

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
Subcommittee on Investigations and Oversight**

**HEARING CHARTER**

***A Review of the Advanced Research Projects Agency - Energy***

Tuesday, January 24, 2012  
2:00-4:00 p.m.  
2318 Rayburn House Office Building

**PURPOSE**

On Tuesday, January 24, the Science, Space, and Technology Subcommittee on Investigations and Oversight will hold a hearing entitled “***A Review of the Advanced Research Projects Agency-Energy.***” The purpose of this hearing is to review the Advanced Research Projects Agency-Energy’s (ARPA-E) performance and evaluate recent reports from the Department of Energy Inspector General (DOE IG) report OAS-RA-11-11, “*Advanced Research Projects Agency-Energy*” and the Government Accountability Office (GAO) report 12-112, “*Advanced Research Projects Agency Could Benefit from Information on Applicants’ Prior Funding.*”

**WITNESSES**

- **Dr. Arun Majumdar**, Director, Advanced Research Projects Agency – Energy, U.S. Department of Energy
- **The Honorable Gregory Friedman**, Inspector General, U.S. Department of Energy
- **Mr. Frank Rusco**, Director, Energy and Science Issues, U.S. Government Accountability Office

**BACKGROUND**

Established in 2007 by the America COMPETES Act (P.L.110-69), ARPA-E is statutorily charged to “overcome the long-term and high-risk technological barriers in the development of energy technologies” that result in “(i) reductions of imports of energy from foreign sources; (ii) reductions of energy-related emissions, including greenhouse gases; and (iii) improvement in the energy efficiency of all economic sectors.”<sup>1</sup>

The America COMPETES Act charged ARPA-E with achieving these goals by:

- “(1) identifying and promoting revolutionary advances in fundamental sciences;
- (2) translating scientific discoveries and cutting-edge inventions into technological innovations; and

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<sup>1</sup> P.L. 110-69 Sec. 5012(c)(1)(A)

(3) accelerating transformational technological advances in areas that industry by itself is not likely to undertake because of the technical and financial uncertainty.”<sup>2</sup>

First funded at a level of \$400 million in the 2009 American Recovery and Reinvestment Act (Table 1), ARPA-E’s initial Funding Opportunity Announcement (FOA) awarded \$151 million to 37 awardees in October 2009. The first FOA did not limit awards to a specific technology and made awards in a wide array of energy efficiency and renewable energy technology areas. In April 2010, ARPA-E announced the second FOA which provided \$106 million to 37 awardees through programs relating to electrofuels, vehicle batteries, and carbon capture and storage technology areas. The third FOA, announced in July 2010, provided \$92 million to 43 awardees through programs to research electrical power electronics, grid scale energy storage, and building efficiency. A supplemental funding round of \$9.6 million was announced in September 2010 to six “transformational energy research projects.”<sup>3</sup> Each project receives funding ranging from \$500,000 to \$10 million.

*Table 1. Advanced Research Projects Agency – Energy Budget (dollars in millions)*

Program	FY09 ARRA	FY10 Enacted	FY11 CR	FY12 Request	FY12 Enacted	FY12 Enacted versus FY11 Enacted	
						\$	%
ARPA-E	400.0	15.0	180.0	650.0	275.0	95.0	52.8

ARPA-E’s award selection process is competitive and peer-reviewed. To determine the merit of applications, ARPA-E develops technical requirements for each program area and includes four standard criteria in the selection process. The standard criteria are as follows: (1) impact of the proposed technology relative to the state of the art; (2) overall scientific and technical merit; (3) qualifications, experience, and capabilities; and (4) a sound management plan.<sup>4</sup> The America COMPETES Act provided ARPA-E with administrative authorities that allow project selection and funding to be completed significantly faster than in other DOE R&D programs.

**Current ARPA-E Activities**

In the Fiscal Year (FY) 2011 Continuing Resolution, ARPA-E received \$180 million. Upon receiving the funding, ARPA-E announced a fourth FOA for the following categories:

- **Plants Engineered to Replace Oil (PETRO)** to develop low-cost production of advanced biofuels. (\$36 million)
- **High Energy Advanced Thermal Storage (HEATS)** to research advancements in hot and cold thermal energy storage. The energy storage technologies would assist storage

<sup>2</sup> P.L. 110-69 Sec. 5012 (c)(2)

<sup>3</sup> For more information and full list of awardees visit: <http://arpa-e.energy.gov/ProgramsProjects/Programs.aspx>

<sup>4</sup> For a more detailed description of the selection process, see GAO Report, “Advanced Research Projects Agency-Energy Could Benefit from Information on Applicants’ Prior Funding,” (GAO-12-112), January 2011.

necessary to deliver solar electricity, produce fuel from the sun’s heat, and improve driving range of electric vehicles due to improvements in air conditioning efficiency. (\$37.3 million)

- **Rare Earth Alternatives in Critical Technologies (REACT)** to study technology alternatives to mitigate demand for rare earth materials. (\$31.6 million)
- **Green Electricity Network Integration (GENI)** to advance grid control technologies necessary to manage issues relating to intermittent sources of electricity generation. (\$36.4 million)
- **Solar Agile Delivery of Electrical Power Technology (Solar ADEPT)** to build on the SunShot Initiative. Solar ADEPT seeks to reduce the total cost of utility-scale solar systems by 75 percent by 2017. (\$14.7 million)

On September 29, 2011, ARPA-E announced \$156 million in awards to 60 projects in the previously announced categories.<sup>5</sup> The President’s FY 2012 budget requested \$650 million for ARPA-E. In December 2011, the President signed the FY 2012 Consolidated Appropriations bill, that provided \$275 million to ARPA-E (of which \$20 million is for program direction and is available until September 30, 2013.)

ARPA-E was initially required to spend 2.5 percent of its funds on technology transfer and outreach activities. The America COMPETES Reauthorization Act of 2010 doubled this percentage to 5 percent. This requirement is met in part through an annual Energy Innovation Summit hosted by ARPA-E. The third Energy Innovation Summit will take place in February 2012. The Summit intends to “bring together key players from across the energy ecosystem – researchers, entrepreneurs, investors, corporate executives and government officials – to share ideas for developing and deploying the next generation of clean energy technologies.”<sup>6</sup> Additionally, the Summit includes a “Transformational Energy Technology Showcase” to highlight award winners, finalists, and other innovative energy technologies that did not receive previous ARPA-E funding.

## **GAO REPORT**

On July 28, 2010, then-Science and Technology Committee Ranking Member Hall and then-Investigations and Oversight Subcommittee Ranking Member Broun requested a GAO review of the manner in which ARPA-E was fulfilling its statutorily required objectives. The request letter (Appendix A) asked GAO to “review the program with a focus on addressing the following questions:

1. “To what extent has ARPA-E met its statutory objective to avoid funding projects in technology areas that previously received, or currently receive, private sector funding?”
2. What process and controls does ARPA-E have in place to evaluate whether applicants’ proposed technology project areas receive, or received, industry funding?”

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<sup>5</sup>ARPA-E, “Department of Energy Awards \$156 Million for Groundbreaking Energy Research Projects,” September 29, 2010. Accessible at: <http://arpa-e.energy.gov/media/news/tabid/83/vw/1/itemid/39/department-of-energy-awards-%24156-million-for-groundbreaking-energy-research-projects.aspx>

<sup>6</sup> “ARPA-E, “2012 ARPA-E Innovation Summit,” Accessible at: <http://arpa-e.energy.gov/eventsworkshops/events/tabid/170/vw/3/itemid/38/d/20120227/2012-ARPA-E-Energy-Innovation-Summit-.aspx>

- a. What information does ARPA-E need to collect from applicants to adequately determine if applicants receive, or received industry funding?
3. Has ARPA-E developed funding criteria or established technical milestones in order to assess program success as required by statute?<sup>7</sup>
  - a. What criteria and milestones are being used by ARPA-E project managers to evaluate proposals and projects?
  - b. How do such criteria consider and prioritize current and prior industry funding?
  - c. How is ARPA-E’s overarching statutory purpose to overcome “long-term and high-risk technological barriers” factored into funding criteria and the evaluation process?
4. Is ARPA-E successfully ensuring its activities do not duplicate the efforts of other DoE programs, as required by statute?
  - a. What processes are in place to prevent duplication of effort?”<sup>8</sup>

In response to the request, GAO produced a report titled “*Advanced Research Projects Agency-Energy Could Benefit from Information on Applicants’ Prior Funding*” (GAO-12-112). GAO recommends ARPA-E take three steps to ensure funds are appropriately managed:

- “[P]rovide guidance with a sample response to assist applicants in providing information on sources of private funding for proposed ARPA-E projects;
- [R]equire that applicants provide letters or other forms of documentation from private investors that explain why investors are not willing to fund the projects proposed to ARPA-E; and
- [U]se venture capital funding databases to help identify applicants with prior private investors and to help check information applicants provide on their applications.”<sup>9</sup>

In ARPA-E’s official response to the GAO report, it committed to implementing all of GAO’s recommendations.<sup>10</sup>

## **DOE IG REPORT**

In August 2011, the DOE IG released an audit report on ARPA-E. The purpose of the audit was to “determine whether ARPA-E implemented safeguards necessary to achieve its goals and objectives and to effectively deploy associated Recovery Act resources.”<sup>11</sup> The DOE IG found ARPA-E:

1. “Had not established a systematic approach to ensure that it was meeting the technology transfer and outreach requirement of the COMPETES Act. In particular, ARPA-E had not required funding recipients to expend a percentage of their awards on technology transfer; and

<sup>7</sup> P.L. 110-69 Sec 5012 (e)(2)

<sup>8</sup> Letter from Representatives Ralph Hall and Paul Broun to Mr. Gene Dodaro, July 28, 2010.

<sup>9</sup> GAO Report, p. 22.

<sup>10</sup> GAO Report, Appendix IV: Comments from ARPA-E, p. 35.

<sup>11</sup> DOE IG, “*Audit Report – The Advanced Research Projects Agency-Energy*,” (OAS-RA-11-11) August 2011. Accessible at: <http://energy.gov/sites/prod/files/OAS-RA-11-11.pdf>

2. Had not drafted or, in some cases, approved draft policies and procedures in a number of key areas, including those in the areas of monitoring and oversight of awardees; termination of non-performing awards; technology transfer and outreach; and, invoice review.”<sup>12</sup>

Of the three award recipients that the IG examined, the IG identified concerns with the costs claimed by two of the recipients, identifying \$280,387 in questionable costs. Of the identified questionable costs, the IG noted \$40,890 in direct costs with activities including

“meeting with bankers to raise capital, securing other government funding...costs which do not appear to be allocable to the cooperative agreement because they are related to selling a piece of equipment, a fee to appear on a local television program, and meal costs.”<sup>13</sup>

The remaining \$239,497 was questioned because the indirect cost rate was not supported by the recipient. The IG found ARPA-E was not aware of the type of costs incurred by the recipients, because the agency did not require awardees to submit transaction details as a part of their invoice review process.

The IG reported that, “[a]ccording to an ARPA-E official, ARPA-E focused its attention on meeting the Recovery Act requirement of expeditiously awarding funds to projects by September 30, 2010; and, as a consequence did not have sufficient time and resources to devote to establishing its operational controls in the area of policies and procedures.”<sup>14</sup>

In February 2011, ARPA-E finalized its policy outlining what was considered an allowable cost for technology transfer and outreach activities. The DOE IG noted concern that the policy

“allows recipients to incur several types of costs that are typically unallowable as direct costs under Federal Acquisition Regulations [FAR], such as the costs of procuring additional Government funding and for meeting with investors, without providing a justification as to reasons for their allowability.”<sup>15</sup>

The IG report further noted that ARPA-E tech transfer spending policy “does not reference the FAR or refer to the fact that the types of costs listed are typically unallowable and require prior justifications for the costs before they are incurred.”<sup>16</sup>

The DOE IG made five recommendations concerning ARPA-E:

1. “Finalize the remaining policies and procedures related to the operation of ARPA-E, such as those related to monitoring and oversight of awardees; and termination of non-performing awards;

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<sup>12</sup> DOE IG Report, p. 2.

<sup>13</sup> DOE IG Report, p. 4.

<sup>14</sup> DOE IG Report, p. 5.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

2. Consult with the Headquarters Office of Procurement and Assistance Policy on the allowability of costs contained in the newly developed policy on technology transfer and outreach;
3. Establish a process to accurately measure progress toward meeting the technology transfer and outreach spending requirement;
4. Obtain a Contracting Officer official determination regarding the allowability of costs questioned in this report and to recover costs determined to be unallowable; and,
5. Communicate to recipients the types of costs that are allowable and unallowable as technology transfer and outreach costs.”<sup>17</sup>

In response to the IG report, ARPA-E deployed a new project management system to monitor awardees and clarified its policies on technology transfer and outreach to applicants. The report noted differences remain between ARPA-E and the IG as to the appropriateness of certain costs incurred by awardees.

### **ISSUES FOR COMMITTEE CONSIDERATION**

In FY 2012, ARPA-E received funding for its fourth year of operation. ARPA-E supports projects for periods ranging from one to three years; therefore, the projects initially funded in the first FOA are nearing completion and the agency’s performance necessitates review. Additionally, other items for Committee consideration include:

- What metrics of success and technical milestones has ARPA-E established to assess the agency’s performance?
- Is ARPA-E meeting its statutory objective to fund “high-risk, high reward” research and avoid funding projects in technology areas that previously received, or currently receive, private sector funding?
- Has ARPA-E developed the policy regarding appropriate technology transfer and outreach activities as identified by the DOE IG report?
- Is ARPA-E successfully ensuring its activities do not duplicate the efforts of other DOE programs?
- To what extent has the “halo effect”<sup>18</sup> borne out in practice?

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<sup>17</sup> DOE IG Report, p. 6.

<sup>18</sup> The “halo effect” is a term attached to the phenomenon when a “stamp of approval” from an authoritative source generates follow-on action, such as an ARPA-E awardee receiving private investment due ARPA-E’s endorsement of a technological concept.

# Appendix A

BART GORDON, TENNESSEE  
CHAIRMAN

RALPH M. HALL, TEXAS  
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE AND TECHNOLOGY

SUITE 2321 RAYBURN HOUSE OFFICE BUILDING  
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<http://science.house.gov>  
July 28, 2010

Mr. Gene Dodaro  
Acting Comptroller General  
U.S. General Accountability Office  
441 G St., NW  
Washington, DC 20548

Dear Mr. Dodaro:

On August 9, 2007 President Bush signed *The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act of 2007* or *America COMPETES Act* (P.L. 110-69) with the purpose of investing in innovation through research and development, and improving the competitiveness of the United States. Section 5012 of the COMPETES Act established the Advanced Research Projects Agency – Energy (ARPA-E) in order to “overcome the long-term and high-risk technological barriers in the development of energy technologies.”<sup>1</sup> In order to assist the Committee in its oversight of this new agency, we request that the Government Accountability Office (GAO) review the Department of Energy’s implementation of ARPA-E.

ARPA-E was created to foster long-term, high-risk, high-reward research and development. In establishing ARPA-E, great lengths were taken to ensure that these investments would not simply supplant private sector research and development activities with public investment. Sec. 5012(c)(2)(c) of America Competes states that ARPA-E shall fund projects “in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.”<sup>2</sup> This language represents Congressional interest in ensuring (1) ARPA-E focus limited resources on technology too risky to attract private investment; (2) ARPA-E activities reflect an appropriate role of government that avoids potential interference in the competitive marketplace, resulting in the government “picking winners and losers” among competing technologies; and (3) ARPA-E funding does not crowd out private investment.

Concerns of “crowding out” private investment were echoed by Secretary Chu in recent testimony before Congress which stated,

*We must harness America's entrepreneurial spirit and leverage private sector imagination and ingenuity to transform the way we produce and use energy. Part of those policies must promote*

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<sup>1</sup> P.L. 110-69, Section 5012(b)

<sup>2</sup> *Ibid*

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*the research and development of key technologies needed in the coming decades without crowding out private investment.”<sup>3</sup> [Emphasis added].*

Similarly, The President’s 2011 Budget proposal stated,

We recognize that in some instances, government funding could possibly crowd-out private capital. We are aware of this and we are working cautiously to avoid the areas where this could happen.<sup>4</sup>

In order to assist the Committee in its review of ARPA-E, we request that GAO review the program with a focus on addressing the following questions:

- 1) To what extent has ARPA-E met its statutory objective to avoid funding projects in technology areas that previously received, or currently receive, private sector funding?
- 2) What process and controls does ARPA-E have in place to evaluate whether applicants’ proposed technology project areas receive, or received, industry funding?
  - a. What information does ARPA-E need to collect from applicants to adequately determine if applicants receive, or received industry funding?
- 3) Has ARPA-E developed funding criteria or established technical milestones in order to assess program success as required by statute?<sup>5</sup>
  - a. What criteria and milestones are being used by ARPA-E project managers to evaluate proposals and projects?
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- 4) Is ARPA-E successfully ensuring its activities do not duplicate the efforts of other DoE programs, as required by statute?<sup>6</sup>
  - a. What processes are in place to prevent duplication of effort?

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<sup>3</sup> Statement of Dr. Steven Chu, United States Secretary of Energy, United States Senate, Committee on Appropriations, Subcommittee on Energy and Water Development, *Hearing on National Energy Policies*, 111<sup>th</sup> Congress, April 28, 2010.

<sup>4</sup> United States Department of Energy, Energy Transformation Acceleration Fund, Advanced Research Projects Agency- Energy, Proposed Appropriation Language, FY2011 Funding Request.

<sup>5</sup> P.L. 110-69 Sec. 5012 (e)(2)

<sup>6</sup> P.L. 110-69 Sec. 5012(h)(1)

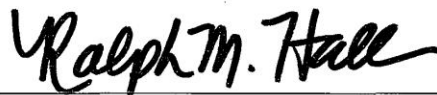


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If you have any questions relating to this request, please contact Mr. Tom Hammond, Investigations and Oversight Subcommittee Minority Professional Staff Member, or Mr. Dan Byers, Energy and Environment Subcommittee Professional Staff Member at (202) 225-6371.

Your assistance in this matter is greatly appreciated.

Sincerely,



REP. RALPH HALL  
Ranking Member  
Committee on Science  
and Technology



REP. PAUL BROWN, M.D.  
Ranking Member  
Subcommittee on Investigations  
and Oversight

cc: The Honorable Bart Gordon, Chairman  
Committee on Science and Technology

The Honorable Brad Miller, Chairman  
Subcommittee on Investigations and Oversight  
Committee on Science and Technology

The Honorable Brian Baird, Chairman  
Subcommittee on energy and Environment  
Committee on Science and Technology