



MINI PRESENTATIONS

Capital Sources | Structured Finance | Stakeholders/ Recipients

9:45 AM



Pulakesh Mukherjee

BASF Ventures

MINI PRESENTATION – CORPORATE VENTURE CAPITAL



Steven Kloos

True North Venture

MINI PRESENTATION – FAMILY OFFICE



Peter Mockel

International Finance Corporation

MINI PRESENTATION – NEW CAPITAL



Jeff Sirr

Munich Re

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

Energy Production

Solar Photovoltaic

Concentrated Solar Power

On-/Offshore Wind

Bioenergy/Waste to Energy

Fuel Cell

Energy Efficiency (EE)

LED Module

LED Full Luminaire

Energy Savings/Performance

Energy Storage

Battery

Other

Desalination

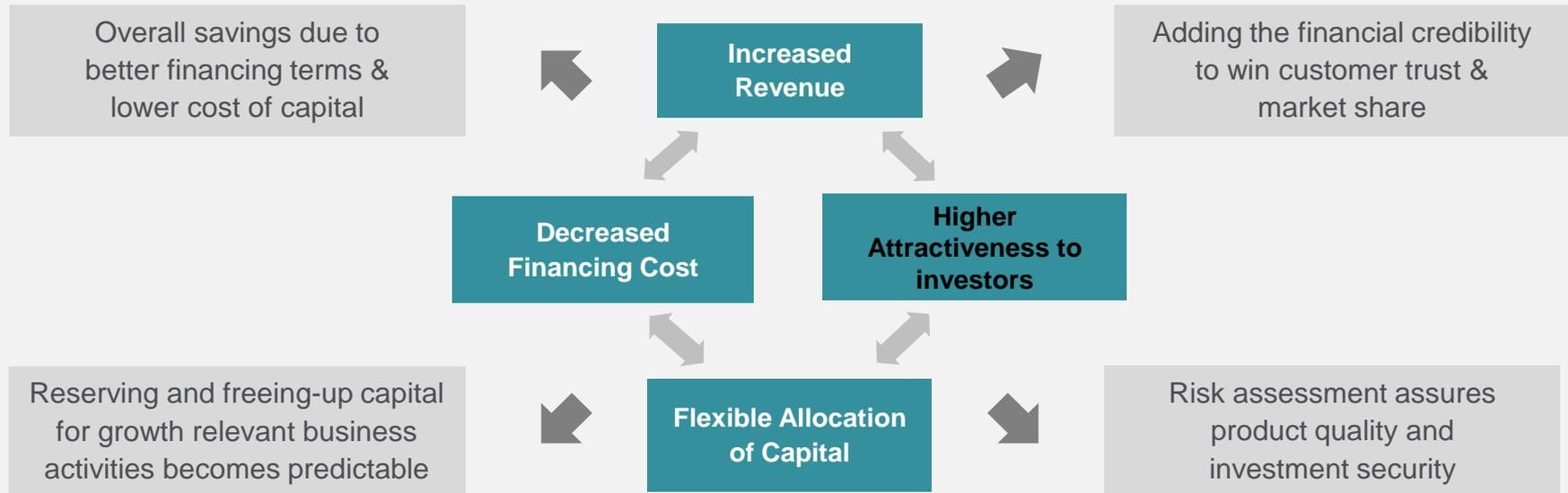
Soil Decontamination

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



Munich Re GTS' Value Proposition

Increasing Profit and Enabling Business



▶ 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

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

Value Proposition

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



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

Investment Grade ↑	'AAA'	Extremely strong capacity to meet financial commitments. Highest rating
	'AA'	Very strong capacity to meet financial commitments
	'A'	Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances
	'BBB'	Adequate capacity to meet financial commitments, but more subject to adverse economic conditions
	'BBB-'	<i>Considered lowest investment grade by market participants</i>
	Speculative Grade ↓	'BB+'
'BB'		Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions
'B'		More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments
'CCC'		Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments
'CC'		Currently highly vulnerable
'C'		A bankruptcy petition has been filed or similar action taken, but payments of financial commitments are continued
	'D'	Payment default on financial commitments



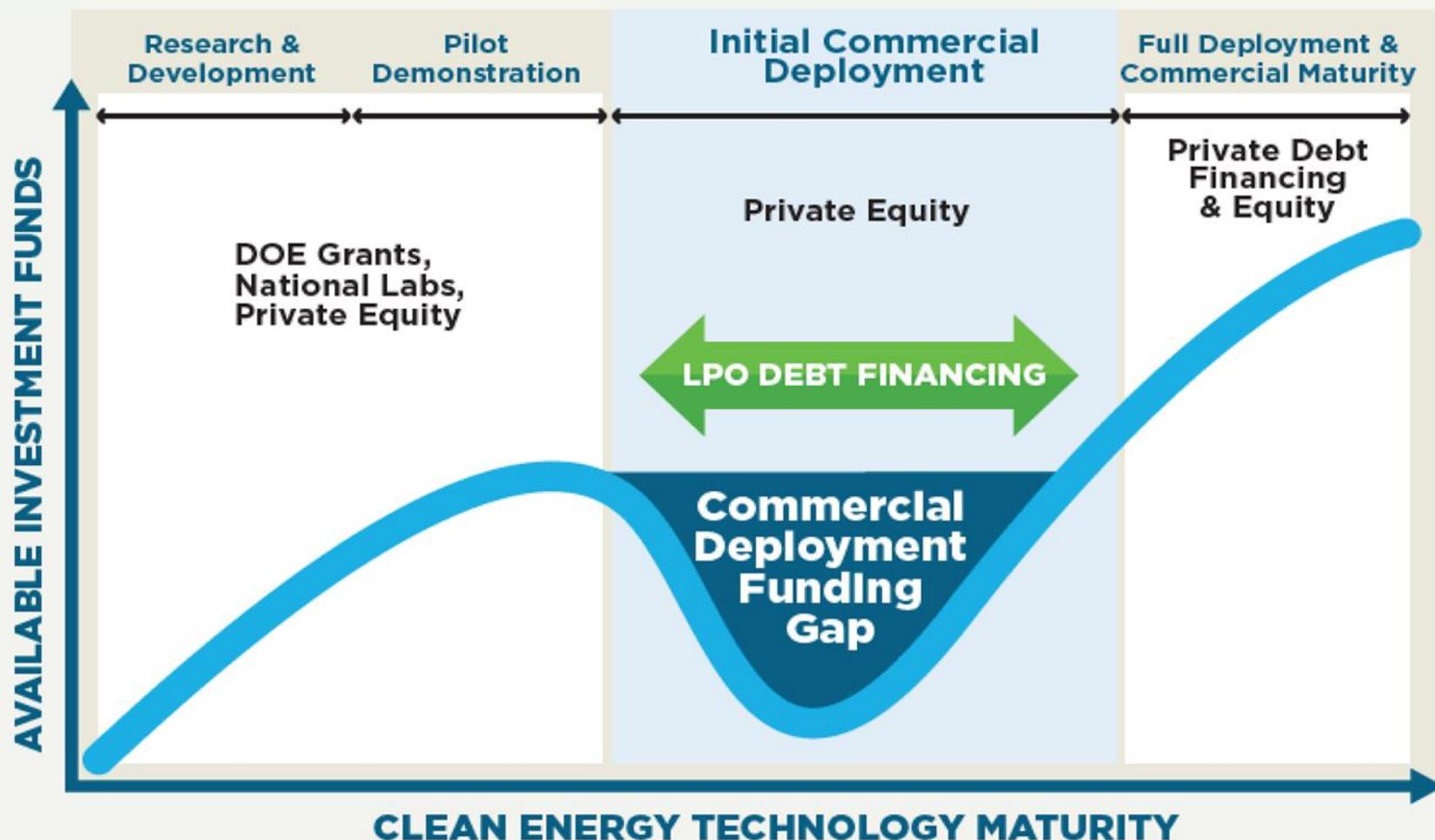
Doug Schultz

Loan Program Office
Department of Energy

MINI PRESENTATION – STRUCTURED FINANCE

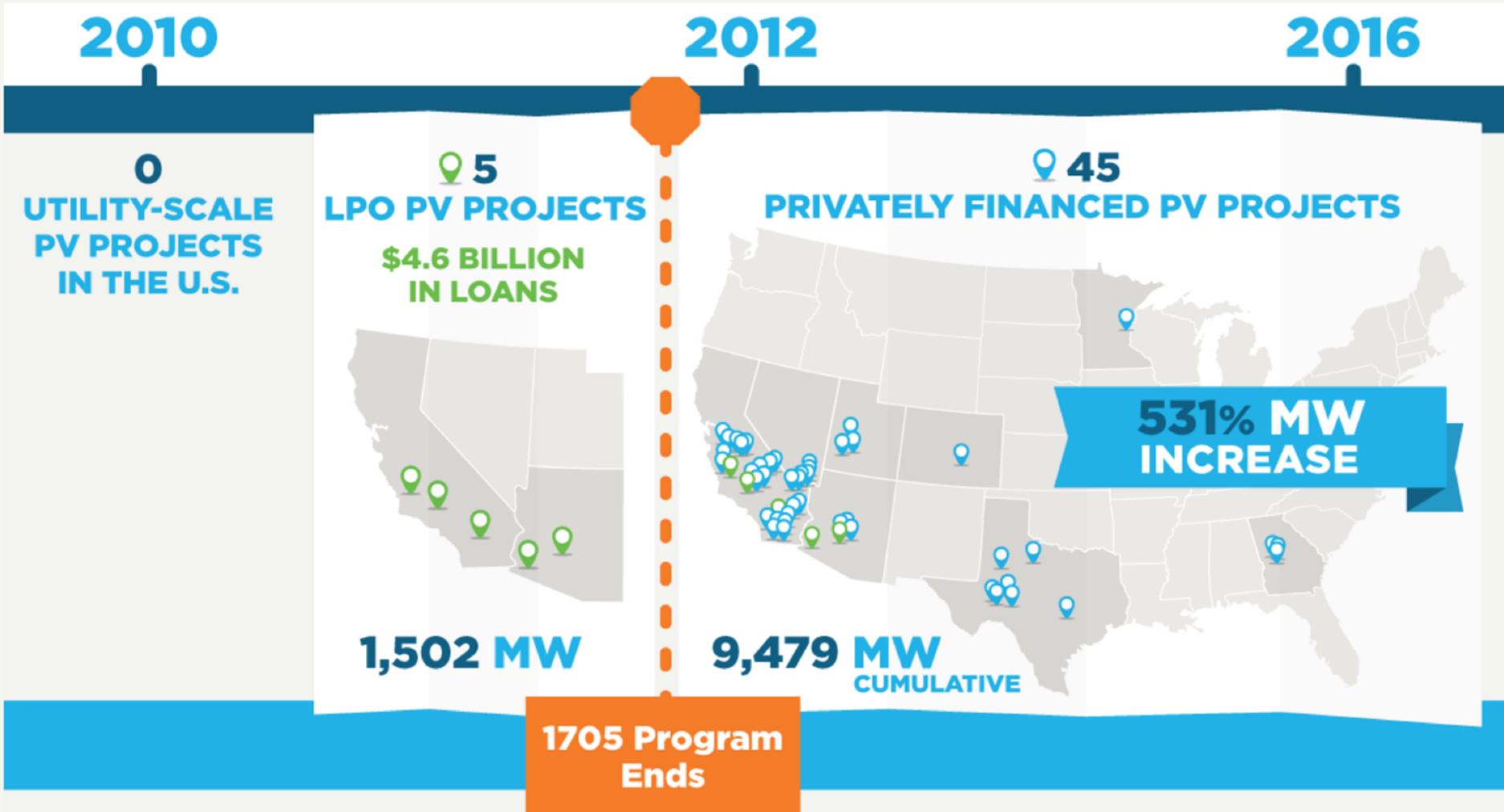
BRIDGING THE FINANCING GAP

PROVIDING CRUCIAL FINANCING FOR DEPLOYMENT OF FIRST-OF-ITS-KIND ENERGY TECHNOLOGIES



LAUNCHING NEW MARKETS

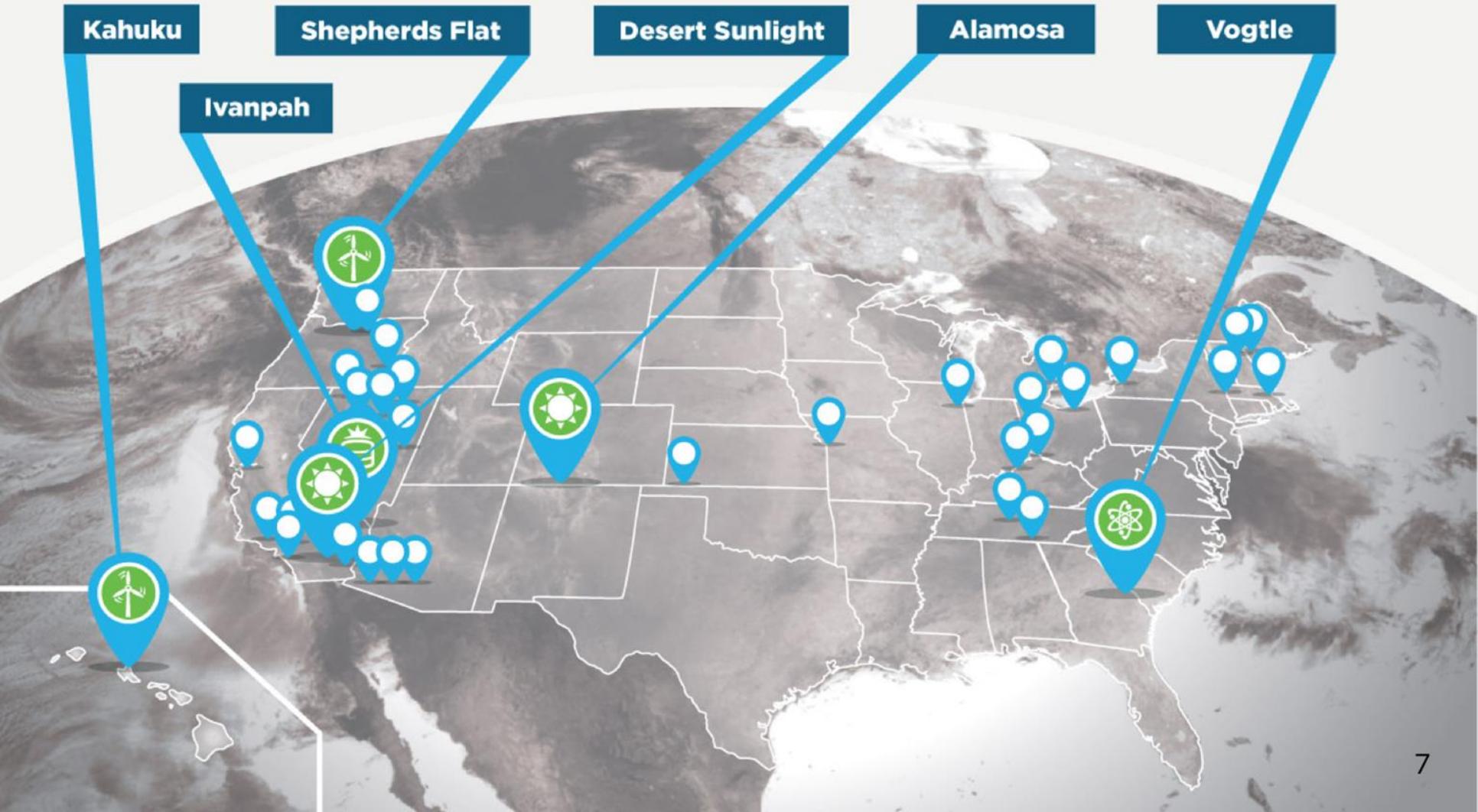
U.S. UTILITY-SCALE PHOTOVOLTAIC SOLAR (PV) PROJECTS >100MW



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



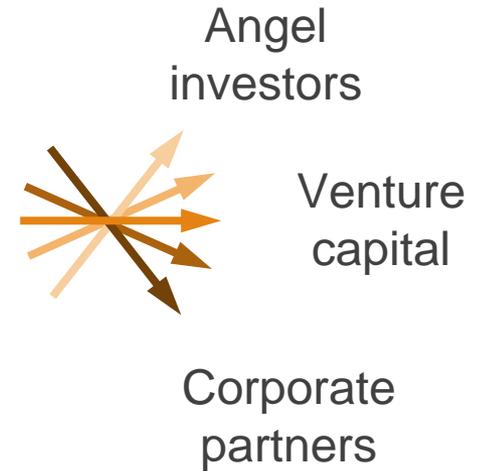
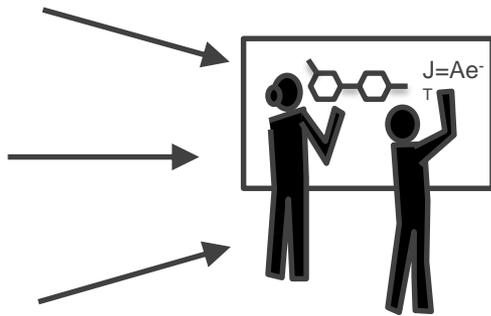


Ilan Gur

Cyclotron Road

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

Cohort 1 Results

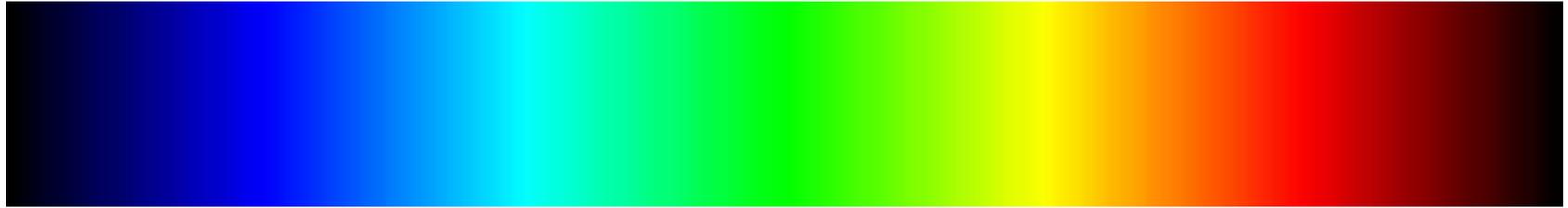
- 100% have built a demo prototype or are funded to do so
- \$10M in follow-on grants and \$5M in private investment
- All 6 teams funded for next stage of development



100%



First money in



First Round

evök
INNOVATIONS

Prelude
VENTURES

Breakout Labs

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)



Anurag Gupta

Case Western

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

Some Thoughts

- Challenges

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

- Solutions Worth exploring?

- Need a new tranching 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



Jeff Weiss

Distributed Sun

MINI PRESENTATION – STRUCTURED FINANCE



DISTRIBUTED SUN

DISCUSSION AT ARPA-E

JEFF WEISS, CO-CHAIRMAN AND MANAGING DIRECTOR

JANUARY 2017



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 (573kW) 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 and sellers of solar assets and entities managing solicitations

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**

beEdison'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 beEdison'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

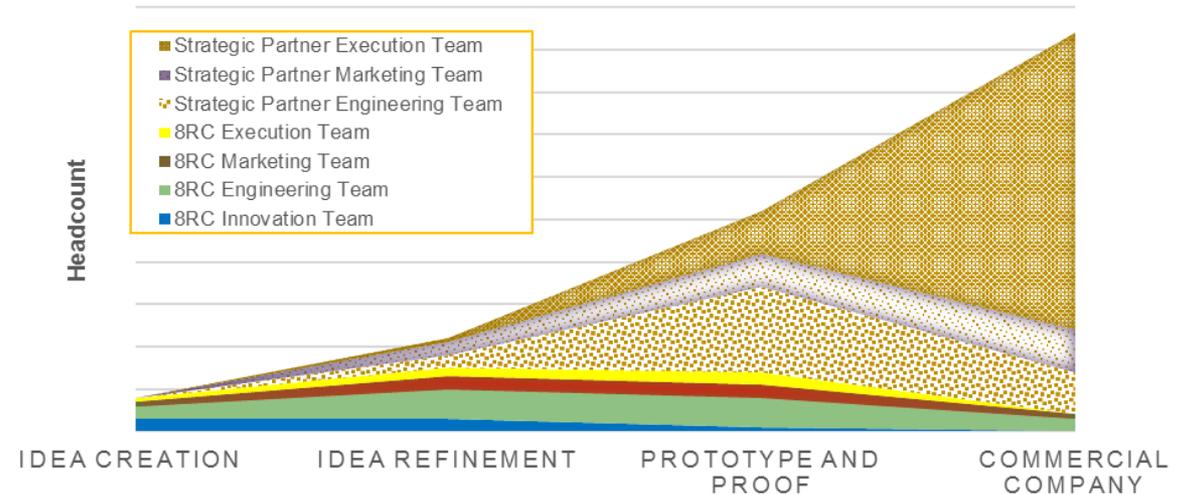
8 Rivers identifies and develops sustainable infrastructure technologies based on three major filters:

- 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...

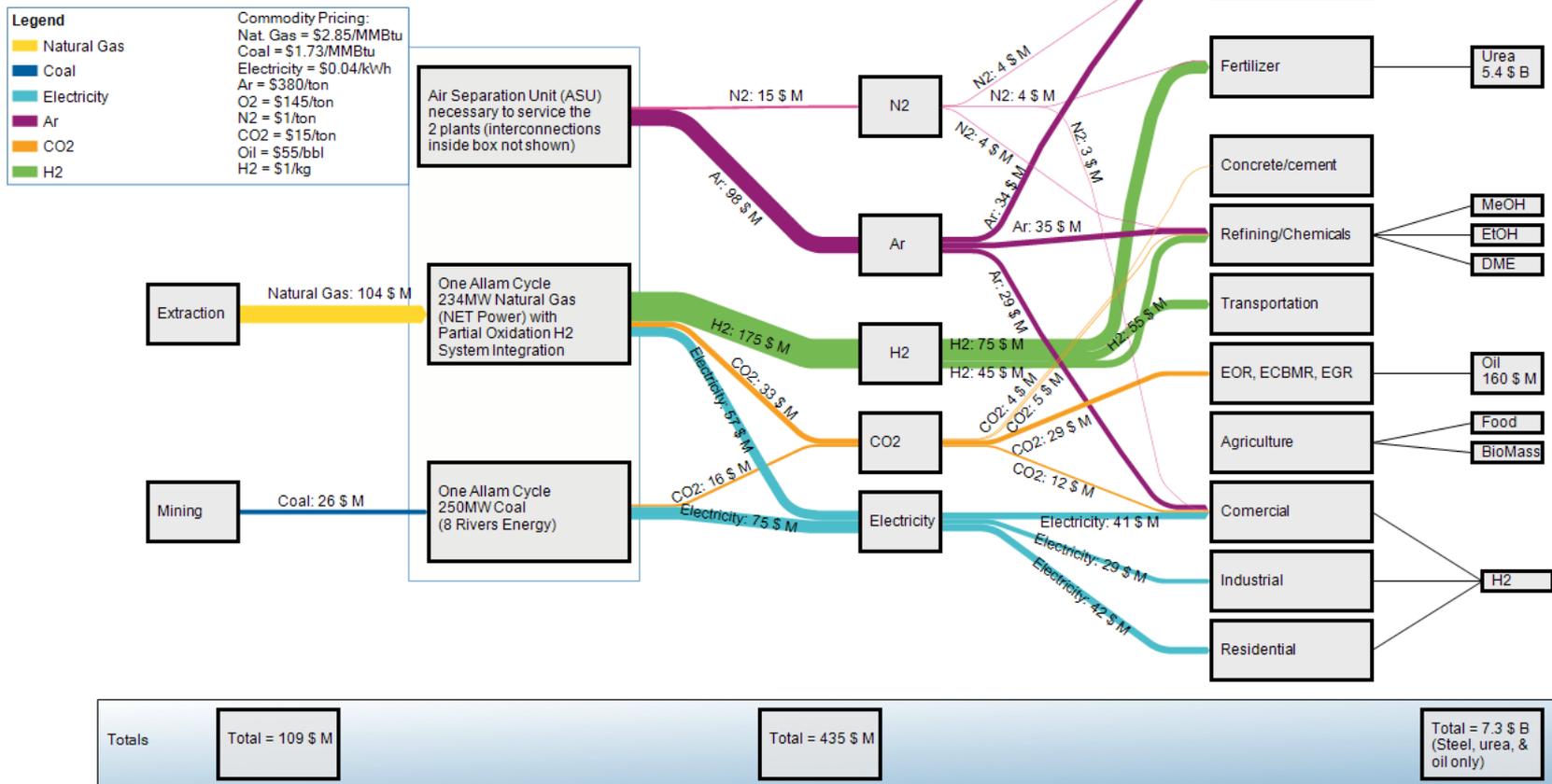
- \$140 million in cash and in-kind services from Exelon and CB&I
- Large in-kind turbine development program from Toshiba

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

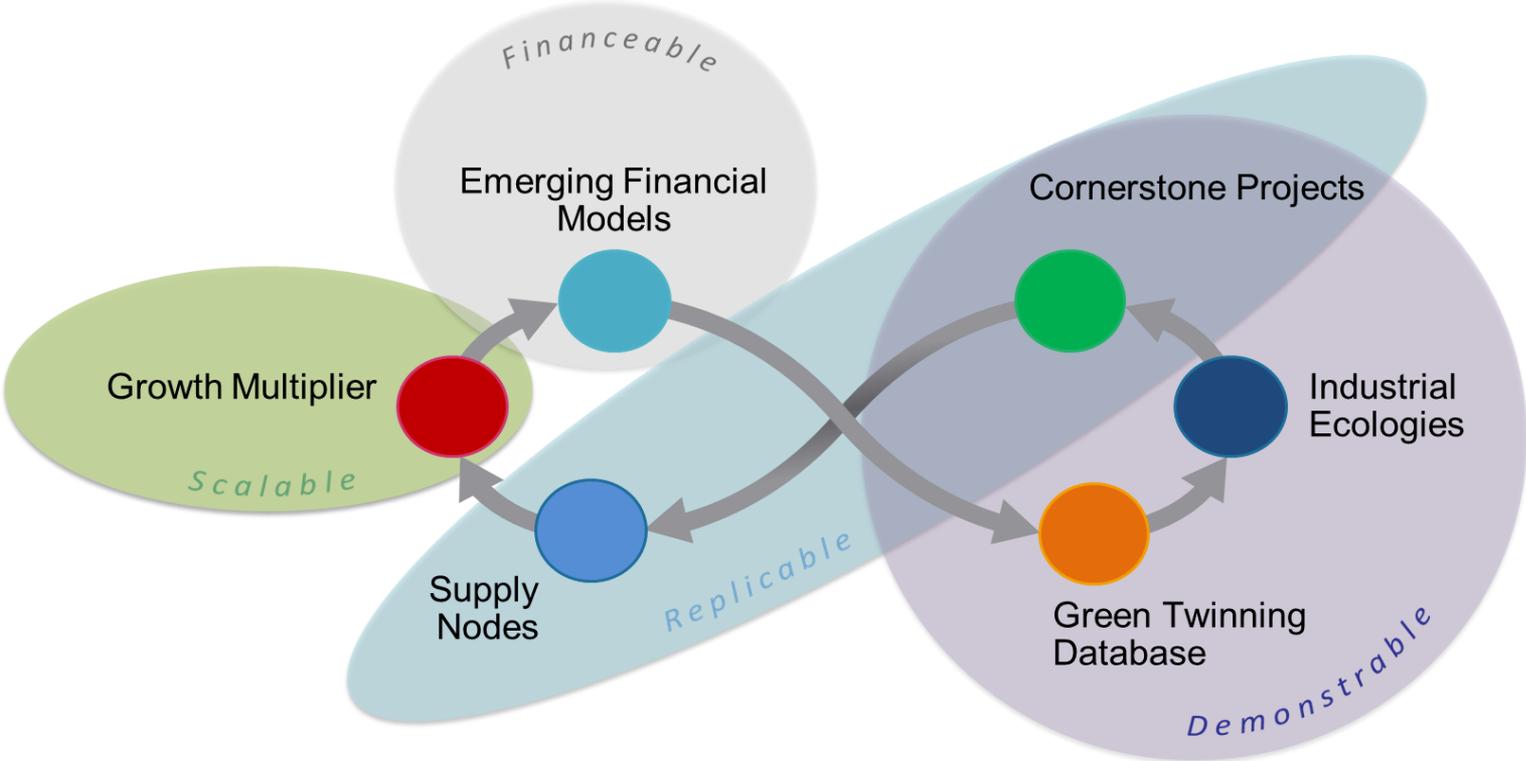
BUT! The final commercial step remains a challenge.

Viewing commercialization through a Systems Finance lens

Allam Cycle H2 Ecosystem



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)



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