National & International Context & Opportunity:
Transforming Markets & Finance

UK Green Investment Conference, Edinburgh
October 27, 2014
Agenda

Drivers of Transformation
- Electricity Markets
  - Centralized to Distributed
- Financing Markets

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- Products
- Transaction Guidelines

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- New York’s Energy Landscape
- NY Green Bank
  - Mission
  - The Opportunity
  - Market Gaps & Barriers
  - Investment Criteria
  - In Scope & Out of Scope
  - Experience So Far
Drivers of Transformation
Electricity Markets

### Historically

- **Underlying assumptions:**
  - Reliability = paramount
  - Demand = inelastic
  - Economies of scale favor central generating stations

- **Produced a system:**
  - Designed to meet forecast peak demand, plus
  - Substantial reserve margin

- **Reality:**
  - Peak demand occurs only a few hours per year
  - Average capacity utilization 55%
  - Economic inefficiency
  - Transmission losses
  - Limited system flexibility

### Current Thinking

- Reliability still paramount
- Questioning most economic way to achieve reliability:
  - Demands of digital economy increase real economic costs of outages
  - Backup needed generally and for severe weather
  - Developments in telecoms, industrial and building system controls, DG, EE prompt reevaluation of assumptions (i.e., demand inelasticity and bulk economies of scale)
### Electricity Markets (cont.)

#### Δ Drivers - “Sticks”
- Aging electricity infrastructure (capital investment in NYS to maintain existing = $30 billion over next 10 years; $17 billion over last 10 years)
- Electricity demand for utilities is flat to declining, although peak demand continues to grow - further challenging the regulated return on assets model
- Dependence on fossil fuels (especially natural gas) pushed by market forces and emissions standards has increased system vulnerability and fuel price volatility

#### Δ Drivers - “Carrots”
- Digital economy and global competition creates new industries and technologies
  - Improved utility ability to manage distribution systems with real-time awareness and control
  - Customers can better see and manage their electricity demand
  - Utilities can better coordinate customer-side resources, facilitating more predictable and manageable system load
- Efficiencies of many DG technologies are improving, while costs are declining ☛ grid parity
- Burgeoning industry developed in industrial and building system management/controls
Centralized to Distributed

Yesterday
Centralized Power

Transmission network
House
Factory
Commercial building

Distribution network

Tomorrow
Clean, local power

Storage
Solar PV power plant
Local CHP plant
Wind power plant
House with domestic CHP
## Financing Markets

### Capital Needs
- Energy investment required far exceeds public resources
- Mobilizing and leveraging private capital for clean energy investments is critical
- Billions of dollars of economically and technically feasible potential clean energy project investments exist
- Clean energy projects provide attractive, commercial returns

### New Approaches
- New distributed assets challenge historic finance models and project cost structures
- Overcoming financing market gaps and barriers currently limiting capital availability
- Market-based strategies involving public-private partnerships to drive greater clean energy deployment = key part of the solution
New York’s Approach
New York’s Energy Landscape

New York State is a leader in developing clean energy solutions and animating markets to shape the future of energy

<table>
<thead>
<tr>
<th>Creating a resilient, efficient energy system</th>
<th>Integrated initiatives to meet clean energy goals</th>
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<tbody>
<tr>
<td>Transitioning to a 21st century energy system to ensure greater grid resiliency, reduce ratepayer costs and support a cleaner environment</td>
<td>Implementing statewide regulatory, programmatic and subsidy reform:</td>
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<td>Moving from government-driven to market-based financial support for clean energy industry</td>
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<td>Reforming the Energy Vision (“REV”)</td>
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<td>NY Green Bank</td>
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<td>Clean Energy Fund</td>
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<td>NY-Sun</td>
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<td>NYPrize</td>
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What we are:

- $1 billion state-sponsored specialized finance entity focused on financial markets and partnering with the private sector to invest in clean energy projects in New York State
- Market-focused and market-responsive
  - Clients/partners drive our investment focus within renewable energy and energy efficiency sectors (projects, not manufacturing)

What we do:

- Identify and alleviate market gaps and barriers to facilitate greater deployment of clean energy in the state

How we developed:

- Early 2013 - Launched by Governor Andrew M. Cuomo as financial component of statewide energy transition
- December 2013 - Initial capitalization authorized
- February 2014 - Opened for business with release of investment solicitation
## Mission

To accelerate clean energy deployment in New York State by working in partnership with the private sector to transform financing markets

### Key Elements

- Motivate greater private sector participation in clean energy financing markets
- Implement structures alleviating clean energy market gaps and barriers
- Enable greater scale, new and expanded asset classes, greater liquidity

### Primary Objectives

- Reduce need for government participation by animating and growing capital markets
- Stimulate faster and more extensive deployment of clean energy assets
- Expand clean energy financing markets by leveraging private sector capital
The Opportunity

- Enormous potential for New York’s clean energy market:
  - Attractive risk/return profiles for clean energy project investments
  - Substantial markets with significant growth expectations
  - Recent Booz & Co. study estimates market opportunities for New York-based projects ~$85 billion

- NY Green Bank capitalizes on unrealized opportunities by:
  - Operating where commercial investment is limited or non-existent
  - Focusing where there is market interest, but limited capital

NY Green Bank operates at the near-frontier of current commercial markets, facilitating the evolution and expansion of those markets. With greater private sector investments in one area, NY Green Bank moves to the next frontier.
New York’s clean energy marketplace is constrained by current market gaps & barriers

Common clean energy transaction issues for private sector financiers

- Lack of sponsorship
- Unfamiliar structures
- Lack of industry and product coverage clarity
- Multiple risk exposures
- New counterparty credits
- Uncertainty as to scale
- Minimal standardization
- Small transaction sizes

Barriers limit private sector capital flows into attractive projects, resulting in clean energy financing market gaps
# Investment Criteria

## Minimum Requirements
- Have expected financial returns equivalent to market expectations
- Be expected to contribute to financial market transformation
- Have potential for energy savings and/or clean energy generation, as well as GHG reduction

## Additional Considerations
- Involve one or more private sector financial parties
- Wholesale (not retail) markets
- Economically/technically feasible
- Unique benefit NY Green Bank brings to the proposed transaction (additionality)
- Scalable & replicable
- How private sector will ultimately take over
- Involve sufficient client and partner “skin in the game”

Credit quality is paramount in the evaluation, structuring and negotiation of NY Green Bank’s investments.
NY Green Bank supports transactions that with scale and experience can ultimately be financed by the private sector

<table>
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<th>Priority Activities</th>
<th>Outside NY Green Bank Mandate</th>
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<tr>
<td>✓ Facilitate development of new asset classes and market liquidity</td>
<td>✗ Support transactions without private capital involvement</td>
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<tr>
<td>✓ Be creative in supporting technically and economically feasible/creditworthy</td>
<td>✗ Accept credit and/or project risks unacceptable to the private market</td>
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<tr>
<td>transactions</td>
<td>✗ Take unproven technology risks</td>
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<td>✓ Develop and incubate new structures</td>
<td>✗ Provide grants or subsidized capital</td>
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<td>✓ Support standardization and aggregation</td>
<td>✗ Pursue one-off transactions</td>
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Experience So Far

**Early Indications**

- Financing needs expressed by the markets affirming NYGB’s approach
- Robust and quality responses continuing to be received - producing strong pipeline of transactions
- Announcement on October 22 of NYGB’s first transactions
  - NYGB investment will mobilize $800 MM in clean energy projects in NYS
  - ~575,000 metric tons/CO₂e
  - Diversity by technology, geography, end-user

**Critical Success Factors**

- Current energy market issues cannot be solved by the public sector alone - gaining the attention and engagement of private sector players is key
- Getting the word out: NYGB business proposition and how to engage with us
- Commercial entity “look and feel”
- Assurance that our strategy is clear and that there is longitudinal commitment and stability
- Flexibility to pivot as needed in response to market

*Market fundamentals are most potent and enduring drivers; the financing “tail” should not wag the market needs “dog”*
Please visit us at
www.greenbank.ny.gov
Appendix

- Technologies
- Products
- Transaction Guidelines
# Technologies

## Renewable Energy

- Solar photovoltaics
- Solar thermal
- On/offshore wind
- Hydro
- Biomass
- Biothermal energy
- Biogas
- Liquid biofuels
- Tidal/ocean power

## Energy Efficiency

- Commercial & industrial
  - Comprehensive improvements to new and existing facilities that save energy
- Load reduction
  - Thermal and electric energy storage
  - Demand response programs
- Residential
  - Comprehensive improvement projects in existing residential buildings
- Multifamily housing
  - Comprehensive improvement projects to multifamily facilities, including systems affecting entire building, the common area, and/or the resident spaces

## Other

- Natural-gas fired CHP
- Electric vehicle infrastructure (including charging stations)
- Fuel cells
- Anaerobic digester gas systems (farm and non-farm)
- Water (where tied to energy/efficiency)

* Lists are non-exhaustive. Additional guidelines for eligible investments available at [www.greenbank.ny.gov](http://www.greenbank.ny.gov)
## Products

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<th>Product Offerings</th>
<th>Product Pricing</th>
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<td>- Dynamic approach requires nimble response, and products will evolve alongside clean energy financing markets</td>
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<td>- Initially offer four broad categories of capital solutions</td>
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<tr>
<td>- Credit Enhancement</td>
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<td>- Warehousing/Aggregation</td>
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<tr>
<td>- Asset Loans &amp; Investments</td>
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<tr>
<td>- Composite Products</td>
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<tr>
<td>- NY Green Bank adopts commercial credit/pricing approaches (may take different view on liquidity)</td>
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<tr>
<td>- Products priced to reflect risk, capital structure position, internal portfolio return needs and comparable transactions</td>
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<td>- NY Green Bank takes into account current market rates and commercial expectations of rates at a point when the market is more developed</td>
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## Financing Arrangements

- Investments into eligible technologies are consistent with investment criteria
- Both NY Green Bank and private sector participation can be structured in multiple ways
- Various transaction and participation sizes considered
- Expected investments between $5-50 MM

## Clients & Partners

- Clients and partners are achieving success in clean energy but limited by lack of financing
- Typically include:
  - Private sector capital providers
  - Industry participants (ESCOs, manufacturers, developers, etc.)
- NY Green Bank does not provide direct capital to fund general business operations or project (pre-construction phase) development