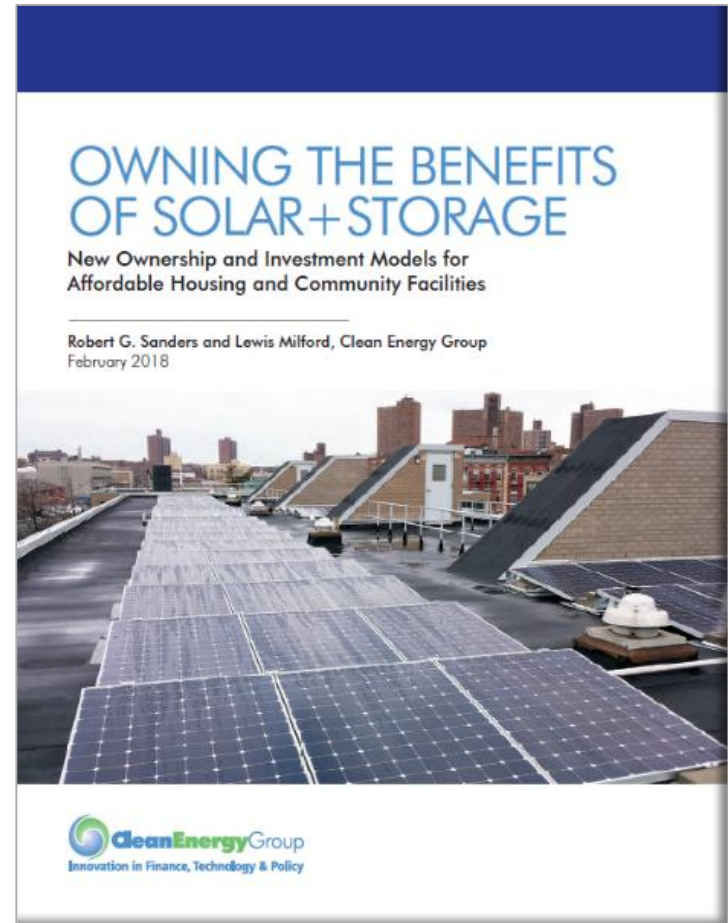
RESILIENT POWER

A project of CleanEnergyGroup



Owning the Benefits of Solar+Storage

- *“Owning the Benefits of Solar+Storage: New Ownership and Investment Models for Affordable Housing”*
 - Immediate direct ownership
 - Third-party ownership flips
 - CivicPACE with third-party ownership
 - Third-party ownership under a utility-contracted payment for services agreement



March 29, 2018

SOLAR + STORAGE FOR LOW- INCOME COMMUNITIES

NHT-Ingenuity Power Solar Partnership



URBAN INGENUITY

NHT-Enterprise.

Urban Ingenuity: Project oversight,
Legal, Energy & Financial Underwriting

National Housing Trust: Lead developer,
Debt origination, Strong balance sheet



- ✓ *Co-development with housers*
- ✓ *Treats solar as a development project*
- ✓ *Benefit streams allocated based on risks / reward*
- ✓ *Building a scalable platform in DC, CA, CO, NY, NJ, and more*

Enterprise & NHT Renewables Track Record

Project	Scope	Enterprise Role	NHT Role
NHT Renewable DC 5 (2014)	<ul style="list-style-type: none"> • 500 kW • \$1.5 M investment 	Debt and grant funding	Sponsor equity, ownership, guarantees, installation, and ongoing operation
Channel Square Renewable (2016)	<ul style="list-style-type: none"> • 500 kW • \$1.5 M investment 	Tax equity and debt	Sponsor equity, ownership, guarantees, installation, and ongoing operation
Nixon Community Solar (2016)	<ul style="list-style-type: none"> • 800 kW • \$1 M investment 	Tax equity	Debt
Denver Housing Authority Community Solar (2017)	<ul style="list-style-type: none"> • 2 MW • \$3 M investment 	Debt	Co-developer (with housing authority)
LINC Housing Solar (2018)	<ul style="list-style-type: none"> • 2 MW • \$2 M investment 	Debt	Developer

Urban Ingenuity Track Record

Project	Scope	UI Role
DC PACE Program (2013 – present)	<ul style="list-style-type: none">• Appx. \$35 M in financing closed to date• 1 MW+ solar PV installed or in construction• First use of PACE for low-income housing and first use of tax-exempt PACE nationwide	Program administrator; UI helped design and now runs the program under contract to DOEE
DOEE Microgrid Grant	<ul style="list-style-type: none">• 3-year grant to explore feasibility of district energy across DC• Identified and screened 75 candidate sites• ‘Microgrid extension’ TA and predevelopment services provided to owners / developers of promising sites	Lead investigator on grant
TA for Solar + Storage at a DC public housing redevelopment	<ul style="list-style-type: none">• Led analysis to design a 700 kW solar + 500 kW / kWh battery system• Supported project developer in understanding economics and integrating the solar + battery into overall project financing	Technical assistance, project management (with design and support from Optony and AF Mensah)

Options for Deploying Solar + Storage

I. Property-level installation

1. Direct purchase by property
2. Lease or PPA at property-level
3. Fold into a planned recapitalization

II. Portfolio-scale project development

1. Houser ownership with tax equity investor
2. Houser Development with NHT-IP ownership

Purchase vs. Lease: Case Study



PROJECT: St. Denis Apartments

DEVELOPER: NHT/Enterprise

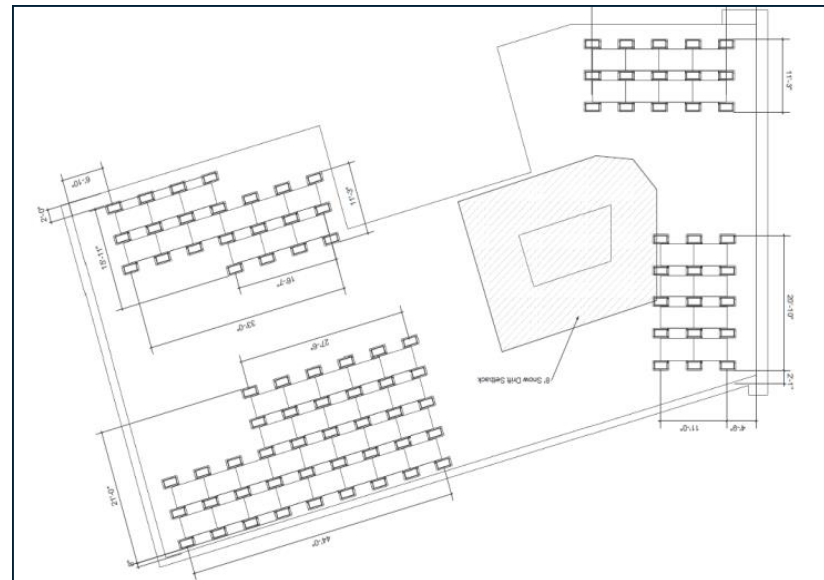
LOCATION: Mount Pleasant, Washington, DC

CERTIFICATIONS: Enterprise Green Communities

NUMBER OF APARTMENTS: 32

SYSTEM SIZE: 15 KW

SYSTEM COST: \$50,000



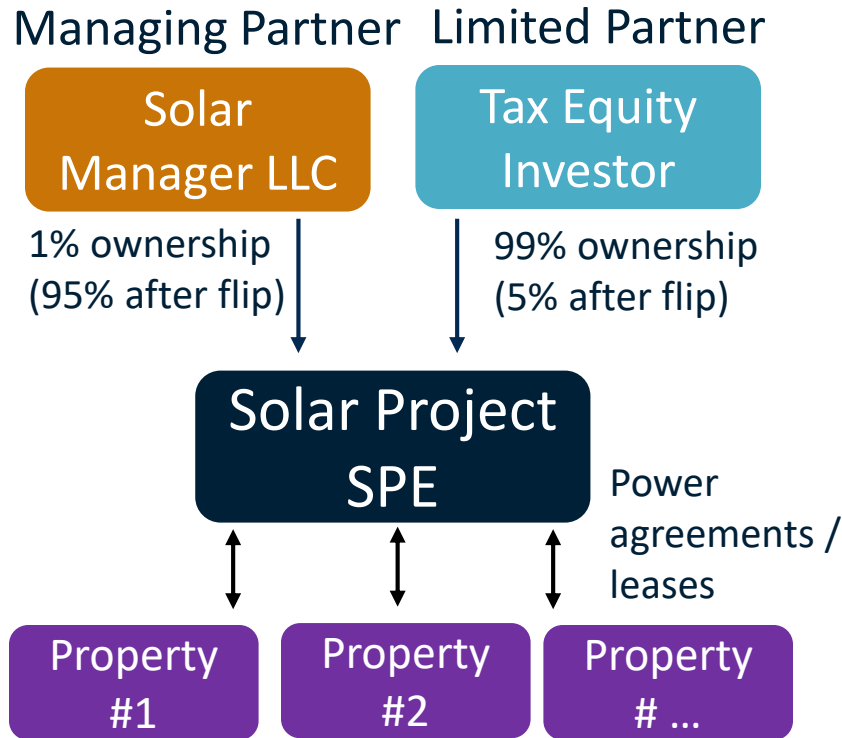
Purchase vs. Lease: Financials

Purchasing							
System Size (kW)	15						
Estimated Output (kwh)	20,000						
Power Price / kwh	0.14						
		2014	2015	2016	2017	2018	2019
Financials							
Equity Investment	\$ (50,000)						
Federal Tax Credit (30%)	\$ 15,000						
Income (Savings and Incentives)		\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000
Net Cash Flow	\$ (35,000)	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000
10-Year NPV	\$20,564						
Payback	4 Years						
Leasing							
System Size (kW)	15						
Estimated Output (kwh)	20,000						
Power Price / kwh	0.14						
		2014	2015	2016	2017	2018	2019
Financials							
Equity Investment	\$ (5,000)						
Income (Savings and Incentives)		\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Net Cash Flow	\$ (5,000)	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
10-Year NPV	\$2,226						
Payback	5 Years						

Portfolio-Scale Project Development

1. Owning and operating solar across multiple properties
2. Setting up standardized leases with the property partnerships
3. Opening projects up to new income streams
4. Aggregating multiple projects in one financing to access economies of scale
5. Potential for development fees makes the benefit worth the brain damage

Portfolio Solar Project Ownership



- Housing owner gets devt fee
- New income + option for tenant benefits
- Housing developer can be in ownership of SPE
 - Makes guarantees
 - Takes on performance risk
 - Puts in equity and gets returns

Illustrative Project: *Portfolio Solar + Battery*

Bldg. Type: Affordable Multifamily Housing (8 sites)
Solar PV: 1 MW
Battery Size: 350 kW / kWh
Location: Washington D.C.

Sources and Uses	
Sources	
Tax Equity	\$ 1,200,000.00
Debt	\$ 2,200,000.00
Sponsor Equity	\$ 600,000.00
<i>Total Sources</i>	<i>\$ 4,000,000.00</i>
Uses	
Solar PV	\$ 3,200,000.00
Battery	\$800,000
<i>Total Uses</i>	<i>\$ 4,000,000.00</i>

10-Year Project Benefits*	
Developer Fees (Y1)	\$400,000
Initial Investment	(\$600,000)
Returns on Equity	\$900,000
Savings	\$625,000

*Fees and returns allocated between houser and co-developer

Illustrative Project: *Portfolio Solar + Battery*

Solar PV + Battery Example

		2019	2020	2021	2022	2023	2024
Income (Energy Payments)	\$	100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Income (Solar Credits)	\$	270,000	\$ 270,000	\$ 270,000	\$ 270,000	\$ 270,000	\$ 270,000
Income (Ancillary Services)	\$	130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000
Operating Expenses	\$	(100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)
NOI	\$	400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000
Debt Service	\$	(300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)
<i>DSCR</i>		1.33	1.33	1.33	1.33	1.33	1.33
Available for Returns	\$	(600,000)	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Sponsor Equity IRR		12%					

		2024	2025	2026	2027	2028	2029
Income (Energy Payments)	\$	100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Income (Solar Credits)	\$	270,000	\$ 270,000	\$ 270,000	\$ 270,000	\$ 270,000	\$ 270,000
Income (Ancillary Services)	\$	130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000
Operating Expenses	\$	(110,000)	\$ (110,000)	\$ (110,000)	\$ (110,000)	\$ (110,000)	\$ (110,000)
NOI	\$	390,000	\$ 390,000	\$ 390,000	\$ 390,000	\$ 390,000	\$ 390,000
Debt Service	\$	(300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)	\$ (300,000)
<i>DSCR</i>		1.30	1.30	1.30	1.30	1.30	1.30
Available for Returns	\$	90,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000

Resilience through Solar + Storage

Challenge: Battery storage can eliminate disruption to entire communities during electricity grid outages, but is too expensive, complex, and physically large for housing owners to routinely use for entire buildings.

Solution: Community Resilience Hubs / powering select critical loads

- Practical interim step toward powering every unit in a building
- Smaller battery size and lower cost
- Support common area loads (emergency lighting, elevators, etc.)
- Create cooling / heating shelters in community centers
- Maintain power for site management offices to allow operations to continue

Solar and Resilience: Case Study

Opportunity for Innovation:

- Large solar PV (multiple rooftops and ground-mount)
- Battery storage
- Larger rehab including many EE measures

Solving to the Challenge:

- Finance solar + battery as part of 4% LIHTC deal
- How to capture benefits with tenant metering
- Underwriting storage

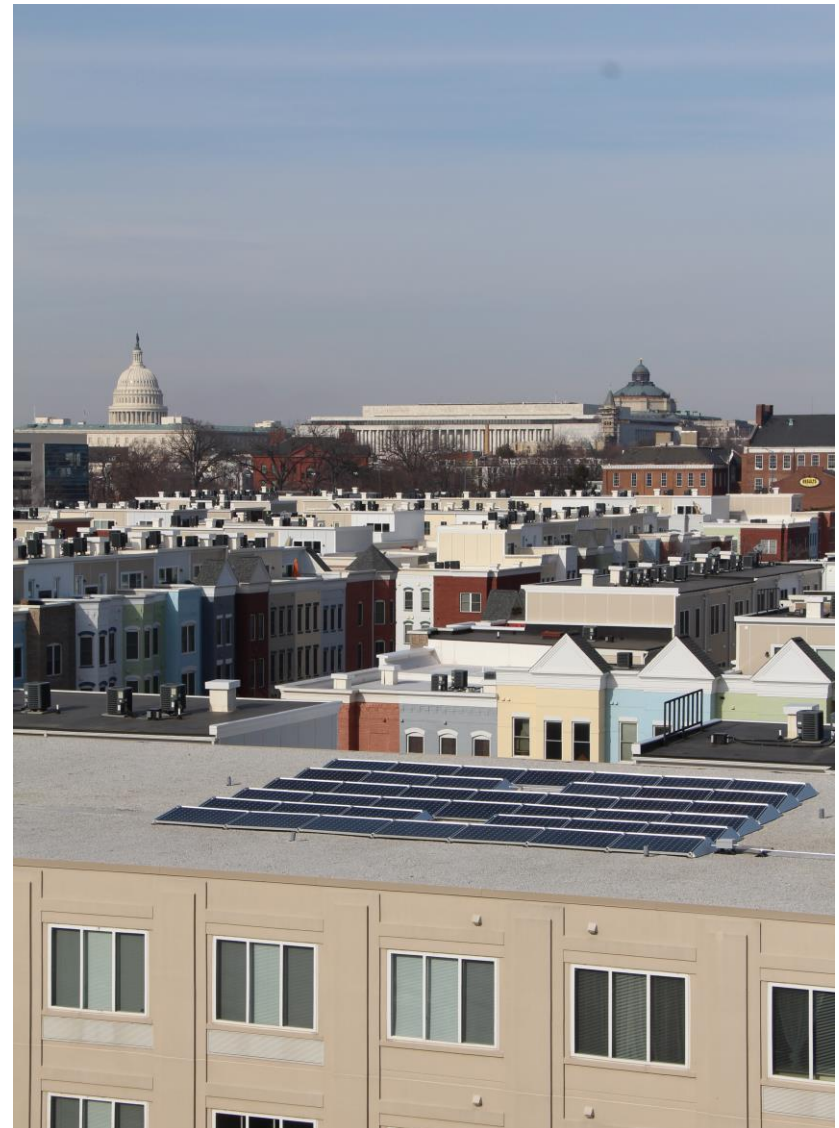


Designing a Resilience Hub

Project Design:

- Feasibility analysis and initial design by Optony (solar) and AF Mensah (battery)
- Appx. 700 kW of solar PV
- 500 kW / kWh of battery storage
 - Powers community center and site office during outages
 - Potential for several hours of resilience each day during sustained blackouts.

Status: System designs and economics incorporated into project plans prior to closing, construction now underway.



How can we help?

- ✓ Provide technical assistance
- ✓ Co-develop solar projects
- ✓ Key role
 - Bring financing and legal structure to deal
 - Library of document templates
 - Tasks lists and deliverables
 - Securing property investors & lender approvals

Jared Lang
National Housing Trust-Enterprise
jlang@nhtinc.org
(202) 333-8931 x115

Bracken Hendricks
Urban Ingenuity
bhendricks@urbaningenuity.com
(202) 796-8925

Thank you for attending our webinar

Rob Sanders

Senior Finance Director

Clean Energy Group

rsanders@cleanegroup.org

Find us online:

www.resilient-power.org

www.cleanegroup.org

www.facebook.com/clean.energy.group

@cleanenergygrp on Twitter

@Resilient_Power on Twitter

Upcoming Webinars



FERC Order 841: Leveling the Playing Field for Energy Storage Resource Market Participation

Wednesday, April 4, 1-2pm ET

FERC and Clean Energy

Thursday, April 26, 1-2pm ET

Read more and register at

www.cesa.org/webinars