NREL Activities to Open Capital Market Investment and Bank Lending for Solar Deployment

For NREL Finance Team Website

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Most managed funds do not invest in renewable energy. To tap this capital, investors need a liquid, tradable product priced by the market.

Hatched sources of capital currently invest in RE, but not necessarily from all investment buckets.

Source: The CityUK
Capital market participation requires...

(i) **Asset and contractual consistency** which allows project cash flows to be pooled into tradable and highly liquid securities, and

(ii) Availability of **due diligence tools** necessary to build market confidence in the asset class.
NREL Securitization Activities: Project History

NREL Goal

- Expand availability of capital
- Lower cost of capital
- Reduce transaction cost, time to access capital

3 Yr. DOE Award:

Advanced Financing to Achieve SunShot

- Organize the industry around:
  - Standard documents
  - Best Practices
  - Robust datasets

- Conduct analysis to comprehend opportunities and barriers

- Promote adoption by developers, financiers, law firms, etc.
<table>
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<tr>
<th>Developers</th>
<th>Legal</th>
<th>Investment</th>
<th>Advisory</th>
<th>Manuf. / Other</th>
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<td>Mercatus</td>
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<td>Troutman Sanders</td>
<td>US Renewables Group</td>
<td>TUV Rheinland</td>
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SAPC Activities

• **Standard Contracts** – first set *available* and in use:
  – Residential Lease (aggregated, disaggregated)
  – Commercial PPA (version 2.0 recently released)
  – Residential PPA near completion

• **Develop Best Practices**
  – Installation, O&M, Independent Engineering
  – *drafts in process via subcommittees – first public releases due Q4 2014*

• **Build Robust Datasets**
  - System performance: oSPARC (Open Solar Performance and Reliability Clearinghouse)
  - Credit performance

• **Develop Mock Filing to Rating Agencies**
  – Residential presented to 5 rating agencies – currently before S&P
  – Commercial mock in development

• **Conduct legal analyses on RA risk concerns**

• **Convert to industry-led group: SEFA**
Standard Contracts

Benefits of Adoption:

• Facilitate cash flows to be pooled into securities to access capital market investment
• Improve confidence among investors and regulators
• Lower transaction costs
• Speed deployment
• Improve customer protection
• Enable market liquidity of projects

Adopters (current or planned):

• Altus Power
• Clean Power Finance
• K&L Gates
• Mercatus
• ModSolar
• Nixon Peabody
• One Roof Energy
• OnSwitch
• SolarCity
• Sunrun
• truSolar
• Others? (please let us know)
Performance Data Set

oSPARC: Open Solar Performance and Reliability Clearinghouse – First major public database of system performance

**First release at InterSolar 2014**
- California Solar Initiative crossed w/ weather data
- Many others in development

Will be critical resource for DOE, NREL, PUCs, other labs, non-profits, etc.

oSPARC Plus was launched with GTM in April, 2014 to provide value-added services and build industry adoption
Banking on Solar – New Task for 2014

• Designed to facilitate direct lending for solar deployment
  o Community banks
  o Credit Unions
  o Regional / National Banks

• Working group: 100+ members
  o Build consensus on underwriting principles
  o Develop educational materials for lenders & regulators (first piece for CEOs just completed)
  o Find solutions to complex legal / banking issues
  o Educate on PACE program benefits & opportunity
  o Promote to retail banking industry
Banking on Solar: Clarifying Legal Issues

What is the priority of liens between the mortgage holder and solar lender in the case of a homeowner default?

Banking on Solar is working with leading attorneys to draft template agreements and elucidate processes to ensure high levels of recovery for solar lenders.
SolarCity Securitizations

<table>
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<tr>
<th>Name</th>
<th>Nov., 2013</th>
<th>April, 2014</th>
<th>July, 2014?</th>
<th>Improvement ?</th>
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<tr>
<td>Name</td>
<td>2013-1</td>
<td>2014-1</td>
<td>2014-2</td>
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<tr>
<td>Yield</td>
<td>4.80%</td>
<td>4.59%</td>
<td>??</td>
<td>Yes</td>
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<td>Bond Size ($ mm)</td>
<td>$54.4</td>
<td>$70.2</td>
<td>$201.5</td>
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<tr>
<td>ADSAB (PV of cashflows - $mm)</td>
<td>$87.8</td>
<td>$106.2</td>
<td>$276</td>
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<tr>
<td>Advance Rate (% of ADSAB)</td>
<td>62%</td>
<td>66%</td>
<td>73%</td>
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<tr>
<td>Wtd. Avg. Seasoning</td>
<td>22 months</td>
<td>12 months</td>
<td>7 months</td>
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<td>Portfolio from Residential</td>
<td>71%</td>
<td>87%</td>
<td>86%</td>
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<tr>
<td>Rating</td>
<td>BBB+</td>
<td>BBB+</td>
<td>BBB+/BB</td>
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<td>Tranches</td>
<td>Single</td>
<td>Single</td>
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While an exciting development, the SolarCity securitizations only represent $325 million funding relative to total industry annual investment of approximately $14 billion.
YieldCo Activity

- **Announced:** NRG Yield, Nextera Yieldco, Abengoa, SunEdison (TerraForm Power)
- **Under consideration:** SunPower
- **SAPC benefit:**
  - Standard contracts and best practices will facilitate asset consistency and thus improve liquidity of projects
  - Make it easier to buy and sell projects to add to yieldco portfolios
Mock securitizations will provide valuable legal documents and feedback from rating agencies to industry, improving opportunity for smaller entities to access low-cost debt.
Next Steps for NREL Activities

• Expand pool of potential investors
  o Structured Finance Industry Group (SFIG)
  o Socially responsible investors (Ceres, others)
  o Real estate industry (REITs, etc.)
• Finalize best practices, next suite of standard contracts, oSPARC data acquisition
• Develop mock securitization for commercial portfolio, find structures that can incorporate tax equity
• Promote adoption of standard contracts, other assets
  o Developers
  o Investors
  o MUSH, non-profit markets
  o Large commercial end-users
• Engage banks & regulators on underwriting practices, data to comprehend asset class performance, etc.
Glossary

- ABS – Asset-Backed Securities
- CDO – Collateralized Debt Obligations
- CLO – Collateralized Loan Obligations
- ETF – Exchange Traded Funds
- MBS – Mortgage-Backed Security
- MLP – Master Limited Partnership
- oSPARC – open Solar Performance and Reliability Clearinghouse
- REIT – Real Estate Investment Trust
- SEFA – Solar Energy Finance Association