MINI PRESENTATIONS

Capital Sources | Structured Finance | Stakeholders/ Recipients

9:45 AM
Pulakesh Mukherjee
BASF Ventures

MINI PRESENTATION – CORPORATE VENTURE CAPITAL
MINI PRESENTATION – FAMILY OFFICE
Peter Mockel
International Finance Corporation

MINI PRESENTATION – NEW CAPITAL
MINI PRESENTATION – STRUCTURED FINANCE
Department of Energy ARPA-E Workshop, Denver, January 2017: Enhancing Capital Flow Into Early Stage Energy Technologies

Jeffrey Sirr, Head of CIP U.S. and Emerging Strategies
George Schulz, Special Enterprise Risks-Green Tech Solutions

Munich RE
Strong Partner for Clean Tech Risk Solutions
Green Tech Solutions within Munich Re
…*Pushing the Limits of Insurability*

Innovative industries require tailor-made solutions for risks not covered in traditional markets

<table>
<thead>
<tr>
<th>Energy Production</th>
<th>Energy Efficiency (EE)</th>
<th>Energy Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Photovoltaic</td>
<td>LED Module</td>
<td>Battery</td>
</tr>
<tr>
<td>Concentrated Solar Power</td>
<td>LED Full Luminaire</td>
<td>Other</td>
</tr>
<tr>
<td>On-/Offshore Wind</td>
<td>Energy Savings/Performance</td>
<td>Desalination</td>
</tr>
<tr>
<td>Bioenergy/Waste to Energy</td>
<td></td>
<td>Soil Decontamination</td>
</tr>
<tr>
<td>Fuel Cell</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Munich Re pools in-house resources and partners with industry experts and advisors.

Images: used under license from shutterstock.com
Munich Re GTS’ Value Proposition

Increasing Profit and Enabling Business

- Increased Revenue
- Decreased Financing Cost
- Flexible Allocation of Capital
- Higher Attractiveness to investors
- Adding the financial credibility to win customer trust & market share
- Risk assessment assures product quality and investment security
- Overall savings due to better financing terms & lower cost of capital
- Reserving and freeing-up capital for growth relevant business activities becomes predictable

Innovative insurance solutions deliver third-party technology endorsement from a credit-worthy partner = ‘bankability’.
Business Enabling Examples (1)
Bioenergy – Access to Capital

Project Description
- Greenfield biomass conversion project
- Forest woody chip waste to 15 million gallons annual ‘drop-in’ renewable fuels (plus RINs credits)
- Technology: combination of gasification, Fisher-Tropsch, hydroprocessing

Value Proposition
- Support new and challenging green technologies
- Upscaling of projects
- Access to broader investor and financing options (i.e. rated bonds)

Risk Transfer Solution
- Performance Output: minimum fuel production; debt service up to 10 years
- Repair: cover supports operator for large unexpected repairs/retrofits

Achievements
- Improved bankability for greenfield biofuel plant
- Protect off-takers, PPA and investment
- Milestone for building a portfolio of risk transfer solutions in the biomass industry
Business Enabling Example (2)
Fuel Cells – Credit Enhancement

Project Description
- Solid oxide fuel cell servers produce electricity independent of grid with low-carbon emission
- 61 MW capacity for over 300 sites at corporate off-takers (WalMart, Home Depot, AT&T) for project financings of Power Purchase Agreements (PPA)

Risk Transfer Solution
- Cover portfolio performance warranty and insolvency of the fuel cell manufacturer/servicer (Bloom Energy)
- Up to 15 years of debt service covered for direct benefit to lenders and investors

Achievements
- Bond-financed transaction achieved investment-grade rating; better financing terms
- Strong business enabling partner for technology provider to access broader financing sources

Value Proposition
- Financial enhancement and economical benefit through risk transfer
- Investment protection

<table>
<thead>
<tr>
<th>Investment Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘AAA’</td>
<td>Extremely strong capacity to meet financial commitments. Highest rating</td>
</tr>
<tr>
<td>‘AA’</td>
<td>Very strong capacity to meet financial commitments</td>
</tr>
<tr>
<td>‘A’</td>
<td>Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances</td>
</tr>
<tr>
<td>‘BBB’</td>
<td>Adequate capacity to meet financial commitments, but more subject to adverse economic conditions</td>
</tr>
<tr>
<td>‘BB’</td>
<td>Consistent highest speculative grade by market participants</td>
</tr>
<tr>
<td>‘BB-’</td>
<td>Consistently lowest speculative grade by market participants</td>
</tr>
</tbody>
</table>

Risk Transfer

- Financial enhancement and economical benefit through risk transfer
- Investment protection
Doug Schultz
Loan Program Office
Department of Energy

MINI PRESENTATION – STRUCTURED FINANCE
BRIDGING THE FINANCING GAP
PROVIDING CRUCIAL FINANCING FOR DEPLOYMENT OF FIRST-OF-ITS-KIND ENERGY TECHNOLOGIES
LAUNCHING NEW MARKETS
U.S. UTILITY-SCALE PHOTOVOLTAIC SOLAR (PV) PROJECTS >100MW

2010

0
UTILITY-SCALE PV PROJECTS IN THE U.S.

2012

5
LPO PV PROJECTS
$4.6 BILLION IN LOANS

2016

45
PRIVATELY FINANCED PV PROJECTS

1,502 MW

9,479 MW CUMULATIVE

1705 Program Ends

531% MW INCREASE

NOTE: MW totals include projects operating or that have obtained financing. All information as of September 2016.
DEPLOYING INNOVATION

$30 BILLION INVESTED IN MORE THAN 30 DIVERSE PROJECTS NATIONWIDE

Kahuku  Shepherds Flat  Desert Sunlight  Alamosa  Vogtle

Ivanpah
MINI PRESENTATION - INCUBATORS
The Cyclotron Road Experiment

1. **Spin-in** top entrepreneurial scientists
2. **Leverage** world class facilities, expertise, and mentorship
3. **Position** people and technology for market

Angel investors

Venture capital

Corporate partners
Cohort 1 Results

- 100% have built a demo prototype or are funded to do so
- $10M in follow-on grants and $5M in private investment
- All 6 teams funded for next stage of development
First money in

Prelude

Breakout Labs

Evōk Innovations

First Round

Corp. JDA
Christina Lampe-Onnerud
Cadenza Innovations

MINI PRESENTATION – START-UPS
Novel packaging architecture for Li-ion battery technology through licensing

Lowest cost, highest safety and highest energy density for two $100 billion emerging markets - electric vehicles and grid storage

Sharing a new type of security aligning early investors with the Cadenza founders and execution team for the long run

Christina Lampe-Onnerud
Founder and CEO
Cadenza Innovation, Inc.
www.cadenzainnovation.com

ARPA-E January 20-February 1, 2017
Cadenza Innovation: Licensing lowest cost, highest safety and highest performance Li-ion battery architecture platform

**Big Opportunity**  New architecture for Li-ion battery packs will enable licensees to lead two $100B emerging markets — Electric Vehicles & Grid Storage

**Strong Team**  Founding team was the C-suite from Boston-Power

**Sustainable Technology Advantage:**  Emerging blocking patent portfolio

**Significant Traction**  Global partners include Fiat Chrysler, Alcoa, ABB, Morgan

**Funding: Seeking additional capital**

to 1) finish product development and validations, 2) win licensing agreements, 3) DEMO deployments, and 4) generate first revenues
Inviting investors to join the Cadenza partnership and licensing journey with multiple win-scenarios

Term Sheet Series A remains open (raised $7M to date)

- generous, non-dilutable equity
- guaranteed minimum 5x upon IPO
- minimum 30% IRR if company is sold within 5 years (equals 3.7x at 5 years)
- permanent annual dividend payout (equals 15+x return at 6-10 years depending on market adoption)
MINI PRESENTATION - ACADEMIC
My Background

- Finance Professor
  - Chairman, Finance Department, Case Western Reserve University
  - Associate Dean (Global Initiatives)

Research/Consulting experience:
- Quantitative Finance, Derivatives, Credit Risk
- Risk modeling, risk strategy
- Structured Finance and Products
- Banking and Financial Institutions
- Green Finance, Impact Investing

Anurag Gupta, Weatherhead School of Management
Some Thoughts

- Challenges
  - Capital intensity
  - Longer lead times, higher failure rates
  - Scalability problems
  - Need to substitute existing assets

- Solutions Worth exploring?
  - Need a new tranched payout structure within the VC model
  - Look for diversification creatively
  - Risk mitigation through “patient capital” providers
  - Can’t view as just clean energy – IT and data may be important
MINI PRESENTATION – STRUCTURED FINANCE
Distributed Sun is a distributed energy services provider that develops, constructs, finances and operates solar and distributed generation energy projects.

Distributed Sun has financed over $200m in projects, and operates in 9 U.S. states.

This includes sponsor equity, tax equity, debt and construction finance.

Distributed Sun in 2017 is actively developing 200MW of community solar projects. Of these, 70MW will be built and commissioned this year.

DSUN led the creation of truSolar®, the industry standard risk scoring criteria and methodology that incorporates over 800 unique risk elements used by energy investors as a key part of their diligence process.

DSUN developed and deployed the beEdison risk scoring software service to operationalize truSolar and to create a data driven decision making tool.

Distributed Sun’s experienced staff includes legal, finance, accounting, engineering, construction, operations and underwriting professionals who are widely and deeply familiar with the electricity markets, federal and state policies and incentives, engineering and construction, and project finance in the renewable energy space.
sunONE Results

- 573 kW operating and all generating cash flows
- Fund closed January 2010; All systems in-service on or before February, 2011
- IRR of 33 percent

Installed capacity (573 kW) exceeded plan (465 kW) by 23%.

Completed construction at average cost of $3.88/watt, a 14.5% reduction from finance-approved $4.54/watt.

sunONE provided investors an after tax yield of 33.3% across portfolio, above the sunONE target hurdle rate of 15%.

sunONE returned 130% of invested capital in cash and tax distributions.
beEdison freemium software, diligence-as-a-service and credit scoring helps buyers and sellers of solar assets and entities managing solicitations and awards

The beEdison platform combines risk scoring with reports and financials, scenario analysis for yields and cash flows, a recommendation engine and contract library, data analytics and more

beEdison offers two services: the patent pending beEdison SaaS risk & diligence platform and the beEdison credit scoring product

beEdision’s BETA software platform moved to a production server on Amazon Web Service in March, 2015 and the company signed its first investor customers Altus Power, Building Energy, JH Whitney and Prairie Gold

The company’s developer customers have registered over 500 MW of projects
beEdison’s credit scoring product it began sales in Q2

beEdison entered into a commercial partnership with Standard & Poor’s to combine S&P’s credit scoring products, databases and algorithms with beEdision’s and truSolar’s methodology to develop a co-branded platform as the leading industry standard for solar C&I underwriting
Walker Dimmig
8 Rivers
Laura Hermann
Potomac Communications

MINI PRESENTATION – START-UP / FINANCE
A SYSTEMS FINANCE CASE STUDY

Enhancing Capital Flow into Early Stage Clean Energy Technologies

Walker Dimmig, 8 Rivers Capital
Laura Hermann, Potomac Communications

January 31, 2017
Systems Finance complements 8 Rivers’ model for commercializing infrastructure-scale technologies

8 Rivers identifies and develops sustainable infrastructure technologies based on three major filters:

- Typical “disruptive” characteristics: cheaper AND better
- Big enough to attract major strategic partners: “the three comma rule”

8 Rivers builds partnerships that reduce execution risk and are critical to success

- Combining our technology and business approach with the intellectual, human, and financial capital of major corporations

THE 8 RIVERS PARTNERSHIP PROCESS

Systems Finance provides a pathway to commercialization by de-risking deployment, influencing market design and providing access to a diversified investor base.
The NET Power case study

NET Power is deploying a novel power generation technology:

- Electricity from natural gas for the same cost as conventional systems
- Produces virtually no air emissions, including >97% CO₂ capture
- $140 million 50MWth demo plant nearing completion

NET Power was structured to bring together critical commercialization skillsets...

- 8 Rivers: inventor; engineering oversight; technology/market dev.
- Exelon: customer; development support; O&M design and support
- CB&I: engineering, procurement and construction; sales
- Toshiba: high-pressure turbine expertise

...and the required financial resources...

- $140 million in cash and in-kind services from Exelon and CB&I
- Large in-kind turbine development program from Toshiba

...while incentivizing the long-term success of the company.

BUT! The final commercial step remains a challenge.
Viewing commercialization through a Systems Finance lens

Allam Cycle H2 Ecosystem

Legend
- Natural Gas
- Coal
- Electricity
- Ar
- CO2
- H2

Commodity Pricing:
- Nat. Gas = $2.85/MMBtu
- Coal = $1.73/MMBtu
- Electricity = $0.04/kWh
- Ar = $5/ton
- CO2 = $15/ton
- Oil = $55/bbl
- H2 = $1/kg

Air Separation Unit (ASU) necessary to service the 2 plants (interconnections inside box not shown)

One Allam Cycle 234MW Natural Gas (NET Power) with Partial Oxidation H2 System Integration

One Allam Cycle 250MW Coal (8 Rivers Energy)

Totals:
- Total = 100 S M
- Total = 425 S M

Totals (Steel, urea, & oil only): 7.3 S B

8 RIVERS
Systems Finance presents an opportunity to cross the Valley of Death

Yale University established the Systems Finance Network to meet demand for new asset classes for infrastructure investment.

(incl. Paul Lussier, Cary Krosinsky, Marian Chertow, Laura Hermann)

January 2017
John Tuttle
ARPA-E

MINI PRESENTATION – PUBLIC EQUITY
Public Equity

- Is public equity an option for early-stage energy (entrance rather than exit)?
  - Advantages
    - Enhanced liquidity (*dependent on trading volume*)
    - Accessible to individual investors
    - With sufficient market cap, accessible to institutional investors
    - Public stock can be used as currency instead of cash
  - Disadvantages
    - Requires additional reporting, internal controls etc. ($$)
    - Raising capital has more hurdles based on % of Market Cap
  - Either or Or
    - Different Board constituency (Independent Directors vs Investors)
    - Earlier liquidity for Mgmt. Team

- Why not more often?
  - Securities trading increment changed from 1/8 to 1/16 in 1997 and then to decimal $0.01 in 2001.
    - Reduced the liquidity in less-active stocks and the incentive for market-makers in micro-cap ($50-300M) listings