Financing for Resilience

Thursday, July 11
2:00 – 3:30 PM
Agenda

- Intro/polling questions
  - Which sector are you from?
- Bob Johnson – Hannon Armstrong
- Andrew Zech – Greenworks Lending
- David Tine – HSB/MunichRE
- Questions/discussion
$300+ billion natural disaster damages in 2017

Source: https://www.ncdc.noaa.gov/billions/
The spectrum of climate risks to real estate

- Physical damage
- Insurance premium repricing
- Tax increases to fund infrastructure
- Investment liquidity reduced
- Economic & demographic damage
- Abandonment of riskiest/least resilient locations
Common resilience projects

<table>
<thead>
<tr>
<th>COMMON RESILIENCY PROJECTS</th>
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<tbody>
<tr>
<td><strong>Energy Supply</strong></td>
<td></td>
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<tr>
<td>- Renewable energy</td>
<td>Ensure building systems continue operating</td>
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<tr>
<td>- Combined heat and power (CHP)</td>
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<tr>
<td>- Battery storage</td>
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<td>- Backup generation</td>
<td>Reduce energy and water demand; increase operating time on backups</td>
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<td>- Microgrid</td>
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<td>- Electric vehicle charging</td>
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<td><strong>Resource Conservation</strong></td>
<td>Mitigate property damage, injury, and system outages</td>
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<td>- Efficient lighting and HVAC</td>
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<td>- Water efficiency measures</td>
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<td>- Building envelope improvements</td>
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<td><strong>Structure Hardening</strong></td>
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<td>- Seismic retrofits</td>
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<td>- Wind-resistant roofs and windows</td>
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<td>- Flood mitigation</td>
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</table>
Speakers

- Bob Johnson, Hannon Armstrong
- Andrew Zech, Greenworks Lending
- David Tine, HSB/MunichRE
“Remember the rule of 3s  
3 minutes without air  
3 days without water  
3 weeks without food.”  

-Bear Grylls
Hannon Armstrong Overview

HASI
LISTED
NYSE
First U.S. public company solely
dedicated to investments in
climate change solutions

PRINCIPAL INVESTOR

~$1 Billion
Invested Annually

$5.5 Billion
Managed Assets

BEHIND THE METER
Energy Efficiency
Distributed Generation
Storage

GRID CONNECTED
Wind
Solar
Storage

SUSTAINABLE INFRASTRUCTURE
Stormwater Remediation
Environmental Restoration
Transmission & Communications
$1.6B
#1 among Financial Allies in terms of capital invested in energy efficiency and/or renewable energy improvements for 2018

$5.2B
Since joining, we have financed $5.2 billion in improvements -- most among all capital providers in the program
Lessons Learned from Hurricane Sandy
United States Marine Corps Base – Parris Island
A Fully Operational Microgrid at Scale
3.5 MW CHP, 8.5 MWhr Battery Storage, 5.5 MW Solar
Seismic Resiliency Using C-PACE Financing
Financing Resiliency – Financing Risks

Obligor Credit

Technology

Contractor Capabilities
Thank You

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Andrew Zech
Greenworks Lending
C-PACE Funding for Resilience

Presented to Better Buildings Summit | July 11, 2019
Introduction

**Greenworks Lending** is a leading provider of commercial PACE (C-PACE) financing. The company was founded in 2015 with the goal of bringing C-PACE to building owners across the country.

Greenworks has provided financing to hundreds of commercial properties in more than a dozen states.

The company completed the C-PACE industry’s first rated securitization (AA) and our assets have been awarded S&P’s highest “Green Evaluation” rating (ES1).
National Expertise

Founded by the architects of the first successful C-PACE program (CT)

Greenworks and its founders have closed 300+ PACE projects across 13 states

Best in class underwriting platform ensures a smooth funding process

Current Markets (19)
Coming Soon
C-PACE 101

C-PACE (Commercial Property Assessed Clean Energy) is a public-private CRE finance program enabled by state law that classifies energy-saving upgrades to commercial real property as a public benefit. Water, seismic, and hurricane upgrades may also qualify.

Once a PACE Program is established, qualifying upgrades may be financed with private capital and repaid as a benefit assessment on the property tax bill over the life of the improvements/new construction (often 20+ years). The assessment transfers on the sale of the property and can be passed through to tenants where appropriate.

While facilitating sustainability efforts, the program also saves property owners money by providing significantly better-than-market financing terms.
Powerful Solution

Cash Flow

- 100% financing
- Long payback period, fixed rate
- Covers all hard and soft costs

Flexible & Secure

- Non-recourse after construction
- Transfers on sale
- Costs can be passed through to tenants
- Pre-payable (with exit fee)

Easy to Qualify

- Qualify based on property value
- Funds most energy and water projects
- All standard commercial property types
Most Buildings Qualify

**Building Requirements**
- Commercial, Industrial, Non-Profit, Multi-Family >5 Units
- Does NOT work for residential, government
- Located within operational PACE municipality
- Current on property taxes

**Financial Requirements**
- Financed amount cannot exceed 35% of property value - and 20% for new construction
- Total property debt (mortgage + PACE) cannot exceed 95% of property value
- Not in bankruptcy
- Meets other state statutory requirements

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**Hotels & Offices**
Increase tenant and guest comfort as well as net operating income

**Retail**
Invest in windows, lighting and more with long-term, low-cost capital

**Manufacturing**
Offset high energy use with renewables and ensure operations with resiliency measures

**Multi-family**
Properties with greater efficiency are not only more profitable, but marketable to tenants as well
Project Types

**Energy Efficient Upgrades & Deferred Maintenance**
Replace HVAC, lighting, windows, roof, etc. or improve seismic or hurricane resiliency to improve property and portfolio value.

**New Construction & Gut Rehabs**
Improve cash on cash returns; decrease cost of capital; fill equity gaps.

**Solar & Renewables**
100% financing and 20+ year repayment drives day-one cashflow and maximizes tax equity for owners.
Resiliency + C-PACE = Perfect Marriage

Automated Building Controls

High Efficiency Lighting

Water Conservation

HVAC Systems

Boilers, chillers and furnaces

Hot Water Heating Systems

Variable Speed Drives

Resiliency

Building Envelope

Resiliency upgrades increase marketability, replace old equipment, reduce OpEx - all of which enhance asset value.

C-PACE preserves owner capital - with 100% financing of hard and soft costs to replace old equipment.

Long repayment “softens the blow;” tax assessment structure may allow pass-through on NNN leases and room surcharge.
**PROPERTY SUMMARY**
Originally built in the 1960s as the 26-story tall headquarters of Hartford National Bank, 777 Main Street is now certified LEED Platinum, features 285 mixed-income apartments, a commercial space on the ground floor, and is the nation’s first C-PACE financed microgrid.

**OPPORTUNITY**
Historic bank building renovated into LEED platinum mixed-use facility (285 residential units + commercial office) with fuel cell, 115kW rooftop solar photovoltaic array.
Resilient infrastructure and 76% utility savings vs. code requirement attracted better-than-market residential tenant mix as well as healthcare tenants in the commercial spaces.

### Renewables Retrofit: Hartford, Connecticut

<table>
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<tr>
<th>Building Type</th>
<th>Measures</th>
<th>Term</th>
<th>Financed Amount</th>
<th>Lifetime Savings</th>
<th>LTV</th>
</tr>
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<tbody>
<tr>
<td>Residential - Multi-Family</td>
<td>Solar (115KW) &amp; 400KW fuel cell supported microgrid</td>
<td>20 years</td>
<td>$1.6M</td>
<td>$1.72M</td>
<td>18%</td>
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</tbody>
</table>
“In order to convert the former Hartford National Bank building for residential use, there was a whole range of interventions we had to take to make it an energy efficient building. From the get-go, Greenworks Lending was a partner to us through every step. When there was a challenge, they were part of the solution.”

Bruce Redman Becker, AIA, AICP, President Becker & Becker
8000 Edgewater  |  Mynt Systems

Greenworks funded code-required structural upgrades (seismic hardening), roof replacement, HVAC, and solar array.

Owner retains tax credits and incentives or third-party owned option for non-profit customers through CollectivePACE

100% financing + 25-year repayment = Day 1 Cash Flow

Financing can cover roof, structural upgrades, and related installation costs
Munich Re Group – Energy Industry Focus

HSB: 150+ years experience in specialty insurance, inspections and engineering services

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Relevant natural catastrophe loss events worldwide 2018

Extreme storms, wildfires and droughts cause nat cat losses of US$ 160bn in 2018

- Geophysical events (Earthquake, tsunami, volcanic activity)
- Meteorological events (Tropical storm, extratropical storm, convective storm, local storm)
- Hydrological events (Flood, mass movement)
- Climatological events (Extreme temperature, drought, wildfire)

Wildfires
- Wildfire (Camp Fire) 8 – 25 Nov, United States Fatalities: 86
- Wildfire (Woolsey Fire) 8 – 22 Nov, United States Fatalities: 3

Hurricanes
- Hurricane Florence 10 – 27 Sep, United States Fatalities: 53

Floods
- Flood, landslide 5 – 9 Jul, Japan Fatalities: 224

Droughts
- Drought Mar – Nov, Europe
- Drought Nov 2017 – May 2018, Argentina

Earthquakes
- Earthquake 18 Jun, Japan Fatalities: 4
- Earthquake 5 Aug, Indonesia Fatalities: 556
- Earthquake 29 – 30 Sep, Japan Fatalities: 4

Typhoons
- Typhoon Jebi 1 – 6 Sep, Japan Fatalities: 17
- Typhoon Trami (Paeng) 29 – 30 Sep, Japan Fatalities: 4
- Typhoon Mangkhut 9 – 19 Sep, Philippines Fatalities: 102

Vulcanic activity
- Volcanic activity, tsunami 22 Dec, Indonesia Fatalities: 2,102

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Severe hurricanes, wildfires and droughts cause high losses
Global losses from natural disasters in 2018

- Natural disasters caused high losses of US$ 160bn – roughly half those of the previous year (US$ 350bn), but more than the long-term average (US$ 140bn)
- At approximately US$ 80bn, insured losses were far above the average of the last 30 years (US$ 41bn), although less than the previous year (US$ 140bn)
- The “Camp Fire” wildfire in northern California caused the highest overall and insured losses (overall losses US$ 16.5bn, insured losses US$ 12.5bn)

Source: Munich Re NatCatSERVICE
Insurance Perspective

• Insurance companies are central to the revitalization efforts of communities and businesses as they respond to the effects of natural disasters.

• Two models utilized from the perspective of risk mitigation and insurance:
  ▪ Blackout Risk Modeling
  ▪ Microgrid Reliability Model

“How Reliable is Your Microgrid” by Richard Jones, Public Utilities Fortnightly, July 2015
Blackout Risk Model™

- Focuses on the U.S. power grid and incorporates extensive data on four peril categories: Hurricanes, winter storms, thunderstorms, and equipment failure or operator error.
- Wild fires and terrorism attack loss scenarios can also be tested. This includes:
  - Severe weather events
  - Electrical grid
  - Tree proximity to power lines
Blackout Risk Model™

- Hurricane event
- Northeast Corridor
- Outage Population,
- 100yr event (1% probability)
- 25,095,957 people impacted
Blackout Risk Model™

- Hurricane event
- Northeast Corridor
- Outage Duration,
- 100yr event (1% probability)
- ~4.0 days of outage for average exposure
Blackout Risk Model™

- Assume $10 Mil of annual BI exposure in all US zip codes
  - This could represent 1 $10 Mil exposure or several smaller exposures totaling $10 Mil.
- 24 hr. waiting period / deductible
- Assumes a 4 day outage
- Return period is probability of occurrence
  - i.e. 5 yr is 20% chance in one year
  - i.e. 100 yr is 1% chance in one year

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<tr>
<th>Return Period</th>
<th>Hurricane</th>
<th>Winterstorm</th>
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<tbody>
<tr>
<td>1000</td>
<td>$318,000,365</td>
<td>$597,849,489</td>
</tr>
<tr>
<td>500</td>
<td>284,026,307</td>
<td>521,753,166</td>
</tr>
<tr>
<td>250</td>
<td>247,325,162</td>
<td>418,962,302</td>
</tr>
<tr>
<td>100</td>
<td>192,864,230</td>
<td>276,838,550</td>
</tr>
<tr>
<td>50</td>
<td>149,479,089</td>
<td>199,762,238</td>
</tr>
<tr>
<td>25</td>
<td>107,578,614</td>
<td>152,285,187</td>
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<tr>
<td>5</td>
<td>40,806,485</td>
<td>57,925,226</td>
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<tr>
<td>Average</td>
<td>32,514,423</td>
<td>48,460,274</td>
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Thank You

Contact info:
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VP Complex Client Group
Hartford Steam Boiler Inspection & Insurance
David_Tine@hsb.com
860-722-5749
Finance + Resilience Initiative

- DOE is considering a new initiative on the intersection of finance and resilience for commercial buildings
- Participants: Building owners and investors, Financial Allies, and insurance companies
- Activities: Roundtable, toolkit of resources, virtual mini-conference
- Key topics
  - Measuring financial portfolio risk and building a resilience improvement plan
  - Mitigating insurance risk and cost
  - Resilience risk disclosure and reporting protocols (e.g. TCFD, GRESB)
  - Accessing capital for resilience improvements
Questions
Thank You

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