Misspent energy

US politicians are pushing to create an advanced research agency to tackle the energy challenges the nation faces. **David Goldston** explores why the current proposition may be ill-prepared for the task.

How do ideas make it on to the agenda for the US Congress? Clearly more than merit is involved; countless plausible notions are always vying for attention, and most of them never get a hearing.

Sometimes, timing is everything. A germane proposal that pops up just when Congress is casting about for some way — any way — to show it's responding to a 'crisis' can gain attention rapidly, especially if it has a respectable pedigree and can play off preconceived notions.

The idea of establishing the Advanced Research Projects Agency – Energy (ARPA-E) is a case in point. The proposal to create a new entity to support pathbreaking energy research and development, modelled on the Defense Advanced Research Projects Agency (DARPA), originated in about seven pages of the National Academy of Sciences' massive report on competitiveness, *Rising Above the Gathering Storm* (see *Nature* **438,** 129; 2005), issued in the autumn of 2005.

The ARPA-E notion was quickly incorporated into bills introduced by Congressman Bart Gordon (Democrat, Tennessee), Senator Hillary Rodham Clinton (Democrat, New York) and Senator Pete Domenici (Republican, New Mexico). Bills to create the ARPA-E were introduced this year in the new Congress, and the House Science and Technology Committee is likely to take up the bill soon, with a vote by the full House likely this summer.

Resting on laurels

How did the ARPA-E — an idea Congress had not even broached in the five years of debate leading up to passage of the Energy Policy Act in July 2005 — swiftly climb to prominence on the Congressional agenda a few months later?

In the autumn of 2005, petrol price spikes in the wake of Hurricane Katrina had put energy back in the news, and Congress needed new ideas fast — preferably ideas that did not sound controversial. And the notion of creating another DARPA immediately struck a responsive chord: the agency, which does not use a peer-review process and in the past has supported risky research, has a reputation as a miracle worker because it is credited with developing the Internet.

Members of Congress love sequels just as much as Hollywood producers do, and for the same reasons: without requiring much new

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thought, they seem destined to produce riches. And as in Hollywood, no matter how spectacular a flop a particular sequel is at the box office, the concept retains its allure. Congress created a version of DARPA at the Department of Homeland Security that has been widely regarded as a failure, but the experience is rarely discussed.

So the ARPA-E began to seem like the answer to Congress' prayers — a proposal offered by a distinguished group, based on a past success and targeted at a pressing concern. And it wouldn't be hard to line up endorsements for ARPA-E legislation. Universities, for example, could see the ARPA-E as a source of new grants in a tight budget climate, at least if they could keep the money away from the national laboratories.

In the rush to embrace the ARPA-E, it was easy to overlook that the proposal was based on virtually no analysis and that the *Gathering Storm* report described the new agency in vague terms. The ARPA-E, it also turned out, was the only recommendation in the quickly prepared report that almost provoked some panel members to write dissenting views.

It's not hard to raise fundamental questions about the value of the ARPA-E. Indeed, the question of exactly which issues the ARPA-E needed to tackle wasn't even raised in the report. Where is the bottleneck that prevents new energy technologies getting to market? Is there too little daring research, too little applied research or too little capital to develop good ideas into affordable products? Or is there a market failure that stifles demand for developing new technologies?

The report blithely took the technocratic path of assuming that US energy problems are largely the result of an inadequate supply of fresh

ideas. But there's ample evidence that a bigger problem is the lack of demand for new ideas in the marketplace; the status quo is comfortable, and government policies do not encourage companies or consumers to worry about the environmental costs of using energy. To take one obvious example: plenty of technologies exist to make cars more fuel efficient, but few will find their way into the market without tougher fuel economy standards or a higher petrol tax.

Vague attempt

And what about the DARPA analogy? Does it apply to energy — an area in which, unlike defence, the government is not the primary market, price matters and the broad outlines of the research agenda are relatively clear? What exactly would the ARPA-E fund that couldn't be funded by current programmes? And what should current programmes stop funding because their work would be better pursued by the ARPA-E?

One would look in vain for answers in the Academy report or in much of the discussion it has inspired. The report instead offered arias of adjectives; in one passage the research that the ARPA-E would fund is described as "creative, out-of-the-box, transformational, generic".

A year and a half after the release of *Gathering Storm*, all the fundamental questions about the ARPA-E remain on the table. At a hearing last month, the House Science and Technology Committee asked the witnesses to discuss what areas of technology the ARPA-E should pursue. This seems an odd question to raise when the Committee is poised to pass the bill: it's a bit like setting a wedding date without a fiancé.

And in perhaps the most telling remark at the hearing, John Denniston, a venture capitalist who supports the ARPA-E, told the committee that the single most important step Congress could take to advance energy technology would be to impose a price on carbon.

Who knows? Some kind of ARPA-E might be a good idea as part of a comprehensive energy strategy that included new policy incentives to create an energy market. But the ARPA-E got on the Congressional agenda not because anyone was thinking seriously about energy policy, but rather because no one was. ∎

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