Hydrogen and Fuel Cells for Resiliency: Financing Energy Resiliency

February 18, 2016
All participants are in “Listen-Only” mode. Select “Use Mic & Speakers” to avoid toll charges and use your computer’s VOIP capabilities. Or select “Use Telephone” and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at: www.resilient-power.org
Who We Are

www.cleanegroup.org
www.resilient-power.org
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, webinars, and more.
Northeast Electrochemical Energy Storage Cluster (NEESC)

NEESC is a network of industry, academic, government and non-governmental leaders working together to help businesses provide energy storage solutions.

www.neesc.org
Today’s Guest Speakers

• Nicholas Zuba, Manager, Commercial & Industrial Programs, CT Green Bank

• Geoff King, Associate, NY Green Bank
C-PACE:
Financing resiliency in Connecticut

Resilient Power Webinar
February 18, 2016
Who is the CT Green Bank?

Help ensure Connecticut’s energy security and community prosperity by realizing its environmental and economic opportunities through clean energy finance and investments.

Support the Governor’s and legislature’s energy strategy to achieve cleaner, cheaper and more reliable sources of energy while creating jobs and supporting local economic development.
Property Assessed Clean Energy

CT Green Bank provides 100%, low-cost, long-term funding.

Owner repays over time through property taxes.

A senior PACE lien is put on the property and stays regardless of ownership.
C-PACE Key Benefits

- 100% financing up to 25 years
- Positive cash flow in year 1
- Technical underwriting / SIR > 1
- Tax obligation fixed to the property
What upgrades are eligible?

Anything that saves energy from baseline…as long as it isn’t going anywhere

Building Envelope Upgrades

- High efficiency lighting
- HVAC upgrades (chillers, boilers, furnaces)
- High efficiency hot water heating systems
- Building automation and controls
- Building enclosure/envelope improvements
- Variable speed drives on motors, fans, and pumps

Renewable Energy Systems

- Solar systems
- Microgrids
- Wind systems
- Fuel cells
- Geothermal
- Heat recovery and steam traps
Financing Fuel Cells – Amortization for C-PACE

Fuel Cell Value Stream

- ITC
- MACRS
- LREC
- Energy Savings

Value vs. Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>2</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>3</td>
<td>$500,000</td>
</tr>
<tr>
<td>4</td>
<td>$0</td>
</tr>
</tbody>
</table>

Year 1-10
Financing Fuel Cells – Amortization for C-PACE

Fuel Cell Value Stream and Debt Service

- Total Value/Savings Stream
- Annual Debt Service Payments

Value

Year

$0

$500,000

$1,000,000

$1,500,000

$2,000,000

$2,500,000

1

2

3

4

5

6

7

8

9

10

CONNECTICUT GREEN BANK
Financing Solar Systems – Enabling Ownership

Solar Value Stream

- ITC
- MACRS
- ZREC
- Energy Savings

Value

Year
Financing Solar Systems – Enabling Ownership

Solar Value Stream and Debt Service

- Total Value/Savings Stream
- Annual Debt Service Payments

Year

Value

$0

$100,000

$150,000

$200,000

$250,000

1 2 3 4 5 6 7 8 ... 22 23 24 25

$0

$50,000

$100,000

$150,000

$200,000

$250,000
## Financing Challenges for Microgrids

<table>
<thead>
<tr>
<th>Multiple Technologies</th>
<th>Multiple Credits</th>
<th>Multiple Revenue Sources</th>
<th>Custom-Fit Solutions</th>
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</thead>
<tbody>
<tr>
<td>Existing financial structures focused on individual generator types</td>
<td>Existing tools for financing projects are structured around customer building types</td>
<td>Benefits include reduced energy costs and GHG emissions and/or energy security and reliability</td>
<td>Making microgrids economical is a demand and supply side equation</td>
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</table>

**Microgrids link one or more generator technologies**

**Microgrids may serve a network of all customer types (resi., comm., MUSH, etc)**

**Energy savings may not pay for investment** - some benefits come at a cost premium

**Microgrid customers in aggregate must have a demand profile fitting for the operating profile of the generator(s)**
C-PACE: Buildings are collateral for microgrid system

- Private capital provides 100% low-cost, long-term financing securing through senior tax lien and repaid through property bills

- Capital costs are assessed to end-users on a pro-rata basis based on their projected ‘benefit’ (e.g. energy savings/R)ECs/et

- Microgrid developer locks in repayment of fixed costs over 20 years. Microgrid owner/operator signs short term ESAs with customers for energy supply, delivery, reliability, etc.
Thank you!

Nicholas Zuba
Manager, Commercial and Industrial Programs

Connecticut Green Bank
Phone: 860-258-7825
E-mail: Nicholas.Zuba@ctgreenbank.com
Program Website: www.cpace.com
NY Green Bank Overview

Hydrogen and Fuel Cells for Resiliency: Financing Energy Resiliency

Geoff King, Associate
February 18, 2016
1. **New York’s Evolving Energy Landscape**
   - Challenges: New York’s Energy Infrastructure
   - Solution: Reforming the Energy Vision
   - Pillars of REV

2. **New York’s Clean Energy Marketplace & NY Green Bank**
   - The Opportunity
   - Market Barriers & Financing Gaps
   - NY Green Bank Overview
   - NY Green Bank Team

3. **Partnering with Us**
   - Market-Responsive Solutions
   - Investment Criteria
   - Market Response & Current Portfolio
   - Open Solicitation
   - Elements of a Strong Proposal
   - Recently Announced Transactions
   - Examples of What’s to Come
   - Additional NYSERDA Resources
   - Contact Us
New York’s Evolving Energy Landscape
Challenges: New York’s Energy Infrastructure

Investment required to replace New York’s energy infrastructure just to meet currently projected energy demand over next 10 years*

$30 Billion

* 2015 New York State Energy Plan
Reforming the Energy Vision (REV) is New York’s comprehensive strategy to create an efficient, reliable and affordable clean energy system.
REV is comprised of three main pillars that underlie all energy-related state-backed initiatives, agencies, and authorities.

NY Green Bank
Strategically positioned to mobilize greater private sector activity in New York’s clean energy markets.
New York’s Clean Energy Marketplace & NY Green Bank
Market opportunities for New York-based clean energy projects over the next ten years ~ $85 billion*

* Booz & Co., August 2013 - Estimate does not take into account potential utility scale generation, total potential for any other generation types other than distributed solar electric, CHP, onshore wind, biomass or anaerobic digesters.
Private sector is constrained by current market barriers and financing gaps.
NY Green Bank Overview

$1 billion State-sponsored specialized financial entity working with the private sector to alleviate financing gaps in New York’s clean energy markets

<table>
<thead>
<tr>
<th>Key Elements and Objectives</th>
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<tbody>
<tr>
<td>Market focused, responsive and transformative. Capital provided at market, rather than subsidized rates</td>
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<tr>
<td>Reduce greenhouse gas (GHG) emissions</td>
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<tr>
<td>Mobilize greater private sector capital in New York’s clean energy markets</td>
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NY Green Bank Senior Leadership has extensive and varied transactional backgrounds

<table>
<thead>
<tr>
<th>Past Firms</th>
<th>Specialized Expertise</th>
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<tbody>
<tr>
<td>Citigroup</td>
<td>Alternative Energy</td>
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<td>JP Morgan</td>
<td>Structured Finance</td>
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<td>Bank of America</td>
<td>Project Finance</td>
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<td>UBS</td>
<td>Securitization</td>
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<td>Goldman Sachs</td>
<td>Commodities</td>
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<td>Jeffries</td>
<td>Rates</td>
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<td>US Department of Energy</td>
<td>Syndicated Loans</td>
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<td>NRG</td>
<td>Debt Capital Markets</td>
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Partnering with Us
### Market-Responsive Solutions

Private sector project developers and financiers propose creditworthy clean energy transactions through open solicitation.

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<tr>
<th>Broad Categories of Capital Solutions</th>
<th>Product Pricing</th>
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<tbody>
<tr>
<td>• Credit Enhancement</td>
<td>• Rates reflect risk, comparables, and commercial expectations</td>
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<td>• Warehousing/Aggregation</td>
<td>• Demonstrate NY Green Bank is prudent steward of ratepayer funds</td>
</tr>
<tr>
<td>• Asset Loans &amp; Investments</td>
<td>• Serve as agent for greater private investment</td>
</tr>
<tr>
<td>• Composite Products</td>
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</table>
Credit quality is paramount in the evaluation, structuring and negotiation of NY Green Bank’s investments

### Minimum Investment Requirements
- Capital will be repaid and will earn appropriate market rate
- Project will result in reduced GHG emissions
- Transaction involves one or more private sector financial parties

### Additional Considerations
- **Market transformation**: Operate in wholesale (not retail) markets
- **Additionality**: Unique NY Green Bank role in addressing a specific market barrier
- **Scalability**: Transaction can be replicated in the private market
15

Other includes fuel cell, micro-grid, electric vehicle infrastructure and battery storage

2 74% of the proposals received by NYGB identify the total project value of the investments proposed at $3.3 billion. While 26% of proposals received do not specify the total project value of investments, these have been estimated at just under $1.0 billion.

3 MUSH/Government segment includes municipalities, universities, schools, and hospitals and City/State/Federal Government
Open Solicitation

Visit www.greenbank.ny.gov for open solicitation and instructions for online submission

- Open solicitation seeks financing arrangements meeting the NY Green Bank mandate and investment criteria
- Proposals evaluated on a rolling basis
- NY Green Bank team is available to discuss potential investment ideas. Please reach us at info@greenbank.ny.gov
Elements of a Strong Proposal

- Capable experienced management team
- Quality counterparties
- Interested and engaged private sector capital providers
- Identified and well articulated role for NY Green Bank
- Traditional project finance / ‘bankability’ concerns have been evaluated
  - Construction Risk
  - Operating Risk
  - Offtaker / Demand Risk
  - Regulatory Risk
  - Commodity & Rate Risk
  - Refinancing Risk
- A financial model with realistic assumptions
NY Green Bank’s recently announced deals will allow its private sector partners to provide and improve access to cleaner and more affordable energy for their residential, commercial and agricultural customers

$25 Million Warehouse Credit Facility for Level Solar
- Together with U.S. Bank tax equity, this allows Level Solar to expand business by providing up to an additional 6,000 New York households with residential solar

$4 Million Revolving Construction Loan for United Wind
- Together with U.S. Bank tax equity, this allows United Wind to install distributed wind energy systems at 160+ sites in upstate NY for residential, commercial and agricultural customers

$20 Million Subordinated Capital for Renew Financial
- In conjunction with a $50 million senior secured nationwide warehouse facility provided by Citi, this allows Renew Financial to expand its consumer lending program throughout New York State. Offered through a contractor network, this program will provide 12,000+ New York homeowners with up to $20,000 in low-cost financing for clean energy and energy efficiency improvements

$5.5 Million Letters of Credit for Energy Improvement Corporation
- NY Green Bank has provided two letters of credit to Energy Improvement Corporation (EIC). EIC’s Energize NY Finance product uses the PACE loan mechanism to finance qualified energy improvements to buildings for commercial property owners and non profits located in participating municipalities
Examples of What’s to Come

- Energy Services Contract Monetization Portfolios
- Community Solar Debt Portfolio
- Energy Efficiency Loan Warehouse
- Middle Market Commercial Solar Warehouse
- C&I Energy Efficiency ESA Loan Portfolios
- Battery Storage/Demand Response Debt Portfolios
- Residential Solar PPA Back-leverage Warehouse
- Energy Efficiency Residential ESA Monetization Warehouse
- Utility On-Bill Warehouse
- Residential Solar Loan Portfolio
- C&I CHP Debt Portfolio
- Electric Vehicle Infrastructure Financing Solutions
- Streetlighting Savings Monetization Warehouse
- Utility-Scale Wind Project with Merchant Risk Element
In addition to NY Green Bank’s resources, NYSERDA has approval for a 2016 Main Tier solicitation of $150 million to support the construction of large scale renewable projects through its Renewable Portfolio Standard (RPS).

Hydrogen and fuel cells are eligible to participate in NYSERDA’s RPS by applying for Provisional Certification during an active solicitation.

http://www.nyserda.ny.gov/All-Programs/Programs/Main-Tier
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www.resilient-power.org
www.cleanegroup.org
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@Resilient_Power on Twitter

www.neesc.org
Upcoming Webinar

• Fuel Cells for Telecommunication,
  Thursday, March 17, 2-3 pm ET

For more information on this and other upcoming webinars, please visit:

www.cleanegroup.org/webinars