The ARPA-E Funding Process

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The ARPA-E Mission

Catalyze and support the development of transformational, high-impact energy technologies

Ensure America’s

- National Security
- Economic Security
- Energy Security
- Technological Lead
A Brief History of ARPA-E

- **2007**
  - America COMPETES Act signed, authorizing ARPA-E

- **2009**
  - American Recovery & Reinvestment Act signed, providing $400M to establish ARPA-E

- **2014**
  - Over $1B invested
  - 375 projects funded

**Investing in America’s Best and Brightest**

- Universities 35%
- Large Businesses 19%
- Small Businesses 37%
- National Labs 6%
- Non-profits 3%

Funding Distribution (Lead Institution)
Funding Disruptive Approaches to Innovation

- Transformative Research
- Disruptive Technology
- Existing Technology
To date, ARPA-E has invested in 375 energy technology projects across 20 focused programs and 2 OPEN solicitations.
Developing ARPA-E Programs

PROGRAM DEVELOPMENT CYCLE

- Transition Toward Market Adoption
- Program Conception (Idea/Vision)
- Workshop
- Program Approval
- FOA Development & Issuance
- ENGAGE
- ENVISION
- EXECUTE
- ESTABLISH

- Project Handoff
- Ongoing Technical Review
- Contract Negotiations & Awards
- Project Selection
- Proposal Rebuttal
- Merit Review of Proposals

ARPA-E Program Directors

2009 2010 2011 2012 2013 2014
ARPA-E Program Framing Questions

What is the problem to be solved?

How does the program complement R&D efforts in other DOE programs, federal agencies, and the private sector?

What are the program goals and how will progress towards those goals be measured?

If successful, how will the proposed program impact one or more of ARPA-E’s mission areas?

What happens at the conclusion of the program? What are the barriers to commercialization and how might these problems be overcome?

What is the current state of R&D? How is the proposed program a transformative and disruptive approach?

Why is now the right time to solve this problem?

What research communities need to be brought together?

Adapted from the DARPA Heilmeier questions
If it works…

will it matter?
OPEN 2012: 66 Projects, 24 States, 11 Areas

- Advanced Vehicles: 2 Projects
- Water: 2 Projects
- Advanced Fuels: 13 Projects
- Building Efficiency: 3 Projects
- Stationary Generation: 2 Projects
- Grid Modernization: 9 Projects
- Renewable Power: 10 Projects
- Stationary Energy Storage: 8 Projects
- Carbon Capture: 4 Projects
- Thermal Energy Storage: 5 Projects
- Transportation Storage: 7 Projects

Next OPEN FOA in FY 2015 following appropriation
Creating a Successful ARPA-E Project

- The ability to make an **IMPACT**
- The potential to **TRANSFORM** our energy future
- A **BRIDGE** from science to breakthrough technology
- A **TEAM** of best-in-class experts
Top 5 Tips for Writing a Competitive Proposal

1. Read the Funding Opportunity Announcement (FOA)
2. Demonstrate impact
3. Describe the technology
4. Compare to state of art
5. Identify challenges and solutions
Top 5 Tips for Writing a Competitive Proposal

1. Read the Funding Opportunity Announcement (FOA)
   - Motivation for the program
   - Program objectives
   - Technical categories of interest
   - Technical performance targets

2. Demonstrate impact
3. Describe technology
4. Compare to state of art
5. Identify challenges and solutions

Read the FOA! Then read it again, carefully.
Top 5 Tips for Writing a Competitive Proposal

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5. Identify challenges and solutions

- How does it impact ARPA-E mission areas?
- What problem are you trying to solve?

Your first question should not be “will it work?”

“If it works, will it matter?”
Dos and Don’ts of Demonstrating Impact

Hydrogel-based super biodegradable diapers

- Exposing diaper to UV light activates ability to fully dissolve in water in 30 s vs. 300 y biodegradation of conventional diapers
- Will save ~18 billion diapers a year from entering US landfills

Carbon-reducing biocatalyst for human waste

- Novel carbon reducing biocatalyst reduces human waste to pure carbon and water
  \[(\text{CH}_2)_n + \frac{n}{2}\text{O}_2 = n\text{C(s)} + n\text{H}_2\text{O}\]
- Technology acts as carbon sink using human waste, potentially reducing carbon dioxide emissions by more than 1 Giga-tonne per year

Does not address an ARPA-E mission

Addresses an ARPA-E mission area
Top 5 Tips for Writing a Competitive Proposal

1. Read the Funding Opportunity Announcement (FOA)

2. Demonstrate impact

3. **Describe technology**

4. Compare to state of art

5. Identify challenges and solutions

- How does it work? Describe with absolutely no jargon.

- What’s new in your approach?

- Why do you think it will be successful?
Dos and Don’ts of Describing Technology

Flexible, energy efficient time travel

- 10x more efficient time travel to any date and place in the history of the universe
- Leverages novel proprietary technology from Doc and McFly Industries, Inc.
- Validated at proof-of-concept scale by D&M Industry advisors, including several Nobel laureates
- Next generation flux capacitor based on proprietary hafnium alloy is the key enabling technology
- Capacitor placement within metallic vehicle body perturbs the flux dispersal field, allowing smooth passage through the space-time continuum (see references 3-8)
- Time travel requires 1.21 Gigawatt-hours of electrical power, with allows for 10x efficiency gain as validated via the mass/energy balance outlined in Table 3

Too vague, no content

Backs up claims, gives specifics
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4. Compare to state of art
5. Identify challenges and solutions

- How is it done today?
- Why are today’s solutions insufficient?
- How does your solution represent a dramatic improvement?
Top 5 Tips for Writing a Competitive Proposal

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3. Describe technology
4. Compare to state of art
5. Identify challenges and solutions

- What is the challenge to developing your specific technology? Why is it hard?
- What approaches will you take to overcoming these challenges?

Why should we fund you?

Provide **key insight/unique approach** to solve a problem where others failed
Final Remark on Pedigrees

- It doesn’t matter **who** you are…
  - Nobel prize winner or
  - Founder of a tiny startup company
- We only care about the **quality of the idea**

If you’re really good, let it show through in the **quality of your proposal**.
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Concept Papers and Full Applications

- Concept Papers (4 pages)
  - Summarize concept succinctly
  - Describe innovation/impact, proposed work, and team organization/capabilities

- Full Applications (30 pages for technical section)
  - Detailed description of proposed technology, work plan, and budget
  - Detailed justification of how proposed technology will meet FOA technical targets

Use templates provided by ARPA-E
ARPA-E Resources

- ARPA-E UNIVERSITY
- REGIONAL RESOURCES
- ANNUAL ENERGY INNOVATION SUMMIT
- ACTIVE PROGRAM MANAGEMENT
- ARPA-E ENGAGE
SAVE THE DATE!

www.arpaee-summit.com
Feb. 9-11, 2015 | Washington, D.C.