Nurturing the Next Generation of Entrepreneurs: What does success look like, and for whom?
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Technology-to-market Advisor, ARPA-E
History of ARPA-E

ARPA-E Mission

**Mission:** To overcome long-term and high-risk technological barriers in the development of energy technologies

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**Means:**

- Identify and promote revolutionary advances in fundamental and applied sciences
- Translate scientific discoveries and cutting-edge inventions into technological innovations
- Accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty

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Ensure U.S. Technological Lead & U.S. Economic and Energy Security
Creating New Learning Curves

- Transformative Research
- Disruptive Technology
- Existing Technology
What Makes an ARPA-E Project?

**impact**
- High impact on ARPA-E mission areas
- Credible path to market
- Large commercial application

**transform**
- Challenges what is possible
- Potential to disrupt existing learning curves
- Leaps beyond today’s technologies

**bridge**
- Translates science into breakthrough technology
- Not researched or funded elsewhere
- Catalyzes new interest and investment

**team**
- Comprised of best-in-class people
- Cross-disciplinary skill sets
- Translation oriented
If it works…

will it matter?
Tech-To-Market Approach

**Scope**
Provide strategic market insights necessary to create innovative, commercially-relevant programs

**Advise**
Support project teams with skills & knowledge to align technology with market needs

**Manage**
Manage project teams’ T2M efforts through T2M plans and jointly developed milestones

**Partnerships**
Engage third-party investors and partners to support technology development towards the market
Focused programs prioritize R&D topics by their potential to make a significant difference in ARPA-E’s mission space.

- Size of the potential impact
- Technical opportunities for transformation
- Portfolio of projects with different approaches

OPEN programs support the development of potentially disruptive new technologies across the full spectrum of energy applications.

- Complement focused programs
- Support innovative “one off” projects
- Provide a “snapshot” of energy R&D
- OPENs have occurred in 2009, 2012 and 2015
Since 2009 ARPA-E has provided $1.5 billion in R&D funding to more than 580 projects.

- 74 projects have attracted more than $1.8 billion in private-sector follow-on funding
- 56 projects have formed new companies
- 68 projects have partnered with other government agencies to further development
- 208 patents issued by U.S. Patent and Trademark Office
- 1,328 peer-reviewed journal articles from ARPA-E projects
- 1,493 reported subject invention disclosures

As of February 2017
OPEN Funding Opportunity Announcements (FOAS) support the development of potentially disruptive new technologies across the full spectrum of energy applications. Are you ready to change the world? Accepting concept papers through February 12.
2018 SUMMIT
March 13-15
Technology Showcase:
March 13-15
Gaylord Convention Center,
Washington, D.C.

This is the premier event that showcases
America's future energy technologies.

energy innovation summit

www.ARPAE-Summit.com
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WADE BITARAF
Director, Energy & Sustainability, Plug And Play Technology Center
I. We accelerate and invest in startups. We run over 20 stage-agnostic accelerator programs a year and invest in over 150 companies.

We match over 130 multinational corporate partners to world-class startups disrupting and incrementally improving their industry.

III. We provide flexible co-working space. With a 180,000 sq. ft. building in the heart of Silicon Valley, we have enough room to cater for tiny teams, all the way up to rapidly growing startups.

IV. We host major industry events daily. We host hundreds of events a year with high calibre audiences, making our HQ a great place to network.
ALL-IN-ONE STARTUP ECOSYSTEM

- Mentorship
- Logistics
- Networking
- Corporate Innovation

- Investment
- Active Investments
- VC Co-Investments
- Dealflow Sessions
- Match-making
- Accelerator Programs
- Business Development
- Daily Events
- I.T. Services
- Data Center
- Office Space
- EIR Advisors
- Service Partners
- Pitch Polishing
- Workshops

PLUGANDPLAY
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Managing Director, Cleantech & Physical Sciences Venture Services, Mars Discovery District
MaRS CLEANTECH
(ENERGY AND ENVIRONMENT)
NORTH AMERICA’S LARGEST URBAN INNOVATION HUB

1.5 million sq ft
Direct subway & streetcar access
150+ Total Tenants
80+ Startup Tenants
Convening entrepreneurs with financial, academic & business communities
MaRS VENTURE SUPPORT PROGRAMS ARE SEGMENTED BY STAGE TO FOCUS ON HIGH-GROWTH HIGH-POTENTIAL VENTURES

**SERVICE MODEL**

**VENTURE STAGE**

- **START**
  - 60% of Ventures
  - $0-1M in revenue
  - Pre-seed funding

- **GROWTH**
  - 35% of Ventures
  - $1-5M in revenue
  - Series A funding

- **SCALE**
  - 5% of Ventures
  - $5M+ in revenue
  - Series B or more

**Customized (1:1) (Pilot Program)**

- 1:1 Business & Technical advisory
- Talent, capital, Int'l market and customer connections
- Marketing & PR support
- Functional training workshops
- Customized Market Intelligence
- Leverage expert network

**Specific (1:1)**

- 1:1 Business & Technical advisory
- Talent, capital, Int'l market and customer connections
- Marketing & PR support
- Functional training workshops
- Customized Market Intelligence
- Leverage expert network

**General (1:many & 1:few)**

- Entrepreneurship education
- Experiential workshops
- Market Intelligence Insights
- Peer-to-peer online network
MaRS CLEANTECH EVOLUTION

ARCTERN VENTURES

• A $50M private capital fund
• Equity in 10 MaRS Cleantech Ventures
• Portion of returns go to MaRS
• Currently raising Fund 2 ($150M target)
• Managing Partners are Tom Rand (also part-time in VS) and Murray McCaig

ADVANCED ENERGY CENTRE

• Public-private partnership founded by MaRS Cleantech with Ontario Ministry of Energy, and corporate partners
• Guides utilities and organizations in our rapidly shifting energy sector, helping them plan for the future, and adopt new methodologies and business models

Venture Services, ArcTern, & AEC are known together as MaRS Cleantech
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MILAN POIDL
HEAD OF SV INNOVATION HUB, ENEL
Open Innovation: collaboration with Start-ups

January 2018

Milan Poidl
Enel Silicon Valley Innovation Hub Manager
milan.poidl@enel.com
Enel today
Global and diversified operator

- ~38 GW renewable capacity
- ~47 GW thermal capacity
- ~40 €bn Regulated Asset Base
- ~62 mn distribution end users
- Presence with operating assets #1 in Italy, Spain, Chile, Peru
  and #2 in Argentina, Colombia
- ~18.3 mn free retail customers
  #1 in Italy and Spain

1. As of 2016
2. Consolidated (35.9 GW) and managed (1.9 GW) capacity including 24.9 GW of large hydro.
3. Presence with operating assets
Enel Green Power
Positioning and key figures

Expanding and consolidating our footprint

Key figures 2016

Capacity¹
35,7 gw

Wind 10,9 gw
SOLAR 1,2 gw
HYDRO² 24,8 gw

Production
92,4 TWh

GEO 0,8 gw
Biomass 0,1 gw
MINI HYDRO 2,5 gw

Consolidated Capacity Additions³ ~3,5 gw

2017-2019 Industrial growth

A leading owner and operator of wind, geothermal, hydropower and solar power plants in the United States and Canada

1. Not including projects managed through BSO model (Build Sell Operate)
2. Enel Green Power operates the Large Hydro power plants of Enel Group
3. Excludes non-organic growth for 0.9 GW
4. Presence with operating assets

Countries of presence⁴
Countries of interest
**Enel Innovation Hubs**
Global Network to promote exchange of ideas & contacts

**Strong network of relationships for Enel Group:**
- VC funds
- Associations
- Universities
- Institutional programs/financing
- Innovation hubs of other companies
- Accelerators
- Incubators
Innovation needs for the Enel Group

Main areas of interest for each Global Business Line

GLOBAL RENEWABLE ENERGY
- Wind
- Solar
- Hydro
- Marine Energy
- Geothermal
- Storage

GLOBAL THERMAL GENERATION
- Industrial IoT (Digital Power Plant)
- Robotics & Drones for O&M
- Performance Optimization of Thermal Generation

GLOBAL INFRASTRUCTURES AND NETWORK
- Network Components
- Demand Response
- Smart Metering
- Network Digitalization
- Predictive Maintenance

GLOBAL ICT
- Artificial Intelligence
- IoT
- Customer Journey
- Digitalization
- Automated Operations
- Digital Transformation
- Cybersecurity

GLOBAL TRADING
- Blockchain
- Forecasting
- Energy Management

Enel X
- E-Mobility
- E-Home
- E-Industry
- E-City

All Business Lines are actively looking for collaborations with startups to grow the business or to improve operational efficiency
Innovating with Start-ups

How does it work

**Defining Needs**

Business Lines **define the needs for Innovation** and the requirements of solutions to be found.

**Scouting**

Provide scouting through Innovation HUBs and other partners.

**Matching**

Business Lines **evaluate startups and define potential collaboration**.

**Collaboration with Start-ups**

Business Lines **run the projects**.

**Deployment**
Open to collaborate

@enelsharing

Enel Sharing

youtube.com/user/enelvideo

openinnovability.enel.com

startup.enel.com

milan.poidl@enel.com
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MARK VASU
Executive Vice President, Greentown Labs
Our mission is to foster a passionate community committed to solving the world’s biggest efficiency, energy, and environmental challenges by providing the resources and labs startups need to succeed.

64 CURRENT MEMBER COMPANIES

SECTOR
- Energy Generation, 16%
- Energy Distribution & Storage, 11%
- Building/Energy Efficiency, 9%
- Agriculture, Water & Waste, 13%
- Robotics/Automation, 13%
- Transportation/e-mobility, 4%
- Information/Communication Tech & Cleanweb, 7%
- Other, 13%
- Chemicals & Advanced Materials, 13%

LOCATION
- Local, 90%
- Out of State, 4%
- International, 6%
ECOSYSTEM ACCESS — BOSTON, THE NORTHEAST + BEYOND

Investors

Corporate Partners

Universities

Support Organizations

Government

Professional Services

CLEANTECH STARTUPS

State Street

BASF

Saint-Gobain

Veolia

GE

Panasonic

United Technologies

DSM

Braemar Energy Ventures

CEVG Clean Energy Venture Group

BOLT

Black Coral Capital

Breakthrough Energy

MIT Global Founders’ Skills Accelerator

Techstars Boston

Clean Tech Open

MC MassChallenge

Greentown Labs

Fraunhofer Techbridge

MassV创业

MassDevelopment

Massachusetts Clean Energy Center

Daper

Tufts University

Boston University

MIT

Drapers

Babson

Foley Hoag LLP

Wolf Greenfield

Foley Hoag LLP

Boston College

Swissnex Boston

Innovation Hub

Innovation Hub

Innovation Hub

Innovation Hub
MEMBER COMPANY IMPACT + SUCCESS

- $260M+ RAISED
- 900+ JOBS CREATED
- $40M+ REVENUES
- 27 FEDERAL GRANTS
- 70+ PATENTS HELD
- 210+ PRIZE WINS
- $335M+ REGIONAL ECONOMIC OUTPUT
- 15 SERIES A + B ROUNDS
- 3 EXITS
- 86% SUCCESS RATE