HOW TO USE THE PORTFOLIO-LEVEL APPROACH TO FINANCE SOLAR ACROSS AFFORDABLE MULTIFAMILY HOUSING PROPERTIES
Speakers

Bettina Bergoo, Sustainability in Affordable Housing Lender Learning Network / EEFA

Jared Lang, Assistant Vice-President for Sustainability at NHT-Enterprise

Esther Toporovsky, Senior Program Director of Green Communities at Enterprise Community Partners

Chris Jedd, Portfolio Energy Manager at Denver Housing Authority
A collaborative, coalition-driven, 13-state campaign to increase energy efficiency in affordable multifamily housing

Our Long Term Vision: EEFA’s success catalyzes equitable access to clean energy resources for healthier homes, reduced poverty, a cleaner environment and more climate-resilient communities
Sustainability in Affordable Housing
Lender Learning Network

- **Vision:** Stable, affordable multifamily housing for all supported by investments in environmental sustainability

- **Mission:** Leverage the collective expertise and relationships in our network to support a multifamily housing financing market where lenders value environmental sustainability as a means to support economic sustainability

- Knowledge sharing through a *NEW* online resource hub, program and transaction database (under development), webinar series, and connecting at in-person events

- **Advisory Group:**

![Partner Logos]
Launched today: SAHLLN website!

www.energyefficiencyforall.org/sahlln/sahlln-resources/
Financing Structures For Affordable Housing Solar

Jared Lang
National Housing Trust
Key Questions

1. What structures are out there?

2. What’s the NHT Renewable Model?

3. How do you make the benefit worth the brain damage?
National Housing Trust / Enterprise Preservation Corporation

- Own & Operate approximately 4,000 affordable rental units along the East Coast and Illinois.

- NHT/Enterprise has achieved green certification (Enterprise, Earthcraft or other) on approximately 2/3 of units, 2,500 units, in its portfolio.

- First Green Certified property in DC (Galen Terrace)

- Typically reduce energy consumption >20%.
Enterprise & NHT-Renewable Solar Resume

Completed

NHT Renewable DC 5 (2014): 500 KW, $1.3 Million Investment
Channel Renewable (2016): 500 KW, $1.5 Million Investment
Nixon Peabody Community Solar I (2016): 350 KW, $1 million
Denver Housing Authority Solar (2017): 2 MW, $3 million
LINC Housing Solar (2018): 800 KW, $2 Million

In Development

CPDC Solar: 1.2 MW, $3.5 million
Bridge Housing Solar (2018): 800 KW, $2.5 million
NHT Ingenuity Power DC I (2018): 1 MW, $3 million
Riseboro CDC (2019): 1.2 MW, $3.5 million
NHT Ingenuity Power DC II (2019): 1 MW, $3 million
Jonathan Rose Companies Solar (2019): 1.2 MW, $4 million
Structures

1. Purchase at the property partnership

2. Lease / Power Purchase Agreement

3. NHT Renewable Model (Portfolio-scale solar)
Why Purchase?

Benefits
1. 100% of Energy Savings
2. Environmental benefit
3. Local energy production
4. Price stability

Challenges
1. Roof Condition and Structural Reviews
2. Up-front Capital
3. Approvals
4. Construction Risk
5. O&M
Why Lease?

Benefits
1. No installation costs
2. No O&M
3. Energy Savings, but only about 10-30%
4. Environmental benefit
5. Local energy production
6. Price stability

Challenges
1. Roof Condition and Structural Reviews
2. Legal fees associated with onerous approvals
3. 3rd-party owning an asset on your roof
4. Less energy savings, only 10-30%
## Economics

### Table

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<th>Year</th>
<th>Purchase Savings + Incentives ($)</th>
<th>Lease Savings (10% Discount) ($)</th>
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<tr>
<td>Year 20</td>
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</table>

**Total Savings**

| Purchase | $200,000 | Lease | $20,000 |
NHT Renewable Model

1. Setting up a company to finance, install, and operate solar on top of multiple housing properties
2. Singing agreements between the solar company and property partnerships to sell power
3. Opening solar projects up to new income streams
4. Aggregating multiple properties
5. Making the benefit worth the brain damage
NHT Renewable Org Structure

- Housing Owner
- General Partner of Property
- Properties
- Solar Company (Partnership with Solar Tax Investor)

- Power Purchase Agreement
NHT Renewable (Hybrid)

**Benefits**
1. Environmental benefit
2. Energy Savings
3. New income streams
4. Local energy production
5. Price stability
6. Properties:
   - No upfront cost or O&M

**Challenges**
1. Roof Condition and Structural Reviews
2. Up-front Capital
3. Approvals
4. Construction Risk
5. O&M

![Graph](chart.png)
Renewable I Project Scope

NHT/E Properties Impacted: 5
Solar Thermal Systems: 2
Solar Photovoltaic Systems: 4
Total Project Cost: $1.25 million
Photovoltaic: 300,000 kw/year
Thermal: 10,000 therms/year
Project Installation: Q2 2014
St. Dennis 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
## St. Dennis Financials

### Solar PV Example

- **System Size (kW):** 15
- **Estimated Output (kWh/year):** 20,000
- **Power Price / kWh:** 0.14

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<thead>
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<td>Income (Savings and Credits)</td>
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<td><strong>Payback</strong></td>
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</table>
# NHT Renewable Financials

## System Size
- Photovoltaic (kW): 250
- Thermal (Therms): 10,000
- Estimated Output (kwh): 500,000

## Financials

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
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<td>Equity Investment</td>
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</table>

**Payback:** 5 Years
Strong Solar Markets

Rooftop Solar on Affordable Housing gets 5-10 Year Payback

- D.C.
- California
- New Jersey
- New York
- Massachusetts
- Colorado
Decent Solar Markets

Rooftop Solar on Affordable Housing gets 10-20 Year Payback

- Illinois
- Connecticut
- Maryland
- North Carolina
How can NHT Renewable & Enterprise help?

1. Analyze potential solar system sizing
2. Basic financial modeling of options
3. Review risks and reward
4. Provide debt & solar tax investor equity
5. Co-Develop projects
6. Own projects
If you want to learn more...

Jared Lang
Sustainable Development Manager
jlang@nhtinc.org
(202) 333-8931 x115
CASE STUDY:

NHT Renewable DC 5 Project
What we do

- Connecting Capital to Communities
- Innovating Solutions for the Field
- Transforming Policy for long-term change

Diagram:
- Capital
  - Connecting Communities to Opportunity
- Solutions
- Policy
<table>
<thead>
<tr>
<th>Highlights &amp; Learnings</th>
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<tbody>
<tr>
<td><strong>Capital</strong></td>
</tr>
<tr>
<td>✓ Invested $36 million public and private lending capital into clean energy projects</td>
</tr>
<tr>
<td>✓ Through debt, equity, and tax credit equity from banks and philanthropic loans to create lines of credit, technical assistance, green mortgages, solar transactions, and energy efficiency retrofits involving over 3000 homes across the country.</td>
</tr>
<tr>
<td><strong>Program / Policy</strong></td>
</tr>
<tr>
<td>✓ Secured $23 million in grants over the past 10 years</td>
</tr>
<tr>
<td>✓ From public and private sources such as HUD, NYC Weatherization Program, Department of Energy, Energy Foundation and others to test energy and solar development in CA, Chicago, and NY; to retrofit over 4000 homes in NYC; to create Green Capital Needs Assessments; and to develop better benchmarking tools; and to participate in Energy Efficiency for All engagement; and to create Enterprise Green Communities Retrofit and Resilience Toolkits for the market.</td>
</tr>
<tr>
<td><strong>Learned</strong></td>
</tr>
<tr>
<td>✓ Creating portfolio level models will lead to more investment in this sector, as smaller scale debt financing is complex and costly</td>
</tr>
<tr>
<td>✓ Refinancing is a sweet spot, but not every partner needs a full recapitalization or refinance for lighter touch energy repairs</td>
</tr>
<tr>
<td>✓ Partners are interested in a modest cost pathway and new technology upgrades for mid-cycle projects that layer housing + energy funds, but existing energy money is not streamlined or easy to access</td>
</tr>
<tr>
<td>✓ Overall market lacks technical assistance or expertise for this sector and there is a need for targeted predevelopment pots of funding</td>
</tr>
<tr>
<td>✓ Working in collaboration with thought partners on policy, capital, and financing solutions (NHT and NRDC, etc.) is key to bring systemic solutions for solar + energy + resilience to this sector</td>
</tr>
</tbody>
</table>
# CASE STUDY: NHT Renewable

**Project Name:** NHT Renewable, LLC  
**Sponsor:** National Housing Trust (NHT)  
**Location:** Washington, DC  
**Properties:** 5 properties (Copeland Manor, Galen Terrace, Meridian Manor, R St, St Dennis)  
**Units:** 340 units Affordable Homes

**Renovation Plan:** installation of Solar Photovoltaic (PV) and Solar Thermal (ST) systems on the five properties
# Portfolio Solar Model: A Tool to Create Income for Partners

## Structure
- **Traditional Flip LIHTC GP/LP structure.** There is partnership ownership of PV equipment. (Sponsor/GP 1%; ITC Investor/LP 99%/for 5 years)
- **Financing occurs across a portfolio** and maintain ownership at the corporate level, not a property level, align solar incentives for owners, investors and lenders

## Benefits
- **Revenue** – property owner receives the operating income rather than a third party, allowing it to diversify its revenue streams and finance future affordable housing.
- **Decreased Operating expenses** - The PPA terms are more favorable to the Sponsor (pricing locked in for 10 years w/out the usual 3rd party PPA 3% escalation)
- **Less Costly** - develop multiple sites, and get reduced pricing on systems,

## Roles
- **Project Development TA & Origination** – assess opportunity, structure financing/incentives/legal, bring solar provider through developer fee, S4 funds (NHT/E & Enterprise)
- **Sponsor** – create SPE and provide host sites for solar and receive developer fee, income from solar panel operation
- **Debt** – underwrite and provide long-term lending capital to sponsor (ECLF w/ Initiatives)
- **Equity** – provide 30% equity and receive tax benefits, preferred return (NHT w/ identified investor)
Portfolio Solar Model: how does it work?

**PLAYERS**
- **PROJECT SPONSOR/AH OWNER** (0.01% Managing Member)
- **3rd PARTY SOLAR INSTALLER** (Asset Management)
- **3rd PARTY SOLAR MAINTENANCE** (Periodic Maintenance)

**SOURCES**
- **30% ITC EQUITY** (99.9% Investor Member)
- **~60% DEBT** (Enterprise Community Loan Fund)
- **~10% SUBSIDIES** (SREC, Rebates, Grant)

**SPE** (Renewable LLC)
- $ Income (solar panel operation, SREC Sales)
- $ (dev fee, solar panel operation)
- $ (preferred return, tax benefits)

**HOST** (Solar Site)
- $ Income (solar panel operation, SREC Sales)
## Development Budget

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<th>Uses</th>
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<td>Soft Costs</td>
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<td><strong>Total Uses</strong></td>
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<table>
<thead>
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<th>Sources</th>
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<tr>
<td>Debt (ECLF 55%)</td>
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<td>Investor Equity (ITC 30%)</td>
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<td>Sponsor Equity (NHT 15%)</td>
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<td><strong>Total Sources</strong></td>
<td><strong>$1,314,579</strong></td>
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## Loan Terms

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<td>Security</td>
<td>UCC Lien on Solar Equipment</td>
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## Operating Pro Forma – Cash Flow

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<td>$212,577</td>
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<tr>
<td>Tax and Audit</td>
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<td>Maintenance &amp; Insurance</td>
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Underwriting Considerations
<table>
<thead>
<tr>
<th>Collateral</th>
<th>Valuation</th>
<th>Stress test</th>
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</table>
| ✓ UCC lien on equipment  
✓ Sponsor guarantee (100%)  
✓ Sponsor recourse (50% min)  
✓ Sponsor equity (5%-10% min) | ✓ LTV tied to solar equipment useful life  
✓ Net present value of cash stream from solar  
✓ Pledges and rights to solar equipment | ✓ Solar is a cash flow loan  
✓ How is cash flow is produced  
✓ Will cash flow from solar materialize  
✓ Debt payment before other fees or preferred returns (Income-fixed expenses -> lender paid) |
## Repayment: how is cashflow produced, how to guarantee payment stream?

| **Income** | ✓ Solar Renewable Energy Credit income (sale of SREC’s to utility for set rate, term)  
✓ Power Purchase Agreement Contracts (properties guarantee purchase of power for set term and rate) |
| **Performance** | ✓ 3rd party commissioning to ensure built as designed  
✓ Performance guarantee to ensure system performs  
✓ Equipment warranties & Replacement Reserves to ensure output for life of project  
✓ Ensure counterparty/solar installer experienced and reputable |
| **Debt Service Coverage** | ✓ Minimum 1.2 DSCR to ensure substantial cushion  
✓ Conservatively estimate energy output into projections |
| **Evaluation** | ✓ PPA & SREC contracts approvals include term of loan  
✓ Investor and Lender approvals  
✓ ITC investor requirements |
### Organizational Risk: how to assess sponsor as guarantor?

<table>
<thead>
<tr>
<th>Financial Stability</th>
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<tbody>
<tr>
<td>✓ Financial stability and reliability of sponsor organization</td>
</tr>
<tr>
<td>✓ Demonstrate stable balance sheet, good cash flow/liquidity to guarantee the loan.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organizational Goals/History</th>
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<tbody>
<tr>
<td>✓ Is the Sponsor mission aligned/Preservation focused</td>
</tr>
<tr>
<td>✓ Organization dedicated to using energy, renewable for stabilizing portfolios</td>
</tr>
<tr>
<td>✓ History working with the Sponsor that demonstrates successful operations and asset management of existing portfolio</td>
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</table>
## Expected vs. Actual Returns on Operation

### Cash Flow Distributions

<table>
<thead>
<tr>
<th></th>
<th>Year 1 - 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 9</th>
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<td><strong>Initial Projection</strong></td>
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<td>$51,100</td>
<td>$39,446</td>
<td>$39,446</td>
<td>$16,138</td>
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<td><strong>Actual and Revised Projection</strong></td>
<td>$0</td>
<td>$192,702</td>
<td>$182,221</td>
<td>$181,370</td>
<td>$180,523</td>
<td>$137,760</td>
</tr>
</tbody>
</table>

*Actual projections reflect increased revenue from SREC income*
Please contact us for more details!

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DHA Community Solar Garden

Prepared by:
The Housing Authority of the City and County of Denver
DHA’s Solar Appetite

DHA Solar Challenges

- Available suitable space
- Various property types and ownership structures
- Various subsidies
- Various lease and utility allowances scenarios
- Financing
- Utility policies

1 Megawatt = 1,000 kilowatts
Community Solar Overview

“A community solar project—sometimes referred to as a solar garden or shared renewable energy plant—is a solar power plant whose electricity is shared by more than one household. “

Source: Energy Sage
Community Solar 101

- Policies vary state by state
- Various models & approaches
- Various metering & virtual metering scenarios
- Various ways to participate
  - Buy in
  - Power purchase agreement
  - Develop your own
- Benefits
  - Renewable energy
  - Predictable energy costs
  - Energy savings
- Challenges
  - Long term contracts
  - Contract terms
DHA Community Solar Program

- First Housing Authority Developed, Owned & Operated Community Solar Garden
- 100% Low Income
- Supported by the cities of Denver & Aurora
- Allows other Denver Metro Housing Authorities and affordable housing developers to participate
- Expect to provide 20% average energy savings to subscribers
- Offset over 54,000 tons of CO2 emissions
- Provide hands-on training, certification & employment for 10+ affordable housing residents for a year
- Interconnected through the Xcel Energy’s Solar* Rewards Community® program
Project Team
Metering

Syracuse Plaza
“Subscriber”

DHA Solar Garden
“Producer”
Ownership Org Chart

Denver Metro Solar LLC

Denver Affordable Energy Inc., its managing member, (1%)

Independent Board of Directors

The Housing Authority of the City and County of Denver, its sole member

Equity Investor (99%)
Economics

Financing
- Tax equity partner: $1.2 Million
- Lender $2.4 Million
- DHA Equity / Loan $200,000
- Total $3.8 Million

Annual revenue
- Renewable Energy Credits from Xcel Energy (53% of revenue)
- Sale of Electricity to properties (47% of revenue)

Annual Expenses
- Debt Service
- Land lease
- Operations and Maintenance
- Management fee
- Replacement Reserves

DOE Better Building Challenge Summit
Results

- Reduction in Operating Expenses
- Clean Renewable Energy
- Flexibility
- Bill Savings to Low Income Residents
- Work Force Development
Questions?

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Questions (now and later!)

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