



U.S. Clean Energy Investments Status Report January 2010



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U. S. Department of Energy

January 2010



- Create stable, long-term incentives
- Develop projects that are self-funded or cheap
- Make America more competitive with a more efficient and productive economy
- Invest in the next generation of scientists and engineers
- Support innovative research and commercialization funding models

The American Recovery and Reinvestment Act of 2009 is a “kick-start” to the clean energy revolution



- Recovery Act Investments
 - Energy Efficiency
 - Renewable Energy
 - Smart Grid
 - Loan Guarantees
- ARPA-E
- Clean Energy Ministerial and Climate REDI



Department of Energy Program Office	Recovery Act (\$ Millions)
Office of Energy Efficiency & Renewable Energy	\$16,800
Office of Science	\$2,000
Office of Electricity Delivery and Energy Reliability	\$4,500
Office of Fossil Energy	\$3,400
Office of Environmental Management	\$6,000
DOE TOTAL (Excluding Loans)	\$32,700
Office of the Chief Financial Officer - Technology Loan Guarantee	\$6,000
Power Marketing Administrations - Borrowing Authority	\$6,500
DOE TOTAL (Including Loans)	\$45,200

EERE Recovery Act Funding



Office of Energy Efficiency & Renewable Energy	Recovery Act (\$ Millions)
EERE Discretionary RD&D	\$2,500
Technology RD&D	\$1,250
Biomass	\$800
Geothermal Technologies	\$400
Information and Communications Technology	\$50
EERE Directed Funding	\$14,350
Energy Efficiency & Conservation Block Grants	\$3,200
State Energy Program	\$3,100
Weatherization Assistance Program	\$5,000
Energy Star Rebates	\$300
Transportation Electrification	\$400
Clean Cities Alternative Fuels Pilot Program	\$300
Advanced Battery & Hybrid Components Manufacturing	\$2,000
EERE Subtotal	\$16,800



- **Weatherization Assistance Program (appropriated \$5B,)** : Assistance to low-income households for energy efficiency improvements
 - All awards have been made at 100% allocation, \$4.76B obligated, \$441M payments
 - Announcement for Weatherization Training Centers closes 01/21/10. DOE expects to make up to 30 individual awards totaling \$30M.
 - Operation Green Light: engaging and visiting states that have received funding but have not met expected production targets
- **State Energy Program (\$3.1B):** Formula grant program to states for energy efficiency and renewable energy programs and activities
 - Amount obligated as of Dec. 2, 2009: \$3.1B
 - Awards made to date: All 56 at 100% funding level
 - NEPA determinations have been made on \$1,708,414,941 of SEP funds or 56% of the total award for SEP. Of this total, \$1,677,414,941 has been CXed.
 - Technical Assistance Solicitation totaling \$14M issued closed Dec. 7, 2009 to help governmental entities at the state, local, and tribal levels receiving SEP Recovery Act funds



Energy Efficiency Conservation Block Grants (appropriated \$2.8B, \$2.29B obligated, \$78M payments)

- Total Dollar Amount Obligated as of 01/19/10: \$2,266,303,344
- Total Number of Awards as of 01/19/10: 2,095
- Awards planned as the week of January 23-29: 4 awards totaling \$1,303,000
- Total Number of Outstanding Awards as of 01/12/10: 260 awards (\$61M total)

Competitive Block Grants (\$454 million)

- Applications were due by 12/14/09. Approximately 150 applications received for Retrofit Ramp-up (Topic 1); merit reviews have begun

Energy Efficiency Appliance Rebate Program (\$300M): New program to issue rebates for EnergyStar appliances to consumers

- 56 eligible entities received awards as of January 2010
- Some states are rolling out their programs



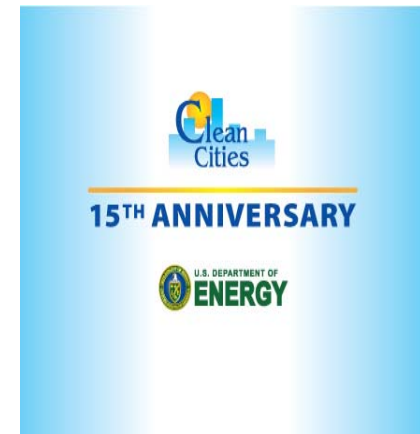
Advanced Battery and Hybrid Component Manufacturing Grants (\$2.0B) & Transportation Electrification (\$400M):

- 30 projects selected for Advanced Battery Manufacturing and 18 projects selected for Transportation Electrification – Announced on 8/5/09
- **Battery Manufacturing (\$1.298 billion obligated)**
 - Awarded (\$1.298B total): A123 (\$249M), Allison Transmission (\$62.8M), Delphi Automotive (\$89.3M), Dow Kokam (\$161M), East Penn (\$32.5 M), Exide (\$34.2 M), GM (\$105.3M), Ford (\$62.7M), Johnson Controls (\$299.1 M), Remy (\$60.2M), Saft (\$95.5M), and UQM Technologies (\$45.1M)
 - Pending: 19 awards pending; Five awards pending for January: Celgard (\$49.2M), EnerDel (\$118.5M), Powerex (\$8.1M), SBE (\$9.1M), and Toda America (\$35M)
- **Transportation Electrification (\$214 million obligated)**
 - Awarded: Colorado State Univ. (\$5M), ETEC (\$86.3M), Navistar (\$39.2M), University of Michigan (\$2.5M), Michigan Technological University (\$2.9M), Purdue University (\$6.1M), San Francisco City/County (\$500k), SCAQMD (\$45.4M), Virginia Community College (\$720k), Workhorse Sales/Navistar (\$39.2M), Wayne State University (\$5M), West Virginia University (\$6.9M)
 - Pending: 7 awards pending; Three awards planned in January: Chrysler (\$48M), Univ. of Missouri (\$5M), and National Fire Protection Assn. (\$4.3M)



Clean Cities Alternative Fuel Pilot Program (\$300M)

- Funding Opportunity Announcement closed May 29, 2009
- 25 projects selected. 16 Awarded (\$190M total); 6 awards pending in January



Industrial Technology:

- **Information and Communication Technology (\$50M)**
 - Closed July 21, 2009
 - Approx. 209 applications received, 156 passed compliance
 - \$47M announced for 14 projects Jan. 6, 2010
- **Combined Heat and Power (\$156M)**
 - Approx. 359 applications received
 - 9 selections announced Nov. 3, 2009
- **State Save Energy Now (\$10M)**
 - 32 selections announced Nov. 3, 2009

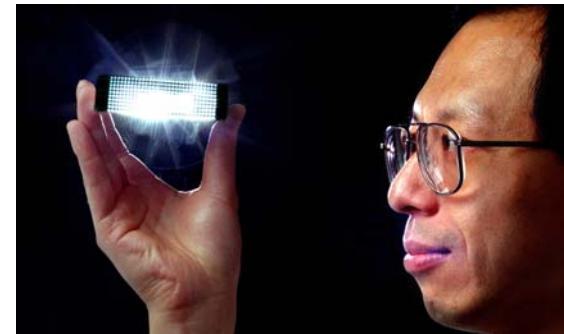
Save
ENERGY
Now®

Vehicles Technology:

- **Commercial Vehicle Integration and Advanced Powertrain (\$240M total / \$110M ARRA funds)**
 - Closed Sept. 9, 2009
 - 42 applications received
- **X-Prize Award (\$5.5M)**
 - To provide technical assistance to national high efficiency vehicle competition
 - Announced Nov. 2, 2009
- **Super Truck** – 9 projects for \$100M ARRA funds (plus \$87M from annual appropriations) announced Jan. 11, 2010



- **Solid State Lighting Core Technologies (\$8M)**
 - Closed on Aug. 10, 2009
 - Approx. 52 applications
 - 3 Awards (\$4M) made on Jan. 15, 2010
- **Solid State Lighting Product Development (\$11.5M)**
 - Closed Aug. 17, 2009
 - 65 applications received
 - 6 Awards (\$10.3) made on Jan. 15, 2010
- **Advanced Energy Efficient Building Technologies (\$25M-\$75M)**
 - Closed on Aug. 18, 2009
 - Approx. 370 applications
 - Selections planned for March 2010
- **Solid State Lighting U.S. Manufacturing (\$23.5M)**
 - Closed Aug, 24, 2009
 - 44 applications received
 - 8 Awards (\$23.5M) made on Jan. 15, 2010
- **Training Program Development for Commercial Building Equipment Technicians, Building Operators, and Energy Commissioning Agents/Auditors (\$7.5M)**
 - Closed Sept. 1, 2009
 - 40 applications received
 - Selections planned for March 2010
- **Building America Energy Efficient Housing Partnerships (\$25M)**
 - Area 1 closed Aug. 27, 2009; Area 2 closed Sept. 30, 2009
 - 9 applications received/selections planned



Integrated Biorefineries (\$564 M)

- Includes commercial bio-refineries, pilot and demonstrations
- Closed June 30, 2009
- Approx. 175 applications
- 18 projects announced 12/4/09

Algal / Advanced Biofuels Consortia (\$78M)

- Closed Sept. 14, 2009
- 2 selections announced on 1/13/10

Infrastructure Development (\$20M)

- Closed Oct. 4, 2009
- \$1.8M for 8 projects selections announced on 1/13/10



National Lab Call for PV and CSP R&D

(\$17M)

- Closed on July 15, 2009
- Approx. 84 applications received
- 15 selections announced Oct. 8, 2009

High Penetration PV (\$17.5M)

- Closed on July 30, 2009
- Approx. 67 applications received
- 7 selections announced Oct. 8, 2009

Solar Market Transformation (\$20M)

- Closed on July 30, 2009
- Approx. 110 applications received
- 25 selections announced Oct. 8, 2009

PV Incubator Awards (\$10M)

- 4 selections announced Jan. 20, 2010



Crystalline Silicon



Thin Films



CPV

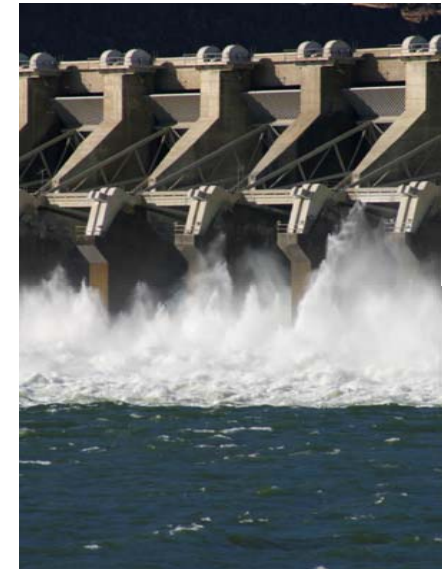


Hydropower

- **Conventional Hydropower Recovery (\$32M)**
 - 73 applications received
 - 7 selections announced on Nov. 4, 2009

Wind

- **Large Dynamometer Wind Testing Facility (\$45M)**
 - 10 applications received
 - 1 selection announced Nov. 23, 2009
- **Wind University (\$24M)**
 - 50 applications received
 - 3 selections announced Oct. 15, 2009
- **Massachusetts Large Blade Testing Facility (\$25M)**
 - Selection announced on June 24, 2009
- **Turbine R&D and Transmission interconnection (\$13.4M)**
 - 25 selections, 25 awarded. Two additional alternates to be funded



Selections Finalized for all Opportunities \$338M announced for 123 projects on Oct. 29, 2009

- **Validation of Innovative Exploration Technologies** (\$98.1M)
 - 69 applications received
- **EGS Component R&D** (\$81.5M)
 - Approx. 137 applications received
- **EGS Systems Demonstrations** (\$51.4M)
 - 16 compliant applications received
- **Ground Source Heat Pumps** (\$61.9M)
 - 168 applications received
- **Data Development, Collection, and Maintenance** (\$24.7M)
 - 8 applications received
- **Energy Production from Low Temperature Resources, Co-produced Fluids from Oil and Gas Wells, and Geopressured Resources** (\$20.7M)
 - 41 applications received





- **Covers electric transmission, distribution, and customer-side applications**
- **Deployment of Phasor Measurement Units (PMU) within the transmission system is a specific program goal**
- **Competitive, merit-based solicitation; more than 431 proposals received and reviewed**
- **Project value for 389 conforming proposals = \$22.4B (\$12.6B Applicant Share/\$9.8B Federal Share)**

Eligibility and Funding

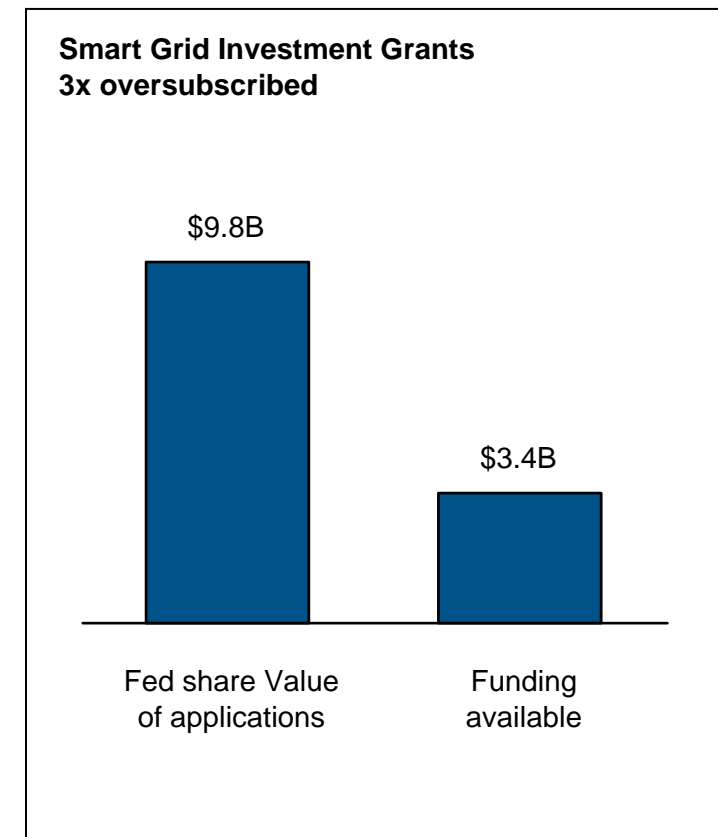
- \$3.4 billion available
- Applications came from eligible entities such as electric utilities, load serving entities, appliance and equipment manufacturers, and IT vendors
- National Laboratories and Federally Funded Research and Development Centers were NOT eligible
- Project awards ranged from \$100,000 to \$5,000,000 for PMU projects; \$500,000 to \$200,000,000 for others
- Federal funding provided for up to 50% of qualified investments requested by grant applicants

<u>2009 Milestones</u>	
<i>Activity</i>	<i>Date</i>
Funding Opportunity Announcement (FOA) - Round 1	Issued June 25, 2009 Closed August 6, 2009 <u>100 selections announced Oct. 27</u> totaling \$3.4B
FOA – Round 2	CANCELLED
FOA – Round 3	CANCELLED
First Set of Letter Awards Made	December 24, 2009



- **Oversubscription: Dollar value of applications far exceeded the funding available**

- **Phases II & III canceled due to over subscription of Phase I**
- **All projects must be completed within 3 years of award & costing completed by 09/30/2015**
- **DOE is working towards finalizing all 100 awards within the next few months.**





- Covers electric transmission, distribution, and customer-side projects at a scale that can be replicated across the country
- Scope includes (1) Regional smart grid demonstrations, and (2) Utility-scale energy storage demonstrations
- Competitive, merit-based solicitation; 150 applications received and reviewed

Eligibility and Funding

- \$620 Million made available
- Applications came from organizations including state and local agencies, universities, electric utilities, equipment manufacturers, and project developers
- Other Federal agencies, National Laboratories, Federally Funded Research and Development Centers, certain non-profits that engaged in lobbying activities after December 31, 1995 were NOT eligible
- Applicant's cost share must be at least 50% of the total allowable costs

<u>2009 Award Milestones</u>	
<i>Activity</i>	<i>Date</i>
Funding Opportunity Announcement (FOA)	Issued June 25, Closed August 26, <u>32 selections made Nov. 24, 2009 totaling \$620M</u>
First Set of Letter Awards Made	December 24, 2009



- Oversubscription: Dollar value of applications far exceeded the funding available**

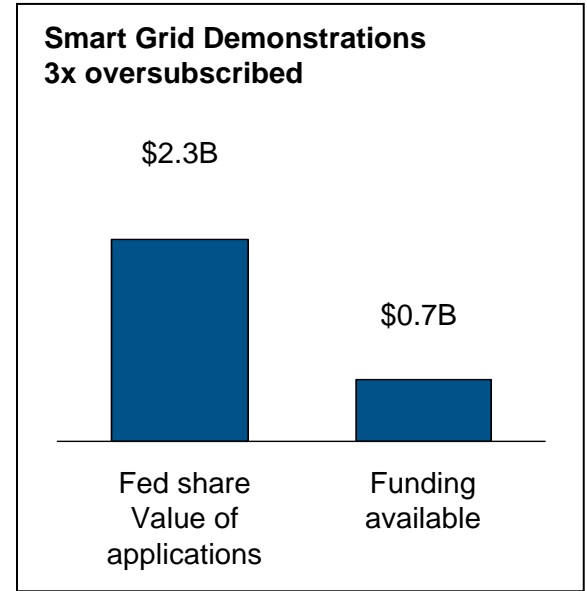
	<u>Regional Demos</u>	<u>Energy Storage</u>	<u>Total</u>
Conforming Applications	70	65	135
Federal Cost Share:	\$1.43B	\$860M	\$2.29B
Applicant Cost Share:	\$1.48B	\$4.52B	\$6.00B
Total Value:	\$2.91B	\$5.38B	\$8.29B

➤ **32 Selected Awards**

- 16 Demonstration Projects totaling \$435M
- 16 Energy Storage Projects totaling \$185M

➤ **Topic Areas – At a scale that can be readily adapted and replicated around the country...**

- *Regional Smart Grid Demonstrations projects will:*
 - ✓ quantify smart grid costs, benefits and cost-effectiveness,
 - ✓ verify smart grid technology viability, and
 - ✓ validate new smart grid business models.
- *Utility-Scale Energy Storage Demonstrations projects will:*
 - ✓ establish costs and benefits,
 - ✓ verify technical performance, and
 - ✓ validate system reliability and durability.



Other Opportunities:

- **Lab Call for Facilities and Equipment**
 - 22 applications received
 - \$104M in selections announced for 8 projects at 7 labs on Nov. 18, 2009
- **Community Renewable Energy Deployment**
 - Closed on July 15, 2009
 - Approx. 68 applications received
 - \$20.5M announced on Jan. 21, 2010 for 5 projects
- **Small Business Innovation Research (SBIR)**
 - 854 applications received
 - \$18M announced Nov. 23, 2009 for 125 projects

Tax Credit Programs:

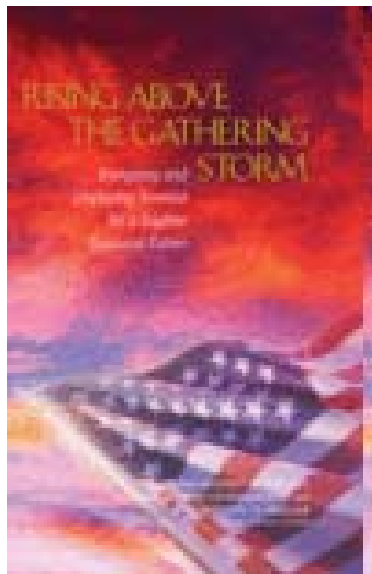
- **Advanced Manufacturing Tax Credit (48C) (\$2.3 billion)**
 - 500 applications by Oct. 16, 2009
 - Consensus merit reviews
 - \$2.3B announced on Jan. 9, 2010 for 184 projects
- **Direct Tax Payments in Lieu of Tax Credits (1603)**
 - \$2.1B announced as of Jan. 24, 2010 for 225 projects





Loan Guarantee Programs	Recovery Act (\$ Millions)	
Section 1703: Federal Loan Guarantee for Projects that Employ Innovative Energy Efficiency, Renewable Energy and Advanced Transmission and Distribution Technologies	\$51,000	2009 Appropriations Act (\$8.5B) for renewable and/or energy efficient systems and manufacturing, and distributed energy generation, transmission and distribution
Section 1705: Federal Loan Guarantee for Electric Power Transmission Infrastructure Investment Projects	\$48,600	2 solicitations open: transmission and innovative energy efficiency and renewable energy
Advanced Technology Vehicles Manufacturing Direct Loan Program	\$25,000	100 applications to date Awards made to Ford, Nissan, Tesla, and Fisker More applications in review on rolling basis
LOANS TOTAL	\$124,600	

Background on ARPA-E



Rising Above the Gathering Storm, 2006 (National Academies)

- Establish an Advanced Research Projects Agency for Energy (ARPA-E)
- “Creative, out-of-the-box, transformational” energy research
- Spinoff Benefit – Help educate next generation of researchers
- Secretary Chu (then Director of Berkeley National lab) on committee

America COMPETES Act, 2007

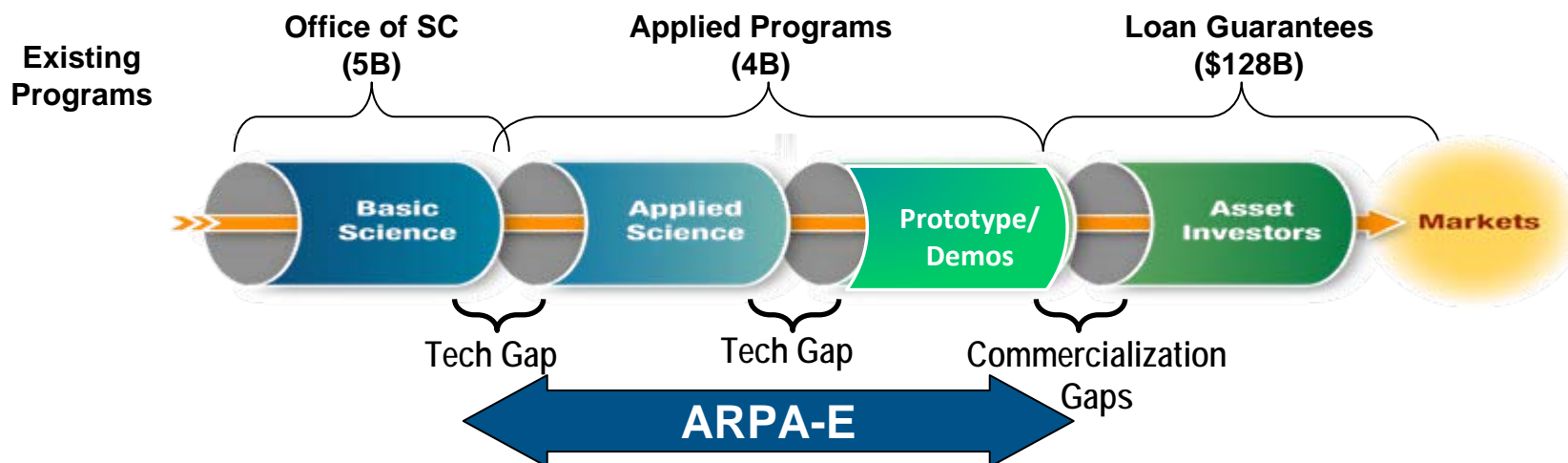
- Authorizes the establishment of ARPA-E

American Recovery and Reinvestment Act of 2009 (Recovery Act)

- \$400M provided for ARPA-E
- President Obama launches ARPA-E in a speech at NAS on April 27, 2009



Energy Innovation Pipeline



What ARPA-E will do

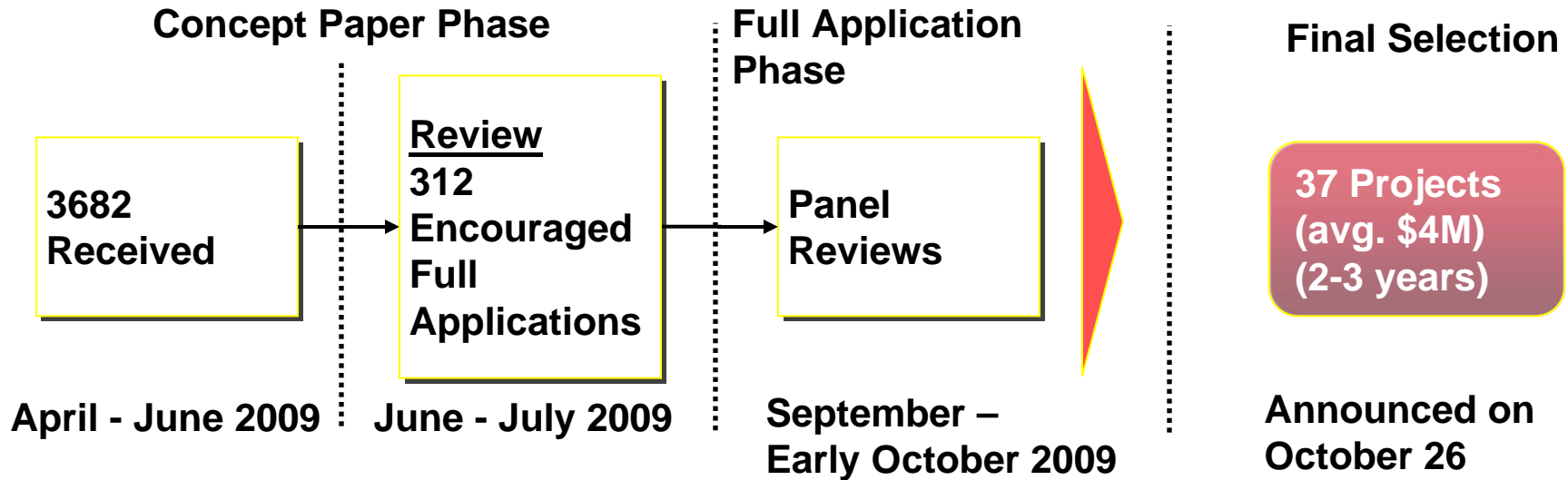
- Disruptive transformational projects
- High risk, high potential programs
- Projects in need of rapid and flexible experimentation/engineering
- Marry technical opportunities with mission gaps
- Breakthrough science that can transform a field
- Outcome focused: to meet climate & energy security objectives; not on a particular scientific problem
- Technology development

What ARPA-E will not do

- Basic Research
- Lowest Technology Readiness Levels project
- Projects longer than 5 years
- Evolutionary improvements
- Large scale commercial viability demos

ARPA-E has moved on from an extensive review process to an aggressive award schedule

Funding Opportunity Announcement 1 Overview

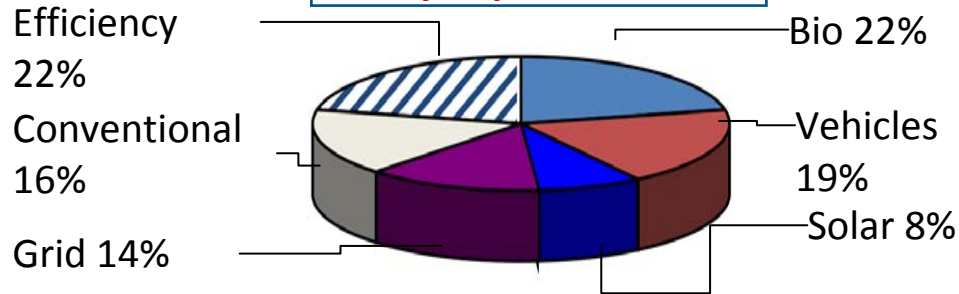


Award Negotiation

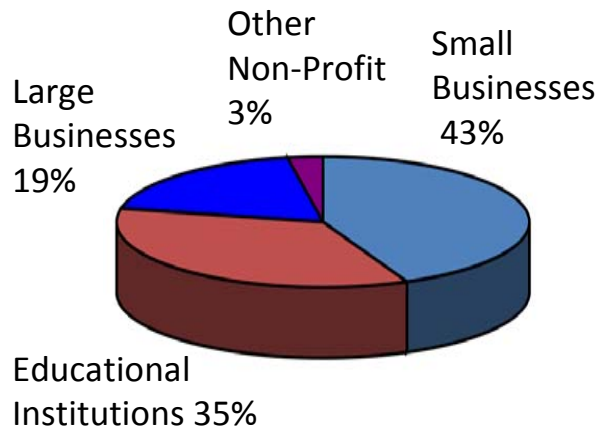
- Between October 26th and January 15th, ARPA-E completed negotiations totaling:
 - 35 out of 37 (95%) of award agreements signed
 - \$134 M out of \$151 M (89%) total funding opportunity; 1 funding awarded
- All negotiations will be completed by January 31, including three TIA (Other Transactions)
- ARPA-E has cut 60% off the average DOE procurement cycle time, defining a new benchmark for program performance

Summary of Applications Funded

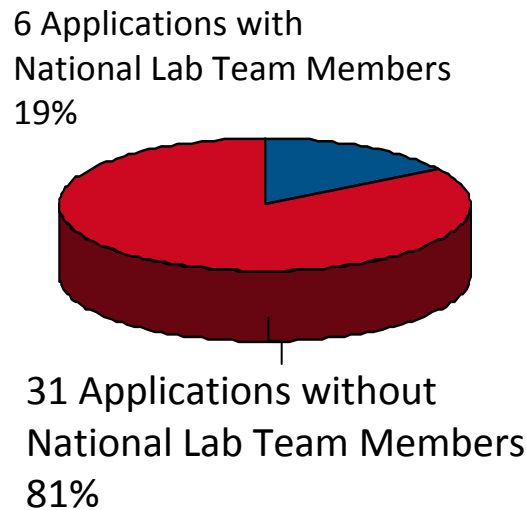
Application Distribution by Topical Panel



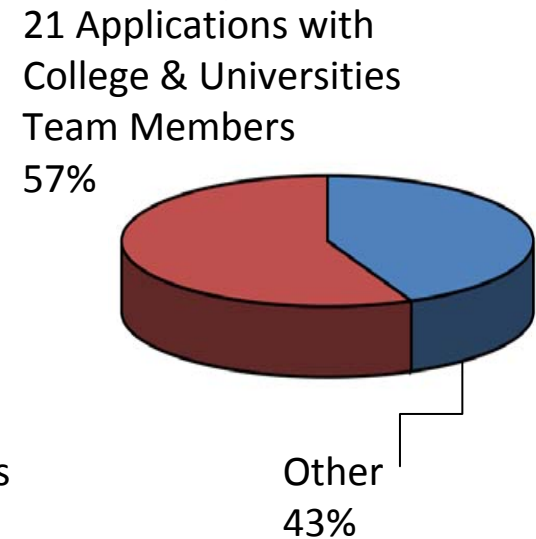
Lead Organization Type for Selected Projects



National Lab Participation



College & University Participation





On December 14, 2009 in Copenhagen, US Energy Secretary Steven Chu made two announcements:

1. Clean Energy Ministerial in mid-2010 to facilitate and coordinate voluntary adoption of national policies and measures to develop and deploy clean energy
2. \$350M Renewable and Efficiency Deployment Initiative (Climate REDI) to help implement Technology Action Plans produced by the Major Economies Forum (MEF) Global Partnership (www.majoreconomiesforum.org)



- *Solar and LED Energy Access Program*
 - Accelerate deployment of high-quality and affordable solar home systems and LED lanterns to those without access to electricity.
- *Super-efficient Equipment and Appliance Deployment Program*
 - Harness the market power of participating countries to accelerate global efficiency gains for appliances traded throughout the world.
- *Clean Energy Information Platform*
 - Enable countries to exchange information about enabling environments and associated deployment outcomes to identify and facilitate widespread adoption of successful deployment policies and measures.
- *Scaling-up Renewable Energy Program (S-REP)*
 - Under the World Bank’s Strategic Climate Fund, provide policy support and technical assistance to low-income countries developing national renewable energy strategies and underwrite incremental capital costs for renewables.



“Quick Start” – in service to the Major Economies Forum
Global Partnership on low-carbon economies



For more information . . .



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