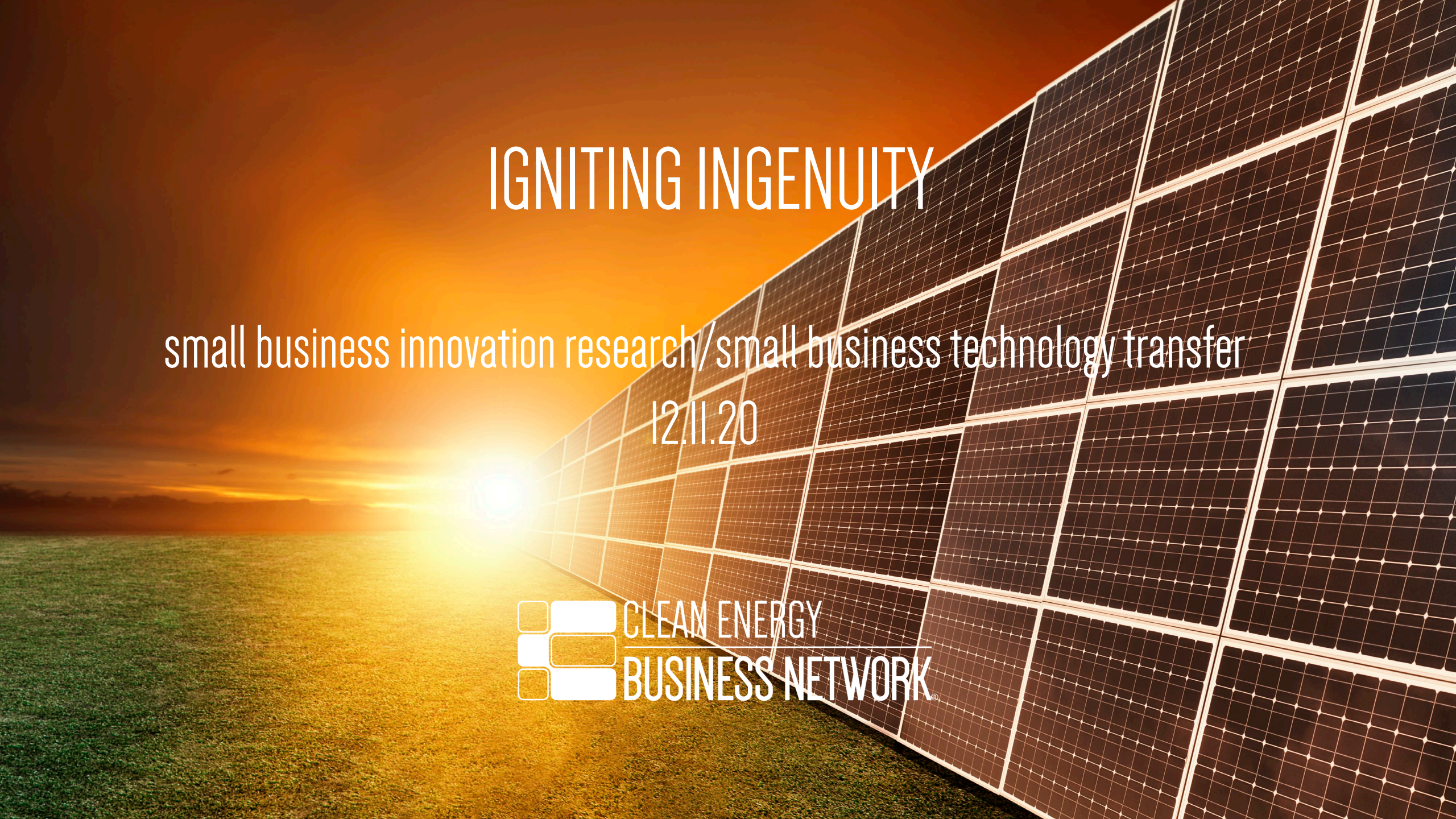
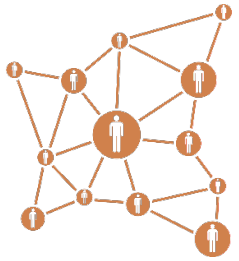

IGNITING INGENUITY
small business innovation research/small business technology transfer
12.11.20
CLEAN ENERGY
BUSINESS NETWORK®

CLEAN ENERGY BUSINESS NETWORK®

the small business voice for the clean energy economy

Policy Support

Market & Technology Education



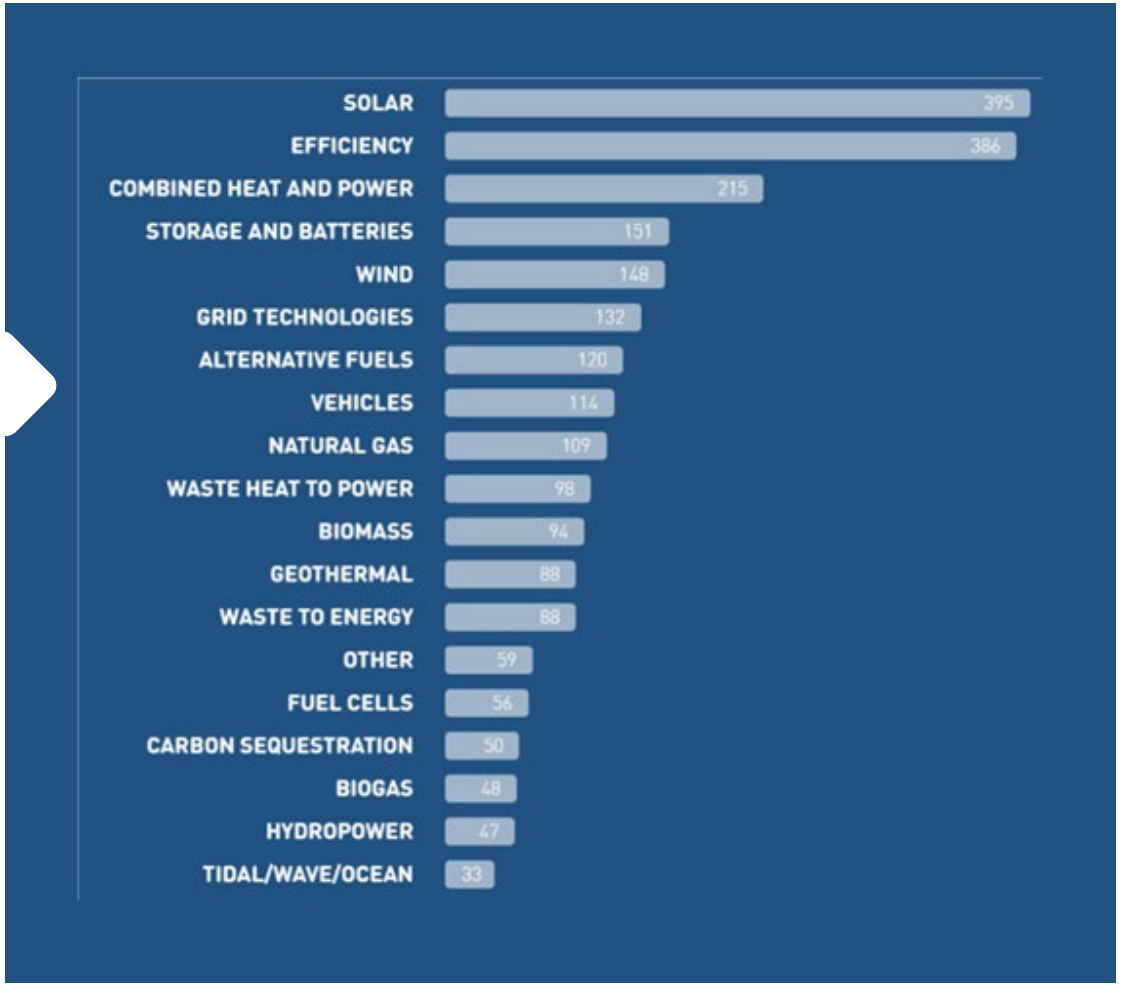
Business Development Assistance

OUR MISSION

OUR REACH

~5,000 small and midsize business leaders across 50 states

Diverse technologies



CLEAN ENERGY BUSINESS NETWORK

AGENDA

- **Small Business Innovation Research (SBIR) & Small Business Technology Transfer (STTR)**
  - Lynn Abramson, President, Clean Energy Business Network
- **Solar Energy Technologies Office SBIR FY21 Solicitation**
  - Peter Lobaccaro, Program Analyst, Solar Energy Technologies Office
- **Insights from Prior SBIR Awardees**
  - Nancy Min, Founder, Ecolong
  - Ben Lepley, Founder, Tectonicus Constructs
- **Where to Find Help**
  - Lynn Abramson, CEBN
  - Frank Yang, Partner, ADL Ventures
- **Panel Discussion: Tips for Applying and Leveraging SBIR program resources**

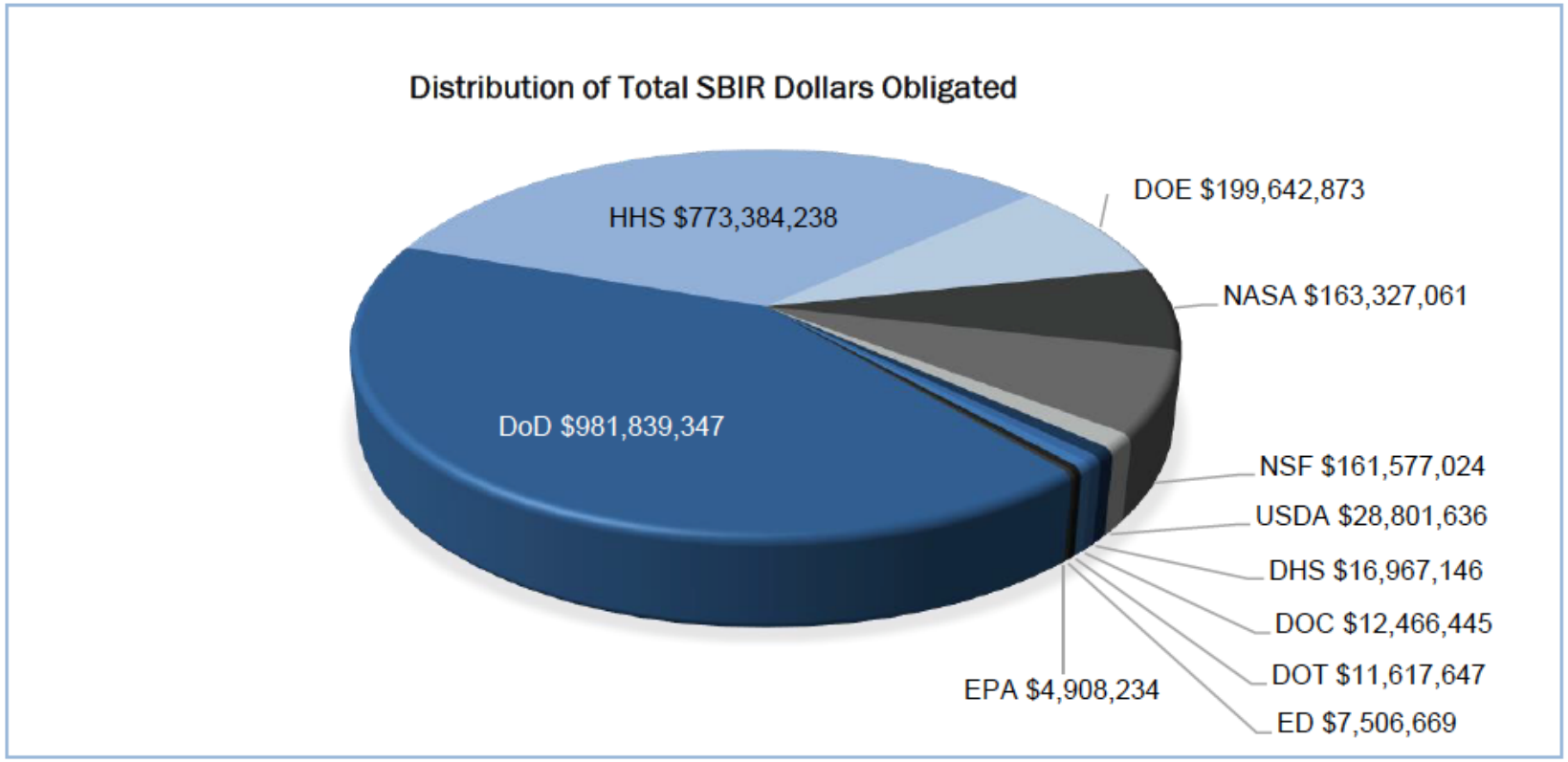
small business INNOVATION RESEARCH

small business TECHNOLOGY TRANSFER

SBIR/STTR OVERVIEW

- 3.65% set-aside of extramural federal R&D budget
  - 3.20% for Small Business Innovation Research (SBIR) – 100% to small businesses
  - 0.45% for Small Business Technology Transfer (STTR) -- ~70% to small businesses/ 30% university partners

Chart 1: Distribution of Total SBIR Dollars Obligated - Participating Agencies



SBIR/STTR OVERVIEW

- Must be spent almost exclusively on R&D expenses (including salary).
- Non-dilutive/no equity
- Divided into multiple phases with goal of new technology commercialization:
  - Phase I: ~$150-225k during a period of 6-12 months, to establish technical feasibility and commercial potential.
  - Phase II: ~$150k-$1M+ during a period of up to 2 years, to support further technology R&D and commercialization efforts.
  - Sometimes Phase IIB: 1:2 private/federal match up to $1.5M
  - Sometimes “Phase III” (unofficial stage): government procurement/demo

APPLICATION GUIDELINES

- Submit any technical questions early
- Contact program officers or connectors for guidance
- Get a DUNS number
- Register with the federal System for Award Management (SAM)
- Tee up letters of recommendation
- Submit short letter of intent
- If you do NOT hear that the proposal was a poor fit, proceed with full application!
- Expect several months for a decision and a few more months for funding

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

SOLAR ENERGY TECHNOLOGIES OFFICE

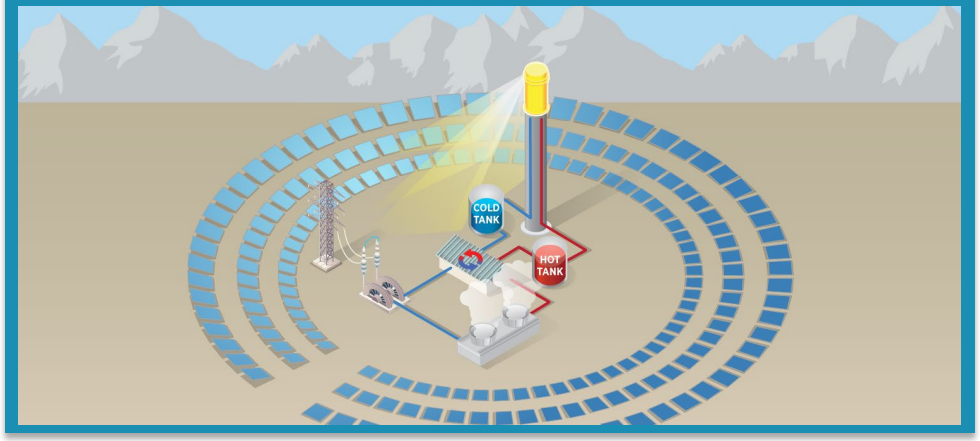
FY21 SBIR/STTR Solar Topics

energy.gov/solar-office

SETO Teams

PHOTOVOLTAICS

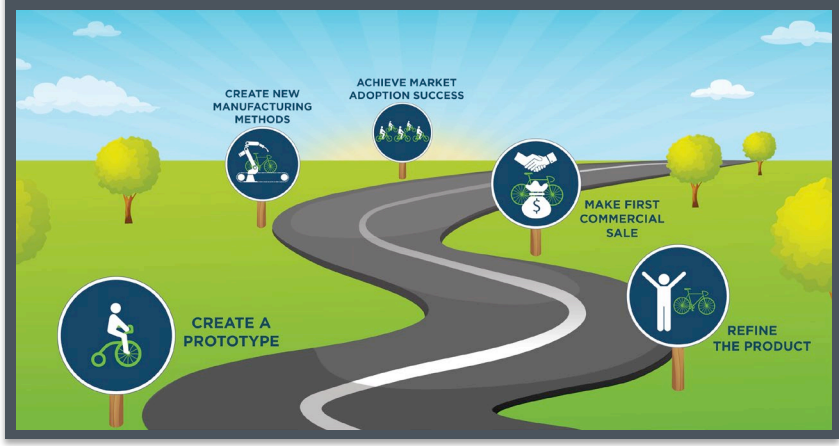
CONCENTRATING SOLAR-THERMAL POWER



STRATEGIC ANALYSIS AND INSTITUTIONAL SUPPORT

SYSTEMS INTEGRATION

MANUFACTURING AND COMPETITIVENESS



SETO Technology to Market Funding Programs

Are you an...	With an...		You should apply for...
 INDIVIDUAL	Idea		American-Made Solar Prize
	Prototype	STOP Need to be an incorporated business	
 SMALL BUSINESS	Idea	$$$ Funding up to $800K over 1 year Ease of entry: easy No cost share	American-Made Solar Prize
	Prototype	$$$ Funding up to $1.3M* over 3 years Ease of entry: medium No cost share	SBIR/STTR
		$$$ Funding up to $2M over 2 years Ease of entry: hard Must provide cost share	Incubator**
 LARGE BUSINESS	Idea		American-Made Solar Prize
	Prototype		Incubator**

*SBIR/STTR funding level is based on participation in two phases of the SBIR/STTR funding program.

**Incubator can include Incubator funding opportunity announcements (FOAs) or Incubator topics in SETO-issued FOAs.

Funding Opportunity: SBIR/STTR FY 2020 Phase I Release 2

KEY DATES

FUNDING OPPORTUNITY ANNOUNCEMENT

- December 14, 2020

FOA WEBINAR

- December 18, 2020

MANDATORY LETTER OF INTENT

- January 4, 2021 - 5 pm ET

FULL APPLICATIONS

- February 22, 2021 – 11:59pm ET

Non-Responsive Notification by Jan 25, 2021

energy.gov/solar-office/sbir

Commercialization Assistance Program

- Additional funding for commercialization activities **in addition to** your R&D award funding

- Up to $6,500 in Phase I (total award amount = $200,000 + $6,500 = $206,500)

- Two options:
  - 1) work with a vendor provided by DOE -> No need to do anything at this point
  - 2) Select your preferred vendor -> Include it in your Application!!

- Read the Funding Opportunity Announcement for more info

Solar Topics: Tech Transfer Opportunities

- Subtopic 16a: Method for Mechanical Load Testing of Photovoltaic Modules with Concurrently Applied Stressors and Diagnostic Methods
- Subtopic 16b: Nanocomposite Barrier Films for Photovoltaic Applications

Solar Topics: Innovations in Solar Systems

- Subtopic 16c: Floating Solar-Powered Aeration Systems
- Subtopic 16d: Solar Systems Resilient to Weather-related or Cyber Threats
- Subtopic 16e: Innovation in Solar Aesthetics for Residential Photovoltaic Systems
- Subtopic 16f: Commercial and Industrial Solar Systems
- Subtopic 16g: Agricultural Solar Systems

Solar Topics: Concentrated Solar Thermal Power

- Subtopic 16h: Components for Gen3 CSP Thermal Transport Systems

Solar Topics: Sub Topic in CABLE

Within the "Conductivity-enhanced materials for Affordable Breakthrough Leapfrog Electric and thermal applications" topic area

- Subtopic 20f: Photovoltaics Module and System Electrical Connections

Solar Topics: Open Topic

- Subtopic 16i: Affordability, Reliability, and Performance of Solar Technologies

For more detailed information on these topics watch SETO's full FY21 SBIR/STTR Solar topics webinar recording

https://doe.webex.com/doe/lsr.php?RCID=d166d0fc2ffc484b9e09f65f57b61c1d
(password: FkTqk54N)

ecolong

Building Interconnected and Resilient Communities

Company Information

- Based in Albany, New York
- Founded in 2015
- Recipient of U.S. DOE SETO SBIR “Advanced Peer to Peer Transactive Energy Platform with Predictive Optimization
  - FY18 Phase I
  - FY19 Phase II

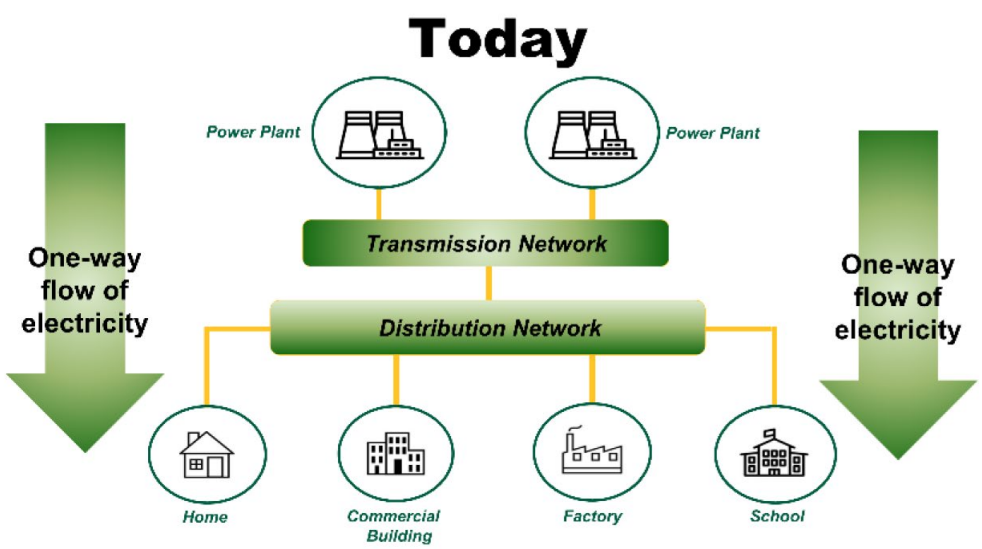
Our Partners

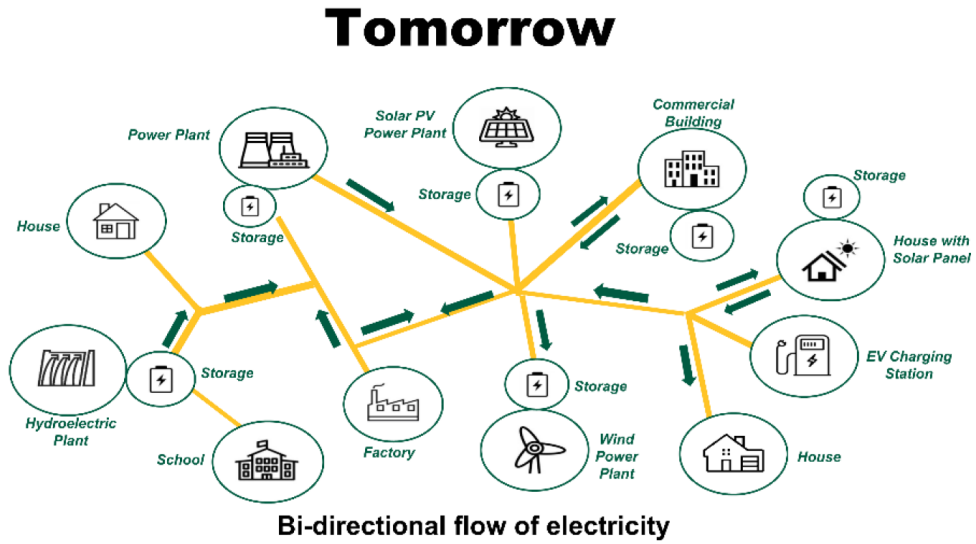
U.S. DEPARTMENT OF ENERGY

Pacific Northwest NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY

Why blockchain for energy?





Current Grid:
Centralized generation
One way power flow
Two-way communication
A few control points

Smart Grid:
Distributed generation
Two-way power flow
Multi-way communication
Millions of control points

Blockchain Technology

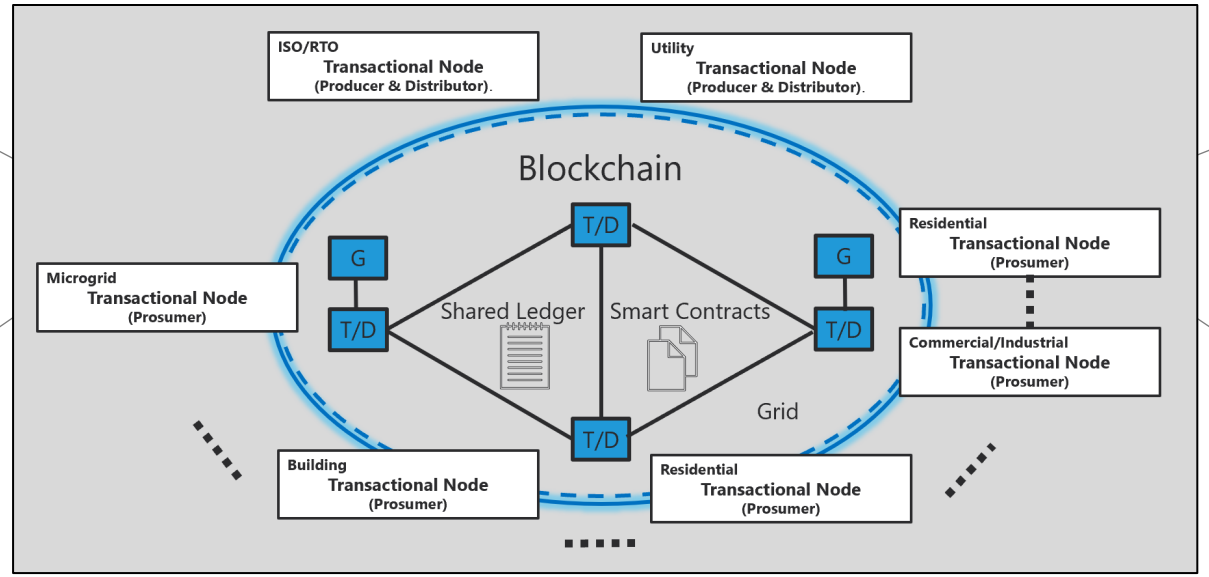
Immutable — Auditable — Automation — Encryption — Decentralized

Project Overview

Advanced peer-to-peer transactive energy platform with predictive optimization

ADVANCED MONITORING AND FORECASTING

OPTIMIZATION



CONTROL TECHNOLOGIES

DECENTRALIZED & SECURE

EMPOWER PROSUMERS

Improve visibility, insight, and control into individual energy consumption and production

GRID RELIABILITY & RESILIENCE

Provide demand response, load shifting, and grid ancillary services

ECONOMIC BENEFIT

Decrease levelized cost of solar electricity, enhanced efficiency, and encourage higher penetration of DER

TECTONICUS

Ben Lepley

Benjamin Lepley, the grant PI and founder of Tectonicus Constructs LLC (since 2012) is a registered architect in Arizona. Since graduating with a B.Arch degree from SCI_Arc, he has successfully designed and managed projects in Mumbai India, Beijing, China, and in Arizona. The largest such project being a 6.5million sqft mixed-use development in Nanjing, China he managed from a conceptual bid-winning stage to design-development, later leading the development of a unique louvered facade system giving the buildings a unique parametrically engaged form with passive shading benefits. As an architecture instructor at the UofA Ben has also led a research studio which engaged with the CAP canal engineers in covering and powering the Central Arizona Project Canal with solar power in 2017 and has intimate knowledge of their specific needs on such a project. Ben is and was the PI for Phase-1 of this grant.

Jordan Kanter

Jordan has a unique educational background, starting with a Bachelors from MIT in Biology and a Masters in Architecture from SCI_Arc, Jordan has a practiced methodology of combining the networking and intelligence concepts from biologic systems, and interfacing them with the built environment. Jordan has worked on award-winning projects in China and the US. One of which, the Harbin Opera house which features a parametrically advanced facade system which employed design methodologies in common with our grant proposal. Jordan led the GIS-based techno-economic study that was so instrumental in defining the scope of our work early-on. Jordan will continue on in phase-2 in a similar role more closely related to commercialization strategies and strategic partnerships.

Doreen Song, P.E.

Doreen is a Civil Engineer who very recently retired from the Bureau of Reclamation as a senior project manager and prior to that has worked in a number of different offices on a wide variety of projects relating to municipal water infrastructure. Doreen has managed and performed design for municipal and industrial water and wastewater treatment facilities, water and sewer lines, pump stations, water resources, grading and drainage projects, solar energy facilities, transportation and community facilities, new construction and renovations. Doreen's project management experience has also given her an extensive regulatory roadmap that fills a critical role for phase-2 and beyond. Doreen will have a key role in administering and coordinating with all the key partners on Phase-2.

Cameron Behning

Our lead parametric designer will be Cameron Behning who has l
involved heavily in phase-1 as a parametric designer. Cameron is
graduating from the UofA and will continue on as a fulltime empl
phase-2. Through out his academic career, Cameron specialized
parametric design, and received recognition for his work. He will
the transformation of the methodology into a set of buildable pre
engineered construction drawings, specification charts, and real-
referenced cost indexes.

Sheehan Wachter

Sheehan is a young architect/designer interested in exploring the
potential for the application of computational techniques in the a
and design of physical environments, from processes of materiali
to computational analysis and simulation, and complex generativ
modeling, these techniques have profound potential. He has an
extensive background in this realm, as he chairs the technology
at the UofA Architecture School, teaching, and developing new c
every year. Sheehan is a digital design and fabrication consultant
his own practice. In phase-1 Sheehan was instrumental in develo
python-based self-shading feedback loop as well as implementin
NREL-SAM / DAYSIM calculators into our methodology.

Arturo Rodriguez

Arturo is a graduate from UTSOA. He is interested in problem solving through different mediums both analog and digital. He worked through GIS in phase-1 to tell a story about Arizona's geo-economic regions and will continue to assist in phase-2 to make solar river commercially viable.

Ken Boe Petersen

Ken is a researcher, creative thinker and artist extraordinaire. Ken leads much of our client related research and writing.

LERA
Consulting and Structural Engineering

GCE
George Cairo Engineering

The Solar Store
sustainable energy solutions

Institutional Partners

James C. Wyatt College of Optical Sciences

WEST CENTER
Water & Energy Sustainable Tecnology Center

nt of Energy

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

Funding Provided by U.S. Department of Energy

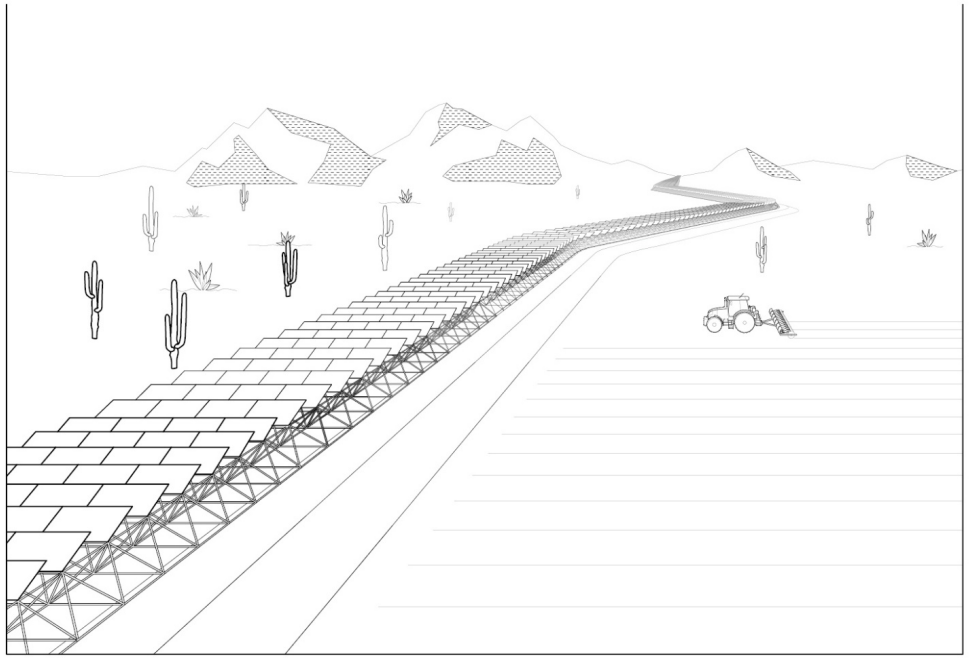
SOLAR RIVER

A WATER AND ENERGY
SOLUTION

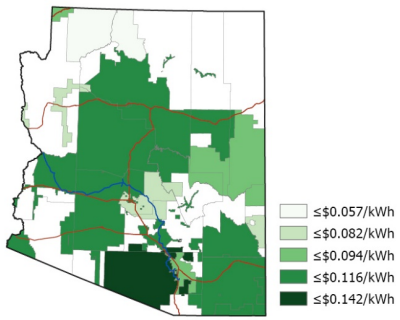
Canal Spanning Solar Structures

An adaptive system to fit the US market

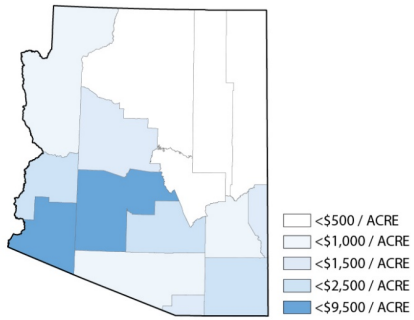
Turn your canal Right-of-Way into year-round revenue. Ditch that costly diesel pump for a solar powered pump.

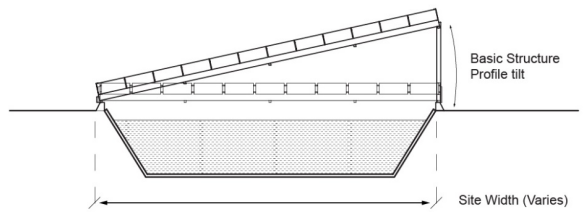


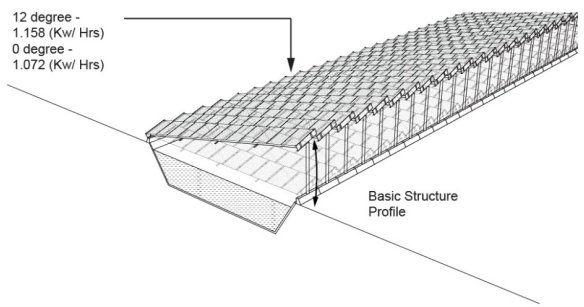
AGRICULTURAL / IRRIGATION
ELECTRICAL BUYBACK RATES



CROP VALUE PER ACRE

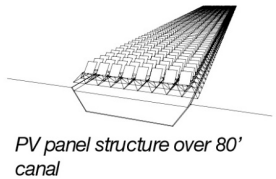






Spanning a Wide Range of Canal Types + Widths

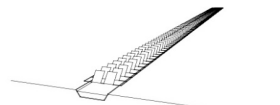
Main Line Irrigation Canals



PV panel structure over 80' canal

Typical Width: 80 Feet
Estimated Power Output for 1/4 Mile Stretch:
1.20 MW = 1,600 HP pump

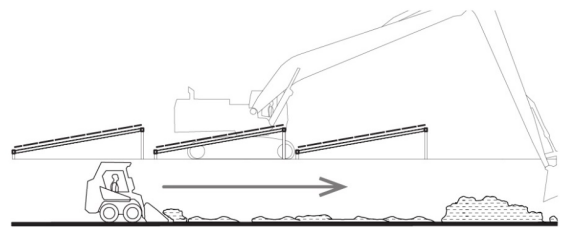
Drain / Collector Canals

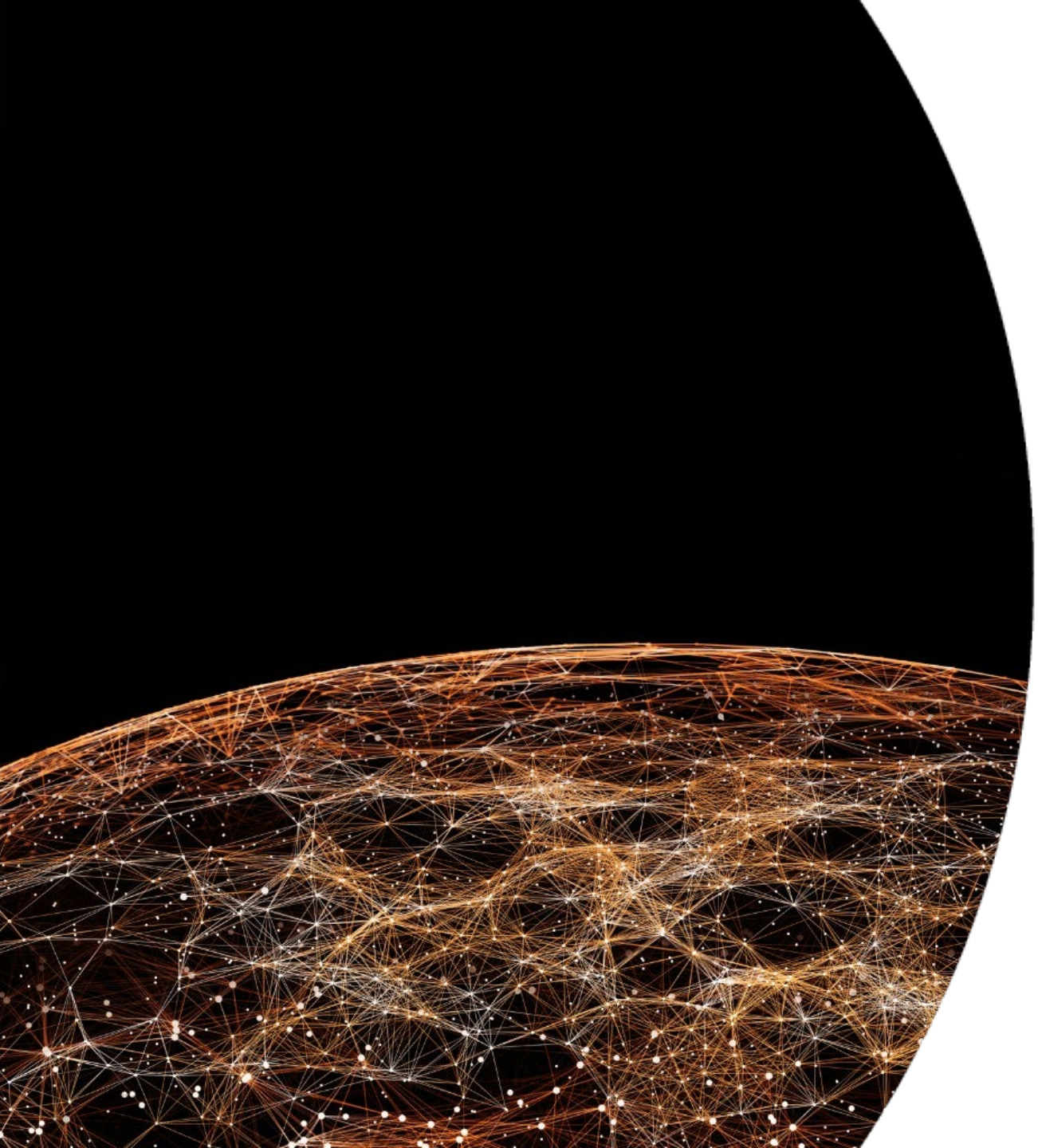


PV panel structure over 20' canal

Typical Width: 20 Feet
Estimated Power Output for 1/4 Mile Stretch:
300 KW = 400 HP pump

Canal Operations + Maintenance





where to find HELP

https://doephase0.dawnbreaker.com/

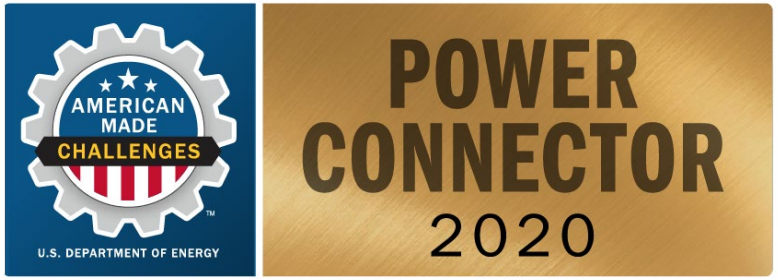
American-Made NETWORK

https://americanmadechallenges.org/network/

140+ Network partners
from 33 states plus
17 national laboratories

Connectors

Power Connectors



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Anita Bell
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CLEAN ENERGY BUSINESS NETWORK

Event Management

Demo days, recruitment events, teaming workshops, promotion at conferences

Outreach

Webinars, blogs, newsletter, SM, Funding Database, case studies

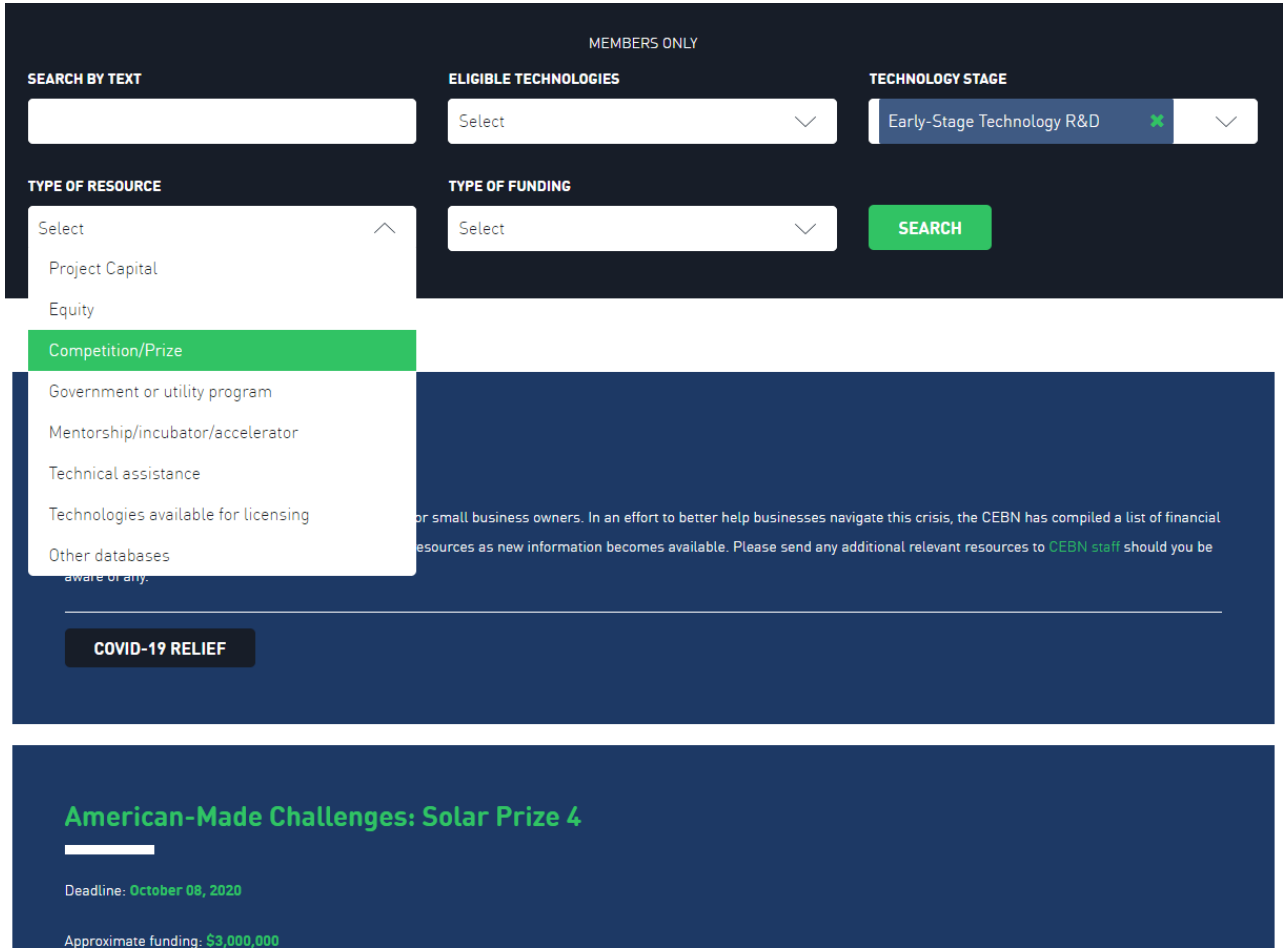
Team Support

Pitch practice, mentor/investor feedback, coaching, technical review

Network and Partnerships

5,000 businesses, 200+ partner organizations

https://www.cebn.org/business-resources/funding-database/



THE UNIVERSITY OF ARIZONA
CENTER FOR INNOVATION

People. Place. Programming.

Growing scalable startups.

Connect With Us:
https://techparks.arizona.edu/UACenterForInnovation

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anitab@uacenterforinnovation.org

Casey Carrillo, Program Manager, UACI
ccarrillo@uacenterforinnovation.org

THE UNIVERSITY OF ARIZONA
CENTER FOR INNOVATION

- The University of Arizona Center for Innovation (UACI) is a science/technology incubator with outposts across Southern Arizona. Since 2003, UACI has incubated 150+ companies and currently serves 38.

- UACI empowers companies to:
  - Develop and execute a successful business strategy.
    - Attract funding, develop and evolve their product from prototype to market, etc.
  - Receive mentorship from successful entrepreneurs.
    - Mentor-in-residence, subject matter experts, staff, etc.
  - Take products from idea to market.
  - Connect to resources of the University of Arizona and our network.
  - Access to state-of-the art facilities and equipment.
    - Dry labs, wet labs, Solar Zone.

ADL VENTURES

At ADL Ventures, we spin-in and spin-out novel technology

PROBLEM SPACE

Open innovation challenges to leverage the new venture ecosystem to solve gnarly technical challenges

www.problemspace.io

ADL VENTURES
Monetizing Innovation

Creation of an “innovation conveyer belt” to commercialize internally-sourced ideas

www.adlventures.com

Venture consulting “do-tank” for corp and govt clients

Corporates

Help legacy-sector corporates uncover disruptive innovations

- >400 next-generation building materials entrants in BMC
- Help PG&E find innovative solutions for major grid and wildfire issues

Startups

Spin out and assist startups to accelerate operations and sales (“scaffolding” model)

- Identify and secure first customer
- Key operational and strategic initiatives

Government

Assist major government entities with commercialization through both operational scaling and recruitment

- Advanced Building Construction Collaborative
- **American-Made Solar Network**
- National lab initiatives

Team

Frank Yang

- Partner at ADL
- Founder / CEO of Liatris, an advanced insulation materials startup that received SBIR award this year
- 10+ years in the solar industry as a co-founder of Stion, a US solar panel manufacturer and systems integrator.

Chris Richardson

- Partner at ADL
- product owner for our ProblemSpace and Monetizing Innovation platforms
- A serial entrepreneur and growth leader in marketing technology and talent networks

Yan Yan

- Senior Associate at ADL
- Experience with accessing and analyzing new technology
- Received master's degree in mechanical engineering from MIT in 2019

panel:

APPLYING for & LEVERAGING SBIR/STTR

- Lynn Abramson, President, Clean Energy Business Network
- Peter Lobaccaro, Program Analyst, Department of Energy's Solar Energy Technologies Office
- Nancy Min, Founder, Ecolong
- Ben Lepley, Founder, Tectonicus Constructs
- Frank Yang, Partner, ADL Ventures