Financing the Clean Energy Transition and the Role of State and Local Green Banks

Dartmouth College

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November 2019
Clean Energy Transition
CLIMATE
SUMMIT

WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?

- ENERGY INDEPENDENCE
- PRESERVE RAINFORESTS
- SUSTAINABILITY
- GREEN JOBS
- LIVABLE CITIES
- RENEWABLES
- CLEAN WATER, AIR
- HEALTHY CHILDREN
- ETC. ETC.
Transitioning to a Clean Energy Economy

1. Technology
2. Policy
3. Financing
1. Technology
2. Policy
3. Financing
In short, we need to:

*Use less energy*
  *(e.g., energy efficient buildings)*

*Substitute fossil fuel consumption for electricity consumption*
  *(e.g., transportation)*

*Produce energy from renewable sources*
  *(e.g., solar, wind)*
Renewables Becoming Best Option

<table>
<thead>
<tr>
<th>Renewable Energy</th>
<th>Levelized Cost ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV—Rooftop Residential</td>
<td>$151</td>
</tr>
<tr>
<td>Solar PV—Rooftop C&amp;I</td>
<td>$75</td>
</tr>
<tr>
<td>Solar PV—Community</td>
<td>$64</td>
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<tr>
<td>Solar PV—Crystalline Utility Scale</td>
<td>$36</td>
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<tr>
<td>Solar PV—Thin Film Utility Scale</td>
<td>$32</td>
</tr>
<tr>
<td>Solar Thermal Tower with Storage</td>
<td>$126</td>
</tr>
<tr>
<td>Geothermal</td>
<td>$69</td>
</tr>
<tr>
<td>Wind</td>
<td>$28</td>
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<table>
<thead>
<tr>
<th>Conventional</th>
<th>Levelized Cost ($/MWh)</th>
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<tbody>
<tr>
<td>Gas Peaking</td>
<td>$140</td>
</tr>
<tr>
<td>Nuclear</td>
<td>$115</td>
</tr>
<tr>
<td>Coal</td>
<td>$62</td>
</tr>
</tbody>
</table>

Source: Lazard; Lazard’s Levelized Cost of Energy Analysis – Version 13.0 (November 2019)
Global Power Capacity Net Additions
= 70% Renewable

Source: International Renewable Energy Agency and REN21
1. Technology

2. Policy

3. Financing
NYC Climate Mobilization Act (April 2019)

Local Laws 92 and 94 requires that most buildings (new construction and substantial renovations) be covered in green roofs or solar PV systems

Local Law 95 requires a building energy efficiency grade (A-F) to be posted on buildings larger than 25,000sf in size

Local Law 96 establishes a PACE (Property Assessed Clean Energy) loan program

- Loans are (a) made using private funds through pre-qualified capital providers, and (b) repaid as a charge on a building’s property tax bill
- Debt service is (a) sized to be less than the savings from the efficiency/clean energy project, and (b) transferrable upon sale of (remains on) the property

Local Law 97 requires reductions in building greenhouse gas (GHG) emissions

- Buildings larger than 25,000 sf will have a “GHG budget” based on size and occupancy classifications
- GHG emissions that exceed the building’s GHG budget subject to penalty

Source: NYC Mayor’s Office of Sustainability
NYS Climate Leadership and Community Protection Act (June 2019)

**Net Zero Emissions:** Commits NY to reaching net zero greenhouse gas emissions (40% emissions reductions from 1990 levels by 2030; 85% by 2050) with remaining emissions reduced, or offset through projects that remove GHGs.

**Ambitious Targets for Electric Sector:** Requires 70% of the state’s electricity from renewable energy by 2030, and 100% emissions free by 2040 with specific goals for offshore wind, solar energy, energy efficiency and energy storage.

**The Climate Action Council and Scoping Plan:** Creates the Climate Action Council to develop a scoping plan within the next two years to produce recommendations for reducing emissions across all sectors of the economy, and then update the plan at least every five years.

**Disadvantaged Communities and Climate Justice Working Group:** Includes several environmental justice provisions, with disadvantaged communities targeted to receive 40% (35% min.) of the overall benefits from the state’s climate programs.

Source: NRDC “Unpacking New York’s Big New Climate Bill: A Primer”
1. Technology

2. Policy

3. Financing
Global New Investment in Renewables

($ in billions; all asset classes and energy sectors)

USD 332.1 billion

Source: Bloomberg New Energy Finance
Global Investments in Energy Efficiency

- While more difficult to measure than renewable energy investment, it is estimated that global energy efficiency investment* grew 3% in 2017 to **USD 236 billion**.
  - Europe represents 32% of the global total in 2017
  - Buildings sector represents 59% of the global total in 2017


* Incremental spending on new energy efficient equipment or the full cost of refurbishments that reduce energy use.
Capital Needed

...The world must invest $2.4 trillion every year through 2035 and cut the use of coal-fired power to almost nothing by 2050 to avoid catastrophic damage from climate change (UN Intergovernmental Panel on Climate Change 2018)...

![Annual Gap in Green Investment](chart.png)
Evolving Finance Landscape
“Yes, the planet got destroyed. But for a beautiful moment in time we created a lot of value for shareholders.”

Source: New Yorker Magazine, Tom Toro
Shareholders to Stakeholders

Shareholder Theory
Milton Friedman, 1970
...there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game...

Statement on the Purpose of a Corporation
Business Roundtable (181 CEOs), 2019
...We believe the free-market system is the best means of generating good jobs, a strong and sustainable economy, innovation, a healthy environment and economic opportunity for all... we share a fundamental commitment to all of our stakeholders. We commit to:
• Delivering value to our customers
• Investing in our employees
• Dealing fairly and ethically with our suppliers
• Supporting the communities in which we work
• Generating long-term value for shareholders, who provide the capital that allows companies to invest, grow and innovate
Efficient Frontier (mid-late 1900s)

Simplified Capital Asset Pricing Model (CAPM)

Expected Return

$\beta$ (Degree of Market Risk)

Source: Principles of Corporate Finance, Richard A. Brealey and Stewart C. Myers
Efficient Frontier (2010s)

Investment Spectrum

Source: Oxford Social Finance Program, Saïd School of Business
Where are the priorities?

Social

Economic

Environment
Where are the priorities?

Source: Circular Ecology, Sustainability Venn Diagram
Sustainability Reporting Frameworks

A company’s impact on economic, environmental or social issues

**CDP**
How a company impacts a range of environmental issues and is positioning itself to address future climate-change scenarios

**GRI**
Global Reporting Initiative
How a company impacts a range of economic, environmental and social issues

Impact on financial performance

**TCFD**
FSB Task Force on Climate-related Financial Disclosures
How material climate-related issues could impact a company’s financial performance

**SASB**
Sustainability Accounting Standards Board
How material sustainability issues impact a company’s financial performance

Primary audiences:
- Cities, government, investors & companies
- Financial market participants

Source: Bloomberg, Materiality Assessment
Financial Products to Meet the Need

- Philanthropic Solution
  - Grant / PRI
- Market-Based Solution
  - Debt/equity financing
- Catalytic Solution
  - Pay for performance
- No Solution
  - Market research required

Source: adapted from Mission Investing: A Framework for Family Foundations; Michael & Susan Dell Foundation, NYU Wagner
Growth in “Sustainable Investing”

More than a quarter of U.S. assets under professional management used sustainable-investing strategies (with environmental, social and governance analysis) in 2018, with investor focus on issues such as handguns and tobacco (Forum for Sustainable and Responsible Investment (US SIF))

**Sustainable Growth**

Investors using socially responsible criteria hit $12 trillion in U.S. assets

- Assets under management

Source: US SIF

Source: Bloomberg News, “Climate Changed: U.S. Sustainable-Investing Holdings Advance 38% to $12 Trillion”, October 31, 2018
Green Banks
Green Banks

A Green Bank is a dedicated public or non-profit finance entity designed to drive private capital into market gaps.

- A financial institution dedicated to increasing and accelerating investment in environmentally sustainable goods and services (e.g., clean energy)
- Its mission is to use finance tools to mitigate climate change
- Unlike typical “banks” it does not take deposits, and its operations can be supported by governments or charitable contributions or both
- It may deploy capital from public or private sources, invest on its own or in conjunction with private sector investors

Source: Coalition for Green Capital website, August 2019.
Green Banks

Current Barriers to Financing
• Capital is expensive
• Financing gaps
• Small, disaggregated projects

Green Bank Solutions
• Lower the cost of capital
• Facilitate increased financing
• Animate private capital markets

Green Banks can provide an alternative to traditional government-funded grant programs
• $1 grant covers $1 of project costs
• $1 used to capitalize a green bank can attract private sector capital providers, typically financing $3 to $10 of project costs
• Additionally, that $1 when loaned to a qualifying project is likely to be repaid with interest, and those monies can finance additional projects

Source: Coalition for Green Capital website, August 2019.
Green Banks – Global Presence

These dedicated green investment entities have been established at the national level:

- Australia
- Japan
- Malaysia
- Switzerland
- United Kingdom

Source: Green Bank Network website, September 2019.
Green Banks – Growing US Presence

Green banks also exist at the state level in CO, CT, FL, HI, MD, MI, NV, NY, RI and at the local level in DC, Montgomery County (MD) and New York City (NY)

NYCEEC (New York City Energy Efficiency Corporation)
NYCEEC

• NYCEEC (New York City Energy Efficiency Corporation) is the oldest local green bank in the US (established 2010)

• NYCEEC is a not-for-profit organization launched by the City of New York to advance the City’s climate and economic goals by developing energy efficiency programs, products and services

• Now, NYCEEC operates throughout the region (NYC plus, CT, DC, DE, MA, MD, NJ, NY, PA, RI) and funds a wide variety of building-related technologies that reduce greenhouse gases, e.g.:
  • energy efficiency
  • combined heat and power
  • fuel conversion
  • demand response
  • building-scale renewable energy and storage
NYCEEC

Mission
Deliver financing solutions and advance markets for energy efficiency and clean energy in buildings

Vision
Energy efficiency and clean energy financing for buildings to achieve scale and be accessible to all
NYCEEC

Why Do We Exist?

• We do not provide lower rates of interest, but will do smaller deals than other lenders
• We share our lessons with other lenders
• We provide feedback to policymakers about their rules and regulations
• We focus on underserved communities (e.g., low- and moderate- income)
• We support newer contractors and the financing of their projects
• We provide referrals to other agencies
• We will try to make sure good projects get done
AFFORDABLE MULTIFAMILY

ENERGY EFFICIENCY

$477,611

TOTAL PROJECT COST

$30,249

NYCEEC PREDEV. LOAN

27%

PROJECTED ENERGY COST SAVINGS
AFFORDABLE MULTIFAMILY

ENERGY STORAGE (100 BUILDINGS)

$1.2M

TOTAL PROJECT COST

$1.2M

NYCEEC ESA LOAN

15%

REDUCTION IN PEAK DEMAND
MULTIFAMILY
CO-OP
SOLAR PV (24 UNITS)

$200,000
TOTAL
PROJECT COST

$186,000
NYCEEC
EQUIPMENT LOAN

94%
GHG SAVINGS
COGENERATION SUPPORTIVE HOUSING FACILITY

TOTAL PROJECT COST: $749,000

NYCEEC EQUIPMENT LOAN: $530,000

AFFORDABLE UNITS GREENED: 326
Conclusion

Clean Energy Transition

Evolving Finance Landscape

Green Banks

NYCEEC