THE EXECUTIVE'S DAILY GREEN BRIEFING

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ARPA-E Deserves Support

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In October 1957, at the height of Cold War passion, the U.S. scientific and military establishment watched as the Soviet Union launched Sputnik into orbit. Surprised, and stung at being beaten into space, the U.S. government responded in several ways, one of which was to create, within a matter of months, the Advanced Research Projects Agency, later renamed the Defense Advanced Research Projects Agency (DARPA). Over the past half century, DARPA has been judged an unambiguous success, and is credited with developing numerous technology innovations including a predecessor to the internet.

In 2007, Congress created – but did not fund – a program for energy research and development within the Department of Energy (DOE) called the Advanced Research Projects Agency – Energy (ARPA-E).

As the name suggests, the program is modeled after DARPA, and it is intended to pursue transformational technologies, administered by a relatively small group of technical experts who are free from bureaucratic hindrances and organized in a flat, non-hierarchical structure. The program is designed to cultivate high-risk high-payoff projects, in contrast to some other recently-created DOE programs, like the loan guarantee program for innovative technologies, which emphasizes low risk of failure and high probability of repayment in its selection criteria.

For a year and a half, ARPA-E existed only on paper, until the American Recovery and Reinvestment Act – the stimulus bill –put $400 million into the program. After a few months of delay – during which time DOE's bandwidth was stretched by the dual imperatives of transition and the initiation of numerous stimulus programs – at the end of April, ARPA-E announced plans to dispense the first $150 million of $400 million.

ARPA-E put out a request for short concept papers for R&D projects between $2 million and $5 million, with some flexibility for larger or smaller awards. Using concept papers rather than the typical DOE grant application process was a smart approach, intended to reduce the time and expense of applying. However, the downside of lowering barriers to entry was that ARPA-E found itself inundated with 3,500 applications – roughly a hundred times as many as they could fund – and unable to provide feedback to most applicants.

Only 200 of those applicants were encouraged to submit full applications, which were due at the end of August. Little is known publicly about the projects that were encouraged to proceed, but the initial crop of concept papers ran the gamut of energy technologies, with, for example, 18 percent reportedly focused on solar technologies, 15 percent on biofuels, 8 percent on energy storage and only 5 percent on carbon and 2 percent on nuclear.

Since it received the flood of concept papers, ARPA-E has also put out a request for information seeking input on programmatic areas and specific technological opportunities that the program should address in the future. This move suggests that the allocation of the remaining $250 million in Recovery Act money will have sharper focus than the initial solicitation and will concentrate on particular technology "choke points."

Although benefits will surely come from the initial $150 million in spending, a narrowed focus is likely to be essential to ARPA-E achieving its programmatic goals. For one thing, ARPA-E has billed its program as a means of taking transformational energy technologies through the "valley of death" that immature concepts must cross to reach commercial readiness. But achieving that goal is likely to require a far more concentrated pattern of investment than will result from the initial $150 million solicitation.

Given the capital intensity and scale-dependence that tends to characterize energy technologies, grants of $2 million to $5 million would be only a small canteen for one crossing the valley of death.

Much depends on the success of ARPA-E in its first year or two.

Currently, the program has no permanent source of funding and the initial allocation of $400 million represents about an eighth of what its cousin DARPA receives each year. Although the House-passed Waxman-Markey legislation would fund ARPA-E with roughly one percent of emission allowance auction revenues, that revenue stream must survive the Senate, and would not become available until years from now. But perhaps we are still waiting for our Sputnik moment.

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