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Building a Culture of Risk-Taking

As acting director of the ARPA for energy, I worked to figure out how a government agency can take big-but-smart bets.

Every day of my last seven years was filled with risk, and it was spectacular. I spent those years at the Advanced Research Projects Agency for Energy (ARPA-E), where I was acting director from 2021 to 2023, working to achieve American energy independence and reduce greenhouse gas emissions.

Modeled on the original DARPA at the Department of Defense, the ARPAs—in addition to energy, there are ARPAs devoted to intelligence, infrastructure, and health—are charged with taking significant risks to fulfill their missions via disruptive innovation. Agency risk-taking is what allows knowledge seekers to venture into the unknown and return (every once in a while) having spied a new path toward a game-changing solution. Famous DARPA-funded successes, for example, include the early internet, cloud computing, GPS, surgical robots, and, most recently, mRNA vaccines.

But government agencies are generally designed to avoid risks through layers of approval, deference to precedence and protocol, and a baked-in anxiety over making waves or ruffling feathers. Most discussions about managing an ARPA revolve around which projects and priorities to take, but I have found that what's most important is enabling the right people. Finding knowledge seekers, setting appropriate incentives, and rigorously defending employees' freedom to make decisions become ever more important tasks as an ARPA grows: risk intolerance gets harder with more visibility.

Here are a few things I've found essential to enable risk-taking in a sustainable way.

Flat structure and essential mission

Not every agency should take an aggressive risk posture. Those offices focused on deployment, standards, or policy need to be confident that what they roll out is absolutely ready for use. Otherwise the repercussions can be devastating. I personally would not want anyone securing the nation's nuclear arsenal to take big risks with unproven technology. (That doesn't forestall technological or policy innovation; it just means different considerations apply.)

ARPA-E's authorizing language explicitly sets the agency up to embrace risk. It was established by the America COMPETES Act of 2007, following a recommendation by the National Academies of Sciences, Engineering, and Medicine. In a section titled "Action B-4: High Risk Research," the Academies' report *Rising Above the Gathering Storm* concluded that "ARPA-E would provide an opportunity for creative 'out-of-the-box' transformational research that could lead to new ways of fueling the nation and its economy, as opposed to incremental research on ideas that have already been developed."

Essential to its ability to undertake such risky research is ARPA-E's flat structure, built around a core of program directors and an agency director. ARPA-E's program directors are empowered to conceive, define, pitch, and implement programs that they believe have the potential to transform the energy landscape. ARPA-E's risk-taking

is also supported by its special hiring authority to make temporary appointments and the agency's internal legal and contracting departments. These attributes create a space where there are fewer layers between ideas, decisions, and action.

Managing risk is really managing people

Everyone at an ARPA should be empowered to help fulfill the mission. ARPA-E has its own in-house contracting and legal support staff who are charged with prioritizing high-risk efforts over risk-avoiding delays. (This cannot be done with only contractors, who by statute have limited decisionmaking authority.) The key is empowering staff to feel comfortable making these decisions—and then actually holding them accountable to *take* the appropriate level of risk rather than kicking every minor anomaly to another person for approval.

When those staff members are empowered and risk-embracing, stuff gets done. When their leaders are risk-averse, progress lags via the accumulation of a thousand paper cuts: a week's delay here, two weeks there, a missed email, an overburdened staffer needing three approvals instead of zero or one, etc.

presentations delivered by program directors to get a program approved by the agency director—are designed to do more than inform; they prompt smart questions, recommendations, lists of hard-to-anticipate outcomes, iterations, and the like. The pitch approach is so important that we base our interviewing process for program directors on it.

Effective pressure testing demands people speak out and be listened to. It very quickly becomes clear if ego or defensiveness is driving a program proposal instead of a true desire to make it the best it can be. There is also a big difference between questioning in a positive way rather than a combative way. (Leaders can coach people to frame the same questions more positively. I have benefited from such coaching myself.) If no one is willing to speak or ask questions, it may mean they don't expect to be heard. Harnessing the power of a roomful of smart brains requires creating a culture where hard questions are welcome because they help us to learn.

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Like any ARPA, ARPA-E relies on program directors ready to take smart, informed risks. By hiring program directors (as well as tech-to-market advisors, PhD fellows, and even leadership) for fixed terms (usually of two to five years), the agency selects for a risk-taking spirit. These term limits—as opposed to career federal status—eliminate internal competition for career advancement and so promote collaboration. That allows smart risk-taking because it enables frank discussions, ensures a diversity of personnel and ideas, and keeps a laser focus on the agency's mission. (It has also resulted in a pretty darn remarkable alumni community.)

Collaboration is built into the ARPA risk assessment process. Taking risks does not mean “taking a chance for the heck of it” or making a “Hail Mary.” It means gathering all the information you can to make a considered push toward an audacious goal. This requires having a community you trust—honestly trust—to challenge your ideas, claims, and assumptions, and to share networks that can push ideas along. It also requires that the director has a strategy to ensure program directors are not competing for program funding.

We build and optimize programs through pressure testing, both internally and externally. Crucial to embracing smart risks, pressure testing is a way to challenge ideas and explore their flaws and potential. Program pitches—significant

was more than their chance to add information and context to their proposals; it demonstrated that they were listening and responding to their peers.

Also crucial to the culture of collaboration and risk tolerance is a workplace where people are treated like human beings. (It is shocking how often this is not appreciated.) During the pandemic, for instance, I temporarily loosened some term limits and fought for my staff to have significant flexibility to live and work remotely, despite internal concerns such changes could expose ARPA-E to criticism. Had I followed that risk-averse advice, I believe we would have lost half our program directors, plus essential staff, and been less able to fulfill our mission.

Incentives to fail well

The nature of high-risk, disruptive programs means that many projects within them will fail to meet their extremely challenging milestone objectives. Program directors, after spending much time and effort to hone their programs, are also empowered to make the difficult decisions to shut down some of the projects. Closing a project means taking a personal risk, as the project may well be led by the director's peers or past or prospective employers. The ability to redeploy funds from cut projects to more promising

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ones incentivizes taking this risk. (It also softens the blow from shutting down a once-promising idea, thus making it easier to take chances on future ones.) Overall, closing underperforming projects to focus resources on promising ones helps directors advance the agency's mission.

This is where the concept of “failing well” comes into play. Program directors gain deep knowledge of their projects by requiring detailed quarterly reports, making site visits, tracking technical and market milestones, and the like. High-quality evidence that a technical pathway has turned out to be a dead end informs other projects and the broader technical community. Uncovering that useful information is not a “failure.” The only way a project fails is if what was learned is not disseminated. Instilling this as a conviction promotes bold, well-informed, well-explained closures, because program directors—and even the project teams (however disappointed)—can see that projects that don't reach milestones can still contribute to the broader mission.

I tried to model this attitude in my own communications. Rather than using the dismissive, opaque, discussion-killing phrase “We can't do this,” I learned to embrace “I'm deciding not to do this and here's why.” Beware those who do the opposite.

Proactive, risk-aware communication

An ARPA's job is to break eggs in order to make the proverbial omelet—which can be terrifying in a government culture where many people's jobs are devoted to keeping eggs whole and in the carton. As acting director of ARPA-E, I found the way to reconcile these conflicting attitudes was to communicate upfront with people outside the agency. I let them know I understood that they could face their own risks (whether perceived or real) due to certain ARPA-E programs. For instance, we engaged in early and abundant outreach efforts with those concerned about proliferation—both within and outside of DOE—for programs involving nuclear materials. This helped us minimize risks to other departments and people, learn about their challenges, avoid surprises and duplicative efforts, and obtain support.

As I came to appreciate the value of this communication, I even asked some program directors to track their outreach with names and dates. This proved extremely valuable in demonstrating how vigilantly we looked out for potential challenges and proactively sought to help mitigate external parties' risks without compromising our technical work.

I also continued the practice of previous leadership in being forthright about any ARPA-E efforts that at first

glance seemed similar to those of other agencies or the private sector. I made sure we could clearly explain why what ARPA-E was proposing was significantly different. (I was proud that the Government Accountability Office acknowledged how well we avoided overlap with other offices' programs.)

Risk-enabling decision-making

As the acting leader of a risk-taking agency, I considered every decision, no matter how small, to make sure it enabled risk. For instance, I resisted being placed on DOE technology roadmaps, which outline strategies for achieving particular technological outcomes, because it might encourage pushback against our riskier programs or pen us into designated territory. Our job is to disrupt the map.

Highlights of risky initiatives I approved for funding at ARPA-E included, but were not limited to, new technologies for nuclear fuel cycles and waste reprocessing (talk about a political football!); new ways to mine domestic critical materials, which include lithium, nickel, and dozens more (more football!); and answering the “cold fusion” question—is it real?—once and for all. Freedom to go after these high-risk goals is essential for achieving ARPA-E's mission. That ability must not be watered down with delays, penny-pinching, conflicts of interest, or those thousand procedural paper cuts—and certainly not squandered by timidity within the institution.

Finally, to enable risk-taking, ARPAs have to resist pressure to prove success in ways that are out of step with a program's goals. A project to create novel battery technologies may not produce timely peer-reviewed publications, but patents (and licenses!) might be a better metric. Although ARPA-E has a carefully curated and frequently updated set of impact indicators, which are good ways of showing progress, essential lessons come only from delving into the details of individual stories. Context is everything. And it's important to keep in mind that when measurable impact may be 20 or more years away, the process itself must be trusted.

I maintain that it is an unacceptable risk *not* to have agencies such as ARPA-E charting new pathways. It's a risk to US competitiveness, a risk to the energy needs of this country, and a risk to our ability to cope with and mitigate climate change. I will forever be grateful that I was a part of this endeavor.

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