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Empowering Clean Energy Startups and Small Businesses

A Guide to Transforming the Department of Energy's Small Business Innovation Research Program.

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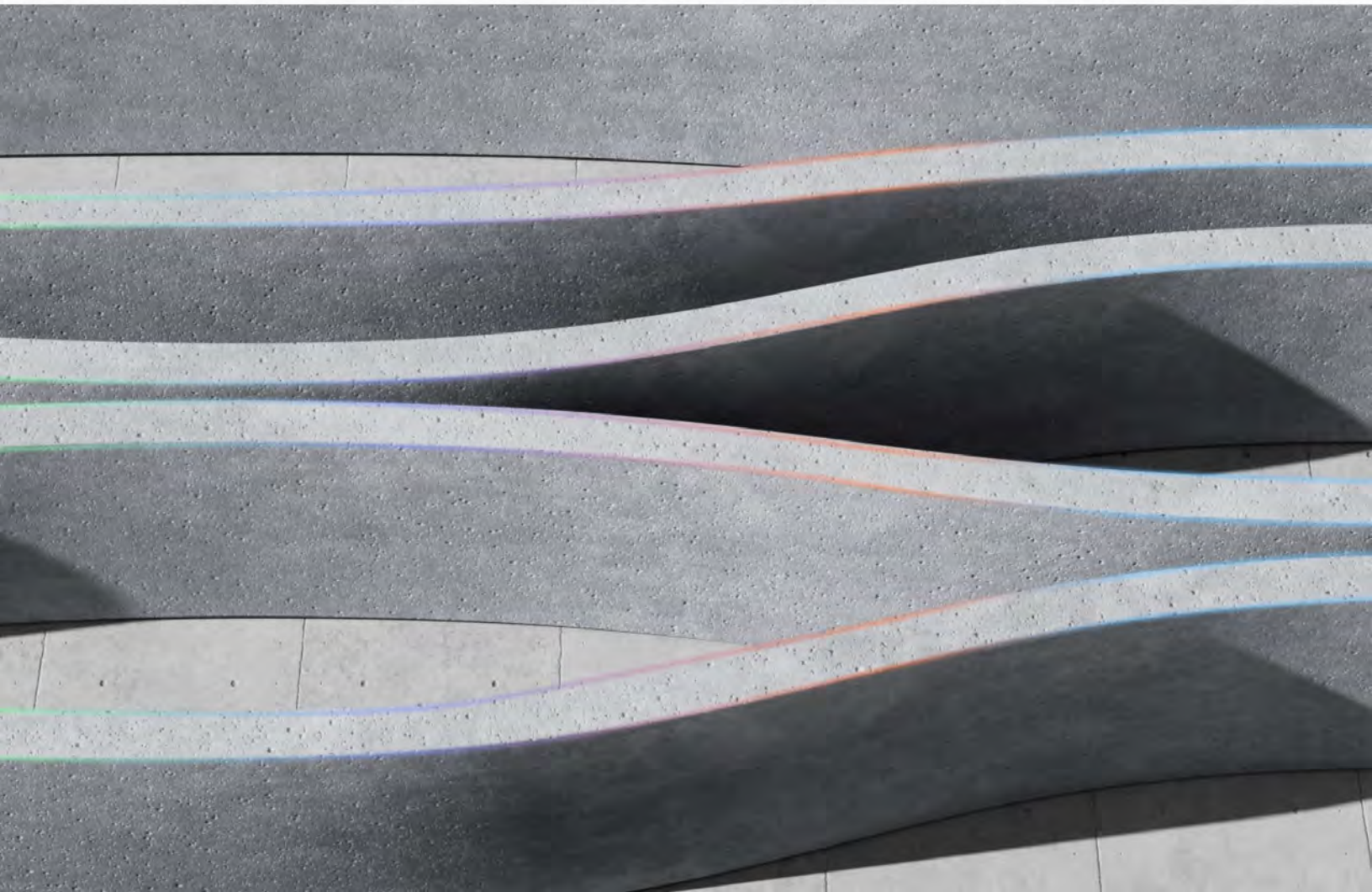

Acknowledgements

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This blueprint discusses structural challenges in federal funding and contracting practices, but those challenges are not a reflection on the dedication or capability of the U.S. Department of Energy workforce. Across offices, administrations, and roles, current and former DOE staff have consistently worked to improve programs and deliver results under significant statutory, budgetary, and operational constraints. Many of the promising practices described here exist because of their initiative and public service. We are grateful for their efforts and for the insights that informed this work.

We welcome questions, feedback, and further discussion. Please contact us at info@cleanecon.org.

Notes to the Reader

1. This paper focuses on SBIR only, not the Small Business Technology Transfer (STTR) program, which would benefit from many of these reforms but has different program dynamics, goals, and funding amounts. References to SBIR/STTR are limited to mentions of DOE organizational structure and relevant legislation.

2. DOE's organizational chart has changed significantly since November 2025, and many of the offices discussed in this paper have been renamed, merged, or repositioned. This paper also introduces a layered terminology—distinguishing between appropriations account offices, technology offices, and the central SBIR Programs Office—that is essential to understanding the reforms proposed here. Appendix 1 provides a short guide to these terms and maps pre- and post-reorganization office structures. Readers are encouraged to start there.

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Executive Summary

The Small Business Innovation Research (SBIR) program serves as the federal government's primary vehicle for seeding private sector innovation, supporting thousands of companies over more than 50 years since the program's inception. Commonly known as "America's Seed Fund," the program delivers at least $1.3 million across two award phases to small businesses developing breakthrough technologies, offering a critical on-ramp from early-stage research and development (R&D) to commercial viability

Intended to spur commercialization and market adoption, the SBIR program catalyzes innovations across the federal government, driving new industries across multiple sectors of the United States economy (spanning not just energy but public health, defense, and others). Among the federal government's many SBIR franchises, the SBIR program at the U.S. Department of Energy (DOE) is one of the largest, managing roughly $300 million in annual funding across thirteen technology offices.[1]

However, despite its scale and prominence, DOE's SBIR program underperforms its core statutory mission: energy technology commercialization.

Instead of developing energy solutions that consistently reach the market, the program leaves the economic potential of its public investment unrealized.

There is a real opportunity to modernize DOE's SBIR program to enable the federal government's rise as a global energy innovation leader and boost our economic competitiveness and the clean energy transition. This paper provides both a diagnosis of why DOE's SBIR program underperforms its statutory commercialization mandate and a complete redesign of DOE's SBIR program

Institutional Intransigence

Underperformance in DOE SBIR does not stem from a single source. SBIR is both failing to reach its potential to help the technologies and companies its investing in and has created implementation challenges within DOE that have limited its support for breakthrough energy technologies getting to market.

APPLICATION OVERLOAD

A first-time DOE SBIR applicant faces four federal registrations, roughly 50 pages of material across fourteen components, and an estimated 150 hours of preparation for a $200,000 award.[2]

[1] National Academies of Sciences, Engineering, and Medicine, Review of the SBIR and STTR Programs at the Department of Energy (National Academies Press, 2020). https://nap.nationalacademies.org/catalog/25674

[2] National Academies of Sciences, Engineering, and Medicine, An Assessment of ARPA-E (National Academies Press, 2017). https://nap.nationalacademies.org/catalog/24778 ARPA-E's 100-day time-to-award benchmark reflects program records and author experience.

The program underperforms due to several factors, including, but not limited to:

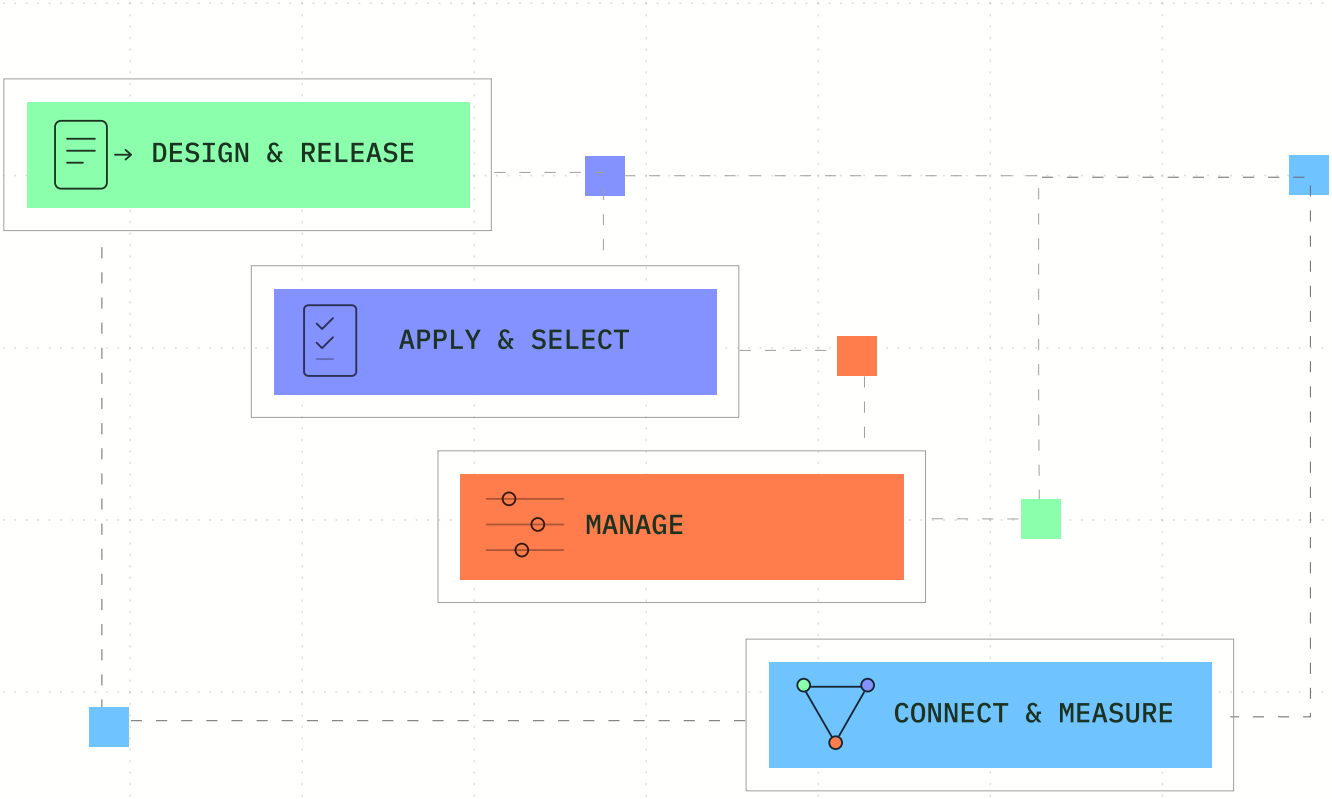
1. **Burdensome application processes,** turning off new applicants and favoring companies that can afford to navigate the process with hired support.

2. **Procedural plaque** in the program, slowing processes and hampering learning-by-doing.

3. **Narrow SBIR topic**s, leaving many novel energy solutions without a way into the program

Furthermore, SBIR traditionally has three phases, however, DOE's SBIR program only utilizes Phase I and II (more on this later). The program that Congress designed to reach innovative small businesses has instead become a system that rewards firms most willing and financially able to learn it and make it past these barriers. Once a company completes Phase II of the program, there is no defined pathway into DOE's energy research, development, demonstration, deployment (read: innovation) or procurement programs.

Some of the reforms that should be applied to the SBIR program have precedents inside the DOE. For example, DOE's former Solar Energy Technologies Office (SETO) found success working with small businesses via a milestone-based structure, where awardees are funded for reaching technical and commercial milestones, thus helping facilitate private sector follow-on funding. In addition, ARPA-E moves from selection to executed awards in 100 days under the same contracting regulations that govern the rest of DOE. The recommended approaches are proven;



Blueprint For SBIR Change

DESIGN & RELEASE

New Management

Move the program to the Office of Technology Commercialization

Open The Front Door

Build open topics and shift criteria to favor new awardees

Clear Authorities

Create strong selection signals but strengthen connections to tech offices

APPLY & SELECT

Simplify Application

Make the application contain only statutorily required information

Lock Calendar

Simplify to 1 single solicitation a year and increase predictability

AI & Maximize Review

Develop AI-enabled systems to support volume of applications

MANAGE

Streamline Phase 1

Use prizes or fixed-price grants for Phase I

Reorient Phase II

Structure Phase II gates on commercialization milestones and accelerate transition

CONNECT & MEASURE

Activate & Connect

Connect portfolio companies to the ecosystem and increase Phase III

Measure & Refine

Continuous monitoring, evaluation, and reporting on commercialization outcomes

Ten Recommendations to Unlock SBIR's Promise

The core reforms to SBIR must span ten interconnected elements across four primary domains of engagement: design and management process, application format and review, management mechanism, and connect and measure. Most reforms can be implemented administratively, while some may require a Secretarial memorandum, and a few must be enabled and codified by Congress.

`(AA) Admin Action` `(CA) Congressional Action` `(DI) DOE Internal`

Design and Management Process

01	(AA)	**Bring in new management**	Designate the Office of Technology Commercialization (OTC) as the institutional home for SBIR, with both operational capacity (keeping awards moving bureaucratically) and commercialization expertise (connecting companies to markets and capital). This ensures management has a commercialization focus and mission.
02	(AA)	**Determine roles and responsibilities**	Determine clear lines of authority across OTC and relevant technology offices at DOE to empower the right leadership and enhance coordination. OTC coordinates program execution and manages selection decisions, technology office staff conduct scientific and technical assessments, and the appropriations account office ensures consistency with broader DOE portfolio strategy.
03	(AA)	**Reduce barrier to entry**	Create permanent open topic tracks that allow companies to propose solutions within broad technology areas rather than match their work to narrowly defined government research focus areas when it does not make sense. Use a mixture of both tracks, with a percentage of awards reserved solely for new applicants and/or adjusted scoring incentives that give first-time applicants meaningful advantages in competition.
04	(AA,DI)	**Fixed application cycles**	Release a single solicitation each year, with a predictable annual cycle to help startups and investors plan accordingly. Release in September, submissions in January, awards in April, with funding available from prior-year appropriations.

(AA) Admin Action (CA) Congressional Action (DI) DOE Internal

Application Format & Review

05	(AA)	**Right size the application**	Return to what is required in the existing statute: one federal registration, one application, and a certification page. This will help entrepreneurs focus less of their time and money on the application and more time on building their breakthrough solutions.
06	(AA)	**Develop AI and operational infrastructure to manage application volume**	Develop AI-assisted compliance screening to sort through the application volume that small review teams cannot manage alone, and combine portal management, reviewer coordination, and award processing under DOE's Partnership Intermediary Agreement (PIA) authority. This will streamline processes and reduce the burden on DOE staff.

Management Mechanism

07	(AA,CA)	**Simplify Phase I**	Phase I is a $200,000 feasibility study. Use fixed-price grants or prizes to simplify reporting requirements and free companies to focus on meeting milestones and objectives in preparation for Phase II. This will reduce the bureaucratic burden on both the entrepreneur and DOE staff.
08	(DI)	**Structure Phase II gate for commercialization progress**	Replace advancement based on "best efforts to complete technical goals" with advancement based on proven attainment of commercial and technical milestones, with the expectation that 25 to 50 percent of Phase I awardees will advance to Phase II. This will reduce potential lapses in funding between Phases, allowing companies to focus on developing their technology and streamline processes between Phases.

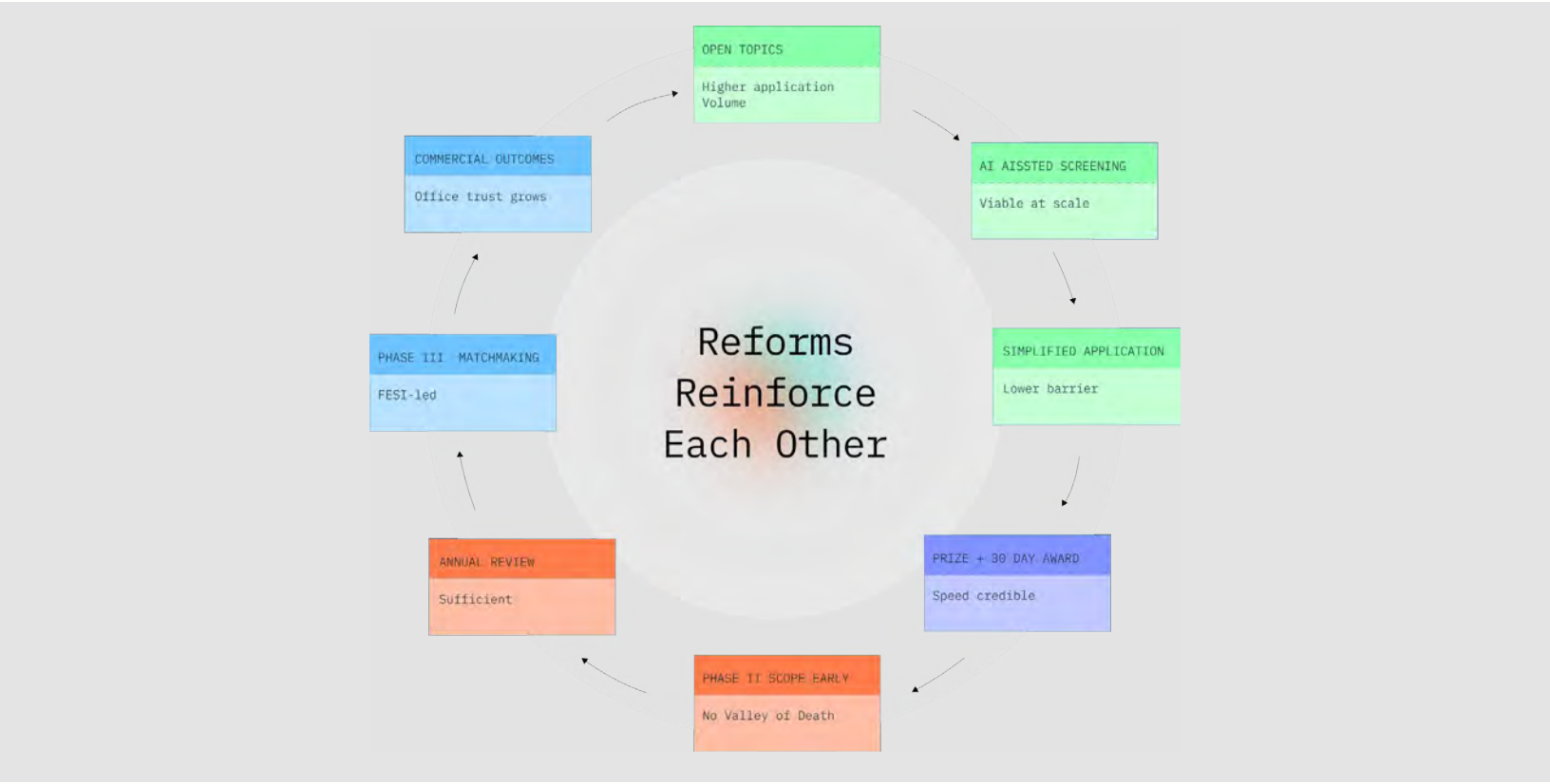
(AA) Admin Action (CA) Congressional Action (DI) DOE Internal

Connect and Measure

09	(AA)	**Connect awardees to markets and capital**	Launch an innovation ecosystem coordination effort that increases awardee access to the private sector through use of Technical and Business Administration (TABA) vouchers for commercialization support and facilitate a Phase III pathways system to connect awardees to DOE's deployment and procurement programs, investor networks, and market intelligence.
10	(DI)	**Create effective evaluation metrics**	Build data infrastructure to track metrics like commercialization rates, time-to-award, new versus repeat applicant success, success by technology office, post-award revenue, and the rate at which SBIR-funded technologies reach customers. This will help OTC set goals and evaluation metrics that allow for continuous iteration and improvement of the program.

Enacting these Reforms

Most of these reforms require only administrative action. A leadership decision, an internal policy revision, or reallocation of existing staff time can implement the changes to application process, topic selection, review authority, award instrument design, and post-award support structure. A smaller set of changes requires a Secretarial memorandum to clarify roles and authorities across participating offices. Only a few require Congressional action, like additional flexibility in award instruments and the establishment of performance-based eligibility standards for repeat awardees. Additional details are in Section 4.4.



The Operating Design

Beyond these individual reforms, this paper presents something most SBIR critiques do not: **an alternative, implementation-ready redesign of the program.**

Section 4 specifies the **full operating design and architecture including:**

- The annual calendar and dual-track solicitation model
- The selection and decision authorities across OTC and the technology offices
- The instrument design and Phase II gate process
- The roles of partnership intermediaries for operational execution
- Roles for ecosystem coordination
- Cross-office portfolio visibility
- Post-award connections that carry companies toward follow-on capital, market entry, and deployment

This section details roles, responsibilities, timing, and authority. It also addresses implementation strategy, arguing that reforms should simultaneously launch a single annual cycle with strong leadership support.

Why Now

DOE has an unprecedented opportunity and the legal authority to transform the program towards energy technology commercialization. It is time for this program to break free of prior constraints to increase the quality of outcomes for DOE, the companies it wants to fund, the technologies it wants to see progress, and the taxpayer investment.

The tools are in place, but they need to be applied to SBIR: Across the DOE, the toolbox that is at the disposal of program managers has dramatically expanded. The partnership intermediary infrastructure for using PIAs has been established. The Foundation for Energy Security and Innovation (FESI) has launched and is staffing up. TABA is an available but chronically underutilized tool. There are AI tools that can be leveraged to assist with compliance checks and application screenings for larger numbers of applications. Finally, recent Congressional direction via the Fiscal Year (FY) 2026 Energy and Water Development appropriations bill (Section 309) enables DOE to move SBIR/STTR and Technology Commercialization Fund money across program offices with greater flexibility.[3]

These reforms have proof points across the federal government. AFWERX (the Air Force's innovation arm), the Defense Advanced Research Projects Agency (DARPA), the National Science Foundation (NSF), the Solar Energy Technologies Office (SETO), the Advanced Research Projects Agency-Energy (ARPA-E), and the National Aeronautics and Space Administration (NASA) have demonstrated what is possible under the same legal framework. Many of these agencies run far more flexible and nimbler SBIR programs that have included many of the proposed recommendations in this report, like milestone payments, open topics, and an increased focus on commercialization and offtake.

DOE has never been empowered to apply these tools and proven reforms to SBIR, until now.

[3]P.L. 119-74, §309 (January 2026). Allows SBIR, STTR, and TCF allocations to be reprogrammed within five named appropriations accounts (EERE, OE, Fossil Energy, CESER, and Science) without §301 restrictions. Nuclear Energy is not currently included.

How to Read This Blueprint

This guide is comprehensive by design, because structural problems require exposing the full architecture both to reach the root cause of the issue and identify fixes.

There are sections particularly relevant to various members of the clean energy innovation ecosystem:

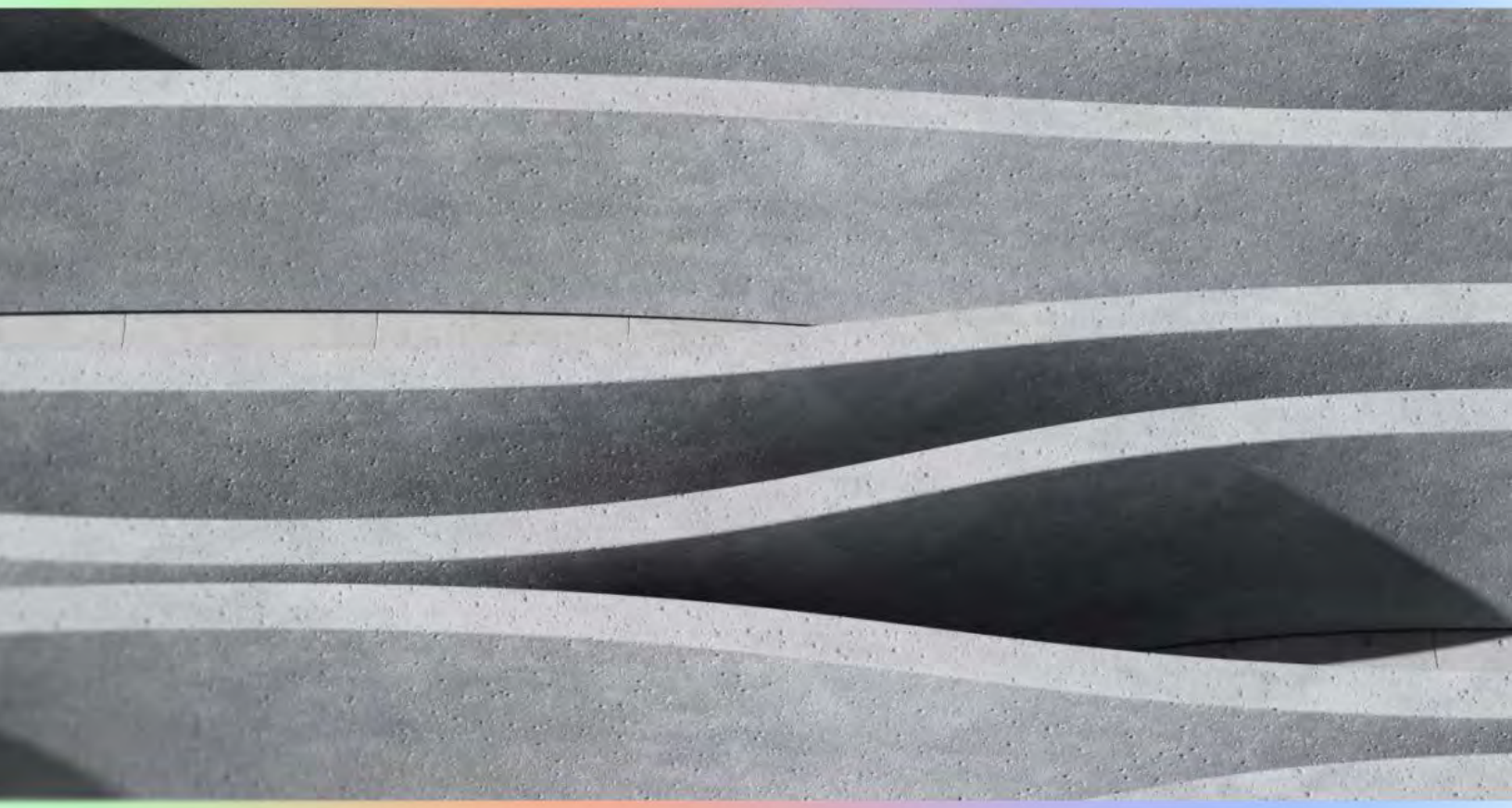
- **DOE political appointees or senior career officials** considering how to transform the program: read Section 2 for the institutional context behind each design choice and Section 4 on the summary of the operating design.
- **Congressional staff evaluating SBIR:** read Section 3 for the reform blueprint and Section 4.4 for what requires legislative action versus what DOE can do now.
- **Startup founders or investors** trying to understand how to access and understand DOE SBIR: Sections 1 and 2 lay out the experience and the structural causes behind it.
- **Clean energy innovation ecosystem organizations** curious about what a reformed program means for organizations that support startups: Section 3 covers the reform blueprint with specific design options and tradeoffs, and Section 4 describes the complete operating design including the roles that ecosystem partners would play in a redesigned program.

Those new to SBIR or with limited exposure to the program, read Section 1 so you have the appropriate historical context of the program and an understanding of how it works within DOE today.

This paper is published for consideration by DOE. The operating design in Section 4 is designed for implementation, but deliberately offered as a hypothesis to be refined, not a final prescription.

SBIR 101:

An overview of DOE's SBIR program and how it's underutilized to bring break-through energy solutions to market.



01

SBIR enactment.

On July 22, 1982[4], President Reagan signed the Small Business Innovation Development Act (P.L. 97-219) into law. The legislation established four statutory objectives for the Small Business Innovation Research (SBIR) program across the federal government:

01

stimulate technological innovation,.

02

foster participation by minorities and disadvantaged persons in technological innovation, and

03

use small businesses to meet federal R&D needs,

04

increase private-sector commercialization of innovations derived from federal R&D.

SBIR awards.

Although legislation has modified award amounts and federal agencies have adjusted implementation processes, SBIR awards are generally made according to the following amounts and schedule (See Table 1). For decades, SBIR has served as a catalyst for supporting small businesses nationwide across areas of national interest (e.g., public health, national security).

Table 1: Current SBIR Award Phases and Schedule

	Phase I	Phase II/IIA/IIB/IIC	Phase III*
Activity	**Technical Feasibility** – showing a product concept is technically possible	**Prototyping** – developing representative example products; & **Demonstration** – testing the prototype in real world or representative environments	Work that derives from, extends or completes the effort of prior Phase I and II awards (rarely used)
Funding	$200-250k	$1.1 – 1.6M	Variable – funds must come from non-SBIR sources
Timeline	6 to 12 months	Up to 2 Years	Variable

*More information on Phase III is located in Appendix 3.

[4] The footnote text should read: "For a more comprehensive review of SBIR's origins and history, see Appendix 2.

1.1 History of DOE's SBIR Program

DOE SBIR has a large budget.

DOE manages one of the largest SBIR portfolios in the federal government at roughly $300 million annually and deploys it across a uniquely fragmented organizational landscape. Understanding how SBIR currently works at DOE, and why, provides essential context for understanding the improvements described later.

SC manages DOE SBIR.

On October 12, 1982, Secretary of Energy James Edwards assigned management of DOE's new SBIR program to the Office of Energy Research (OER), the predecessor to today's Office of Science (SC).[5] The central SBIR/STTR Programs Office (SBIR Programs Office) sits within the SC, even as the program now coordinates across thirteen participating technology offices[6], including applied energy technology offices that did not exist in their current form in 1982. More on the history of the SBIR program can be found in Appendix 2.

SC's mission is misaligned with SBIR's.

The administrative norms, peer-review processes, and institutional assumptions that govern DOE's SBIR program were developed within SC. SC is an office oriented toward fundamental research – the kind of research aimed at improving scientific theories for better understanding and prediction of natural or other phenomena. While energy research is imperative to advancing national priorities, an energy commercialization program like SBIR does not belong in or align with the mission of SC. As a result, program execution reflects a research-first culture that is not fully aligned with the commercialization outcomes SBIR is intended to advance.

SBIR's award schedule.

DOE currently releases four SBIR funding solicitations per year: two rounds each for Phase I and Phase II awards. Phase I awards open in the summer and the fall; Phase II awards are on the opposite schedule, opening in the fall and the summer, respectively.

Each round is called a Release — Release 1 and Release 2 — and the two phases alternate so that SC can distribute the application load appropriately to its staff. Each Release includes a broad range of technology areas. Releases are designed such that any participating technology office has one Phase I and one Phase II release per year.

Phase I solicitations provide a list of prescriptive topic areas that applicants must apply to Phase II solicitations have no topics and are open to both Phase I and Phase II awardees.

The timeline from submission to award notification typically spans four to five months, followed by an additional one to two months before funds are released and projects can begin. DOE receives approximately 1,500 to 2,000 Phase I applications per cycle and makes between 300 and 400 awards, resulting in a selection rate that has generally ranged from 13 to 22 percent, depending on the year.

[5] U.S. Department of Energy, Office of Science mission statement. https://www.energy.gov/science/office-science

[6] The participating pre-2025 DOE reorganization offices were: Office of Advanced Scientific Computing Research, Office of Basic Energy Sciences, Office of Biological and Environmental Research, Office of Fusion Energy Sciences, Office of High Energy Physics, Office of Nuclear Physics, Office of Cybersecurity, Energy Security, and Emergency Response, Office of Energy Efficiency and Renewable Energy, Office of Environmental Management, Office of Fossil Energy and Carbon Management, Office of Defense Nuclear Nonproliferation, Office of Nuclear Energy, Office of Electricity

SBIR Phase III is underutilized for energy technology commercialization. 15 U.S.C. § 638(r)(4) provides authority for sole-source contracting with Phase III awardees. In other words, the statute provides the ability to award follow-on contracts, using non-SBIR funds, to companies that completed Phase II without running a new competition. However, DOE has rarely used this mechanism, and in many cases, stakeholders within and beyond DOE are not aware of it. This effectively closes off the Phase III pathway, cutting Phase II awardees off from a critical avenue for continued DOE support. More information on Phase III and its history is available in Appendix.

Table 2: Award by Phase and Breakout

Phase	Eligibility & Structure	General # DOE Awards
I	Open to any eligible business. $200k with performance for 6-12 months.	200-300
II	Phase I continuations. Between $1.1 - $1.6M, with performance between 12-24 months.	60-80
Straight to Phase II ("Fast-Track Award")	Any new applicant, awardee is selected for both Phase I and Phase II at the same time for a total of $1.3M over 36 months.	New pilot, more limited
IIA	Phase II awardee with R&D beyond the original scope.	<50
IIB	Phase II awardee with R&D beyond the original scope.	<20
IIC	Phase II awardee that is commercialization-focused and requires cost-share match.	Limited to none
III	Up to 2 Years	New pilot, more limited
IIA	Phase II companies are expected to secure non-SBIR funding (whether private investment, agency procurement, or other federal contracts) to bring their technology to market	10-15 low dollar procurements by SC

1.1.1 DOE SBIR Management & Process

Roles and responsibilities of each participating office for DOE's SBIR Program

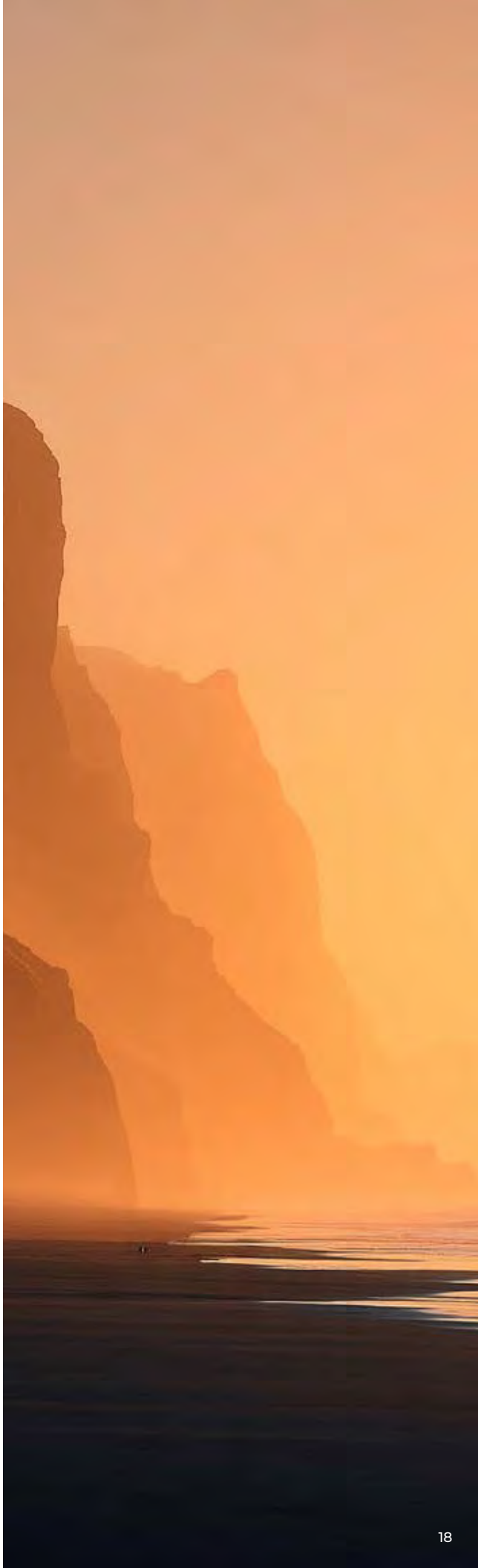
- **SBIR Management.** The SBIR Program Office within SC publishes solicitations, manages the review calendar, ensures legal compliance, and conducts general outreach to attract applicants.

- **13 Technology Offices.** The substantive work of topic development, reviewer recruitment, award recommendation, and post-award grant management sits with the 13 participating technology offices, whose staff carry SBIR as a duty alongside other programmatic responsibilities. Phase I topics are developed by technical staff in each of the 13 technology offices that participate in the program, based on each office's R&D priorities. A typical annual solicitation covers more than 60 topics and 250 subtopics (e.g., a technology office may have multiple topics with onearea of work; that is "Grid Technologies" with subtopics for "transformers", "inverters", etc.).

- **DOE Chicago Field Office.** Dedicated staff at DOE's Chicago Field Office, overseen by SC, manages award execution and grants management.

The Challenge for Innovators

In order to apply, companies must find a SBIR topic that matches their technology solution. There is no way to propose energy R&D projects outside the published topic list. **DOE Technology Offices have authority and should run open topics to allow all ideas to be captured.**



1.1.2 The DOE SBIR Application Process

DOE SBIR participants navigate an inefficient application review process. Roles and responsibilities include:

- **Technology office staff across DOE review applications.** Complete and compliant applications are routed to the SBIR lead in the relevant technology office

- **Technology office staff across DOE manage internal and external Reviews.**

  - Technology offices recruit internal and external subject-matter expert (SME) reviewers, compile their scores, and produce a ranked list of proposals for that topic. External SMEs are used to bring greater expertise to ensure a thorough review.

  - Proposals must score above a defined threshold to be eligible (deemed "meritorious") for selection.

  - Rankings from all topics within a technology office are aggregated and reviewed by senior management (i.e., Technology Office Director or Assistant Secretary) before delivery to the SBIR Program Office at SC.

Innovators must navigate a multiple-step review process to receive a DOE SBIR Phase I award.

- **Innovators must submit a robust LOI.** This process begins with a mandatory Letter of Intent (LOI). Only companies whose LOIs are deemed responsive (e.g., align technically with the topic they applied to) may submit a full proposal.

- **Innovators must register in four places.** Full applications are submitted through DOE's Portfolio Analysis and Management System (PAMS)[7] system and require active registrations for the applicant in SAM.gov and Grants.gov as well as the SBA Company registry.

- **Innovators must navigate a complex application.** The application itself includes approximately 14 components, including a technical narrative, commercialization plan, detailed budget, key personnel qualifications, and required certifications and compliance documents.

[7] PAMS: DOE's grants management portal (https://pamspublic.science.energy.gov). SAM.gov: federal System for Award Management (https://sam.gov). Grants.gov: government-wide grants application portal (https://grants.gov). First-time SBIR applicants must register in all three systems before submitting.

Advancement between phases is inefficient. There are 3 process barriers worth resolving:

- **Phase I triggers another burdensome application process for Phase II support.**

  After graduating from Phase I, companies must submit a new, full application under a separate Phase II funding opportunity announcement (FOA) and compete against other successful Phase I awardees.

- **No transparency on transition rate from Phase I to Phase II.**

  DOE does not publish a target rate for how many Phase I projects are expected to advance, making it unclear to applicants their chances of advancing and limiting their ability to decide whether to go through the Phase II application process.

- **Phase II graduates have no clear path of where to go to keep innovating.**

  Once Phase II concludes, there is no formal linkage to DOE's broader research, development, demonstration, deployment, or procurement programs, and DOE does not track company outcomes after SBIR funding ends. This issue is discussed further in Section 2.3.

Table 3: The Current DOE SBIR Process

Step	Description	Approximate Duration
Federal registrations	SAM.gov, PAMS, SBA Company Registry, Grants.gov	6-8 weeks before submission
Topic release	Technology offices publish narrow topics in solicitation	Summer (Release 1) or Fall (Release 2)
Letter of Intent	Mandatory pre-submission filing through DOE portal	5-7 weeks before full application
Full application	14 components across 40-50 pages; ~150 hours preparation	8-12 weeks from solicitation release
Compliance screening	Non-compliant applications rejected before review	1-2 weeks after submission
Technical review	Proposals scored and ranked	2-4 weeks
Ranking and selection	Technology office rankings aggregated; SBIR Program Office identifies funding cutoff	2-4 weeks
Selection notification	Applicants notified of award or decline	~4-5 months after submission

Table 3: The Current DOE SBIR Process

Step	Description	Approximate Duration
Award execution	Grant negotiation, security and environmental clearance (RTES/NEPA), funds obligated	4-5 months after notification
Phase I performance	Awardee conducts research per approved scope	6-12 months
Phase II application	Separate full application to Phase II Release FOA	8-12 weeks preparation
Phase II review and award	Competitive review against other Phase I completes	3-5 months
Phase II performance	Awardee conducts further R&D	12-24 months
Post-award	No structured pathway to deployment, procurement, or follow-on	Undefined
Ranking and selection	Technology office rankings aggregated; SBIR Program Office identifies funding cutoff	2-4 weeks
Selection notification	Applicants notified of award or decline	~4-5 months after submission

Today's SBIR Program

Although SBIR's statutory objectives are clear, they are not aligned. Every agency's SBIR program is tasked simultaneously with stimulating technological innovation, meeting agency R&D needs, broadening participation, and accelerating private-sector commercialization – goals that can require fundamentally different funding strategies, portfolio construction, and success metrics. The statute provides no framework for prioritizing among these objectives and no clear definition of what constitutes program success. In practice, this leaves agency staff responsible for competing mandates within fixed budgets and phases. That is a recipe for underperformance.

A program optimized to fund many low-dollar exploratory research projects looks very different from one designed to advance a smaller set of companies and products towards operational use by government agencies (procurement) or commercial markets (deployment). The former prioritizes broad access and technical novelty; the latter requires concentrated funding, active portfolio management, and defined transition pathways across innovation stages.

SBIR is expected to do both. **This creates an inherent tension between using small businesses to generate early-stage innovation and using them to deliver deployable solutions for agency missions or private markets.** At DOE, implementation has reflected a research-first orientation. The program has historically defaulted toward incremental R&D awards rather than building structured, outcome-oriented pathways to demonstration, procurement, or market scale.

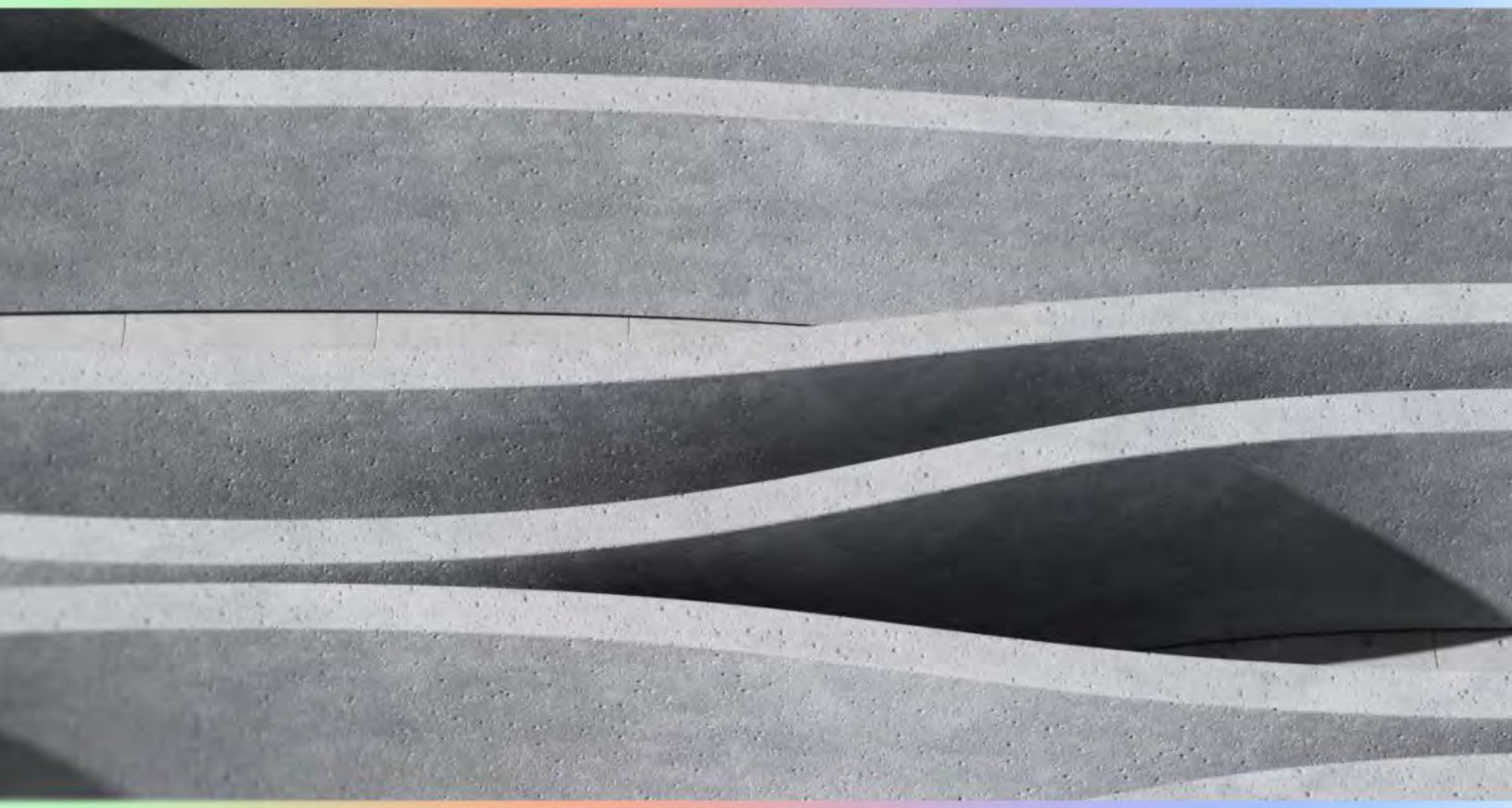
Snapshot: Structural Attributes of DOE's SBIR Program

Large but institutionally fragmented portfolio	• ~$300 million annually, among the largest SBIR programs in the federal government. • Centrally housed in the Office of Science since 1982. • Coordinates across 13 participating technology offices, each with its own mission and priorities. • Central SBIR Programs Office manages compliance, solicitations, and scheduling; substantive technical control is decentralized.
Procedurally intensive application process	• Mandatory Letter of Intent prior to full proposal submission. • Full proposals submitted through PAMS with required SAM.gov and Grants.gov registrations. • Approximately 14 required components, including technical narrative, commercialization plan, budget, and compliance documentation.
Basic research institutional orientation	• Administrative norms, peer-review culture, and evaluation frameworks rooted in the Office of Science. • Implementation reflects a research-first model, even as DOE's mission has expanded toward demonstration, deployment, and commercialization. • Limited Office of Science portfolio-level strategy explicitly oriented toward commercialization outcomes.

Decentralized review and ranking	• Applications routed to SBIR leads in relevant technology offices. • Internal and external subject-matter reviewers recruited per topic. • Proposals scored, ranked within topics, and aggregated at the technology office level. • Central SBIR Program Office determines funding cutoffs based on available funds in consultation with the technology office.
Competitive but broad portfolio	• 1,500–2,000 Phase I applications per cycle. • 300–400 awards per cycle. • Selection rates range from 13–22 percent depending on year. • No published target rate for Phase I to Phase II advancement.
Weak transition to Phase III and deployment	• Federal law allows DOE to award follow-on contracts to Phase III companies (pre-demonstration phase) without running a new competition. • DOE has rarely exercised this authority. • No formal linkage to DOE demonstration, deployment, or procurement programs. • No systematic tracking of company outcomes within DOE after SBIR funding concludes.

Servicing Small Businesses

To understand why DOE's SBIR program underperforms its energy commercialization mandate, it helps to begin not only with the program's architecture but with the experience of the companies it is supposed to serve.



02

2.1 Thirteen SBIRs Under One Roof

DOE's SBIR is far from a uniform program; instead, topics are generated independently by thirteen participating technology offices, each with their own research priorities, review norms, and level of engagement with applicants and the appropriations account office it reports to. SBIR programs vary considerably across DOE offices. For example, the Office of Critical Materials and Energy Innovation (CMEI, formerly Energy Efficiency and Renewable Energy), the Advanced Research Projects Agency-Energy (ARPA-E), the Office of Nuclear Energy (NE), the Office of Hydrocarbons and Geothermal Energy (HGEO), and the research divisions within the Office of Science each operate their SBIR programs differently.

As a result, startups applying to "DOE SBIR" are applying to one of thirteen distinct micro-programs that share a common submission portal, application requirements, and administrative framework, but little else. Informal knowledge of which technology offices are actively funding certain technologies, when solicitations are likely to be released, how to frame a proposal for a particular SBIR staff member within each office, or what reviewers tend to prioritize is unevenly distributed. It resides largely with experienced insiders, repeat applicants, and professional grant writers, creating structural advantages for some firms and additional barriers for first-time or less-connected small businesses.

2.2 One Map, Two Routes

There are fundamentally two types of DOE SBIR awardees: those that view DOE as a customer, and those that are seeking to enter the larger market.

1. The first group are established small firms that build specialized instruments or conduct targeted research for government buyers.

2. The second group are startups and small businesses developing new energy technologies with commercial potential. These are the companies Congress had in mind when it made commercialization one of SBIR's four statutory objectives.

Both are legitimate recipients of federal R&D funding, but SBIR's current structure is far better suited to the first group.

Clear visibility for group one. Release 1 of DOE's annual SBIR solicitation, which primarily covers SC programs, reflects this dynamic. The topics are narrowly defined, applicant pools are smaller, and the expected outcome is often a specific technical product for a known government customer. For SC, this model works well: the award functions effectively as targeted R&D procurement aligned with national laboratory or other basic research needs. A firm building a specialized detector, for example, effectively secures its customer upon award, and progression beyond Phase II may be unnecessary because the grant itself satisfies the business objective.

Where group two hits' roadblocks. The contrast becomes clear in SBIR's Release 2, which covers the technology offices: CMEI, HGEO, NE, and others, whose missions center on bringing novel energy technologies to market. Nominally, their SBIR topics are oriented toward applied energy innovation. In practice, however, Release 2 retains the same architecture as Release 1:

- short performance periods,
- modest award sizes relative to capital requirements, and
- competitive reapplication between phases.

Cont.

For companies developing capital-intensive energy technologies, this program structure limits SBIR's role to incremental technical support rather than meaningful commercialization acceleration.

For venture-scale startups, success depends on building financing momentum and signaling credible pathways to deployment. SBIR can provide technical validation, but additional resources are needed to get their products to market which will require using external capital to fill in the gaps.

New-applicant data reinforces the point. A 2024 GAO analysis found that just 22 firms, less than 1 percent of all SBIR Phase II awardees, captured 11 percent of all Phase II awards government-wide between FY2011 and FY2020, with a median employee count of 161, nearly thirty times the median for typical SBIR winners.[8]

DOE does not publish comparable agency-level data, but our direct experience suggests roughly 25 percent of applicants are new to the program, and for the SC SBIR release, the proportion is very low according to author discussions with staff. **In other words, a program that requires 150 hours of work and four separate federal registrations just to apply for $200,000 is not built to attract companies encountering the federal grants process for the first time.**[9]

[8] GAO, Small Business Research Programs: Increased Performance Standards Likely Affect Few Businesses Receiving Multiple Awards, GAO-24-106398 (March 2024). https://www.gao.gov/products/gao-24-106398
[9] SBA SBIR/STTR Policy Directive (May 2023). SBA estimates first-time Phase I preparation at approximately 150 hours over 12 weeks. https://www.sbir.gov/tutorials/individual-agency-requirements/USDA/proposal-preparation-weeks-1-2

Cont.

Procurement Tools

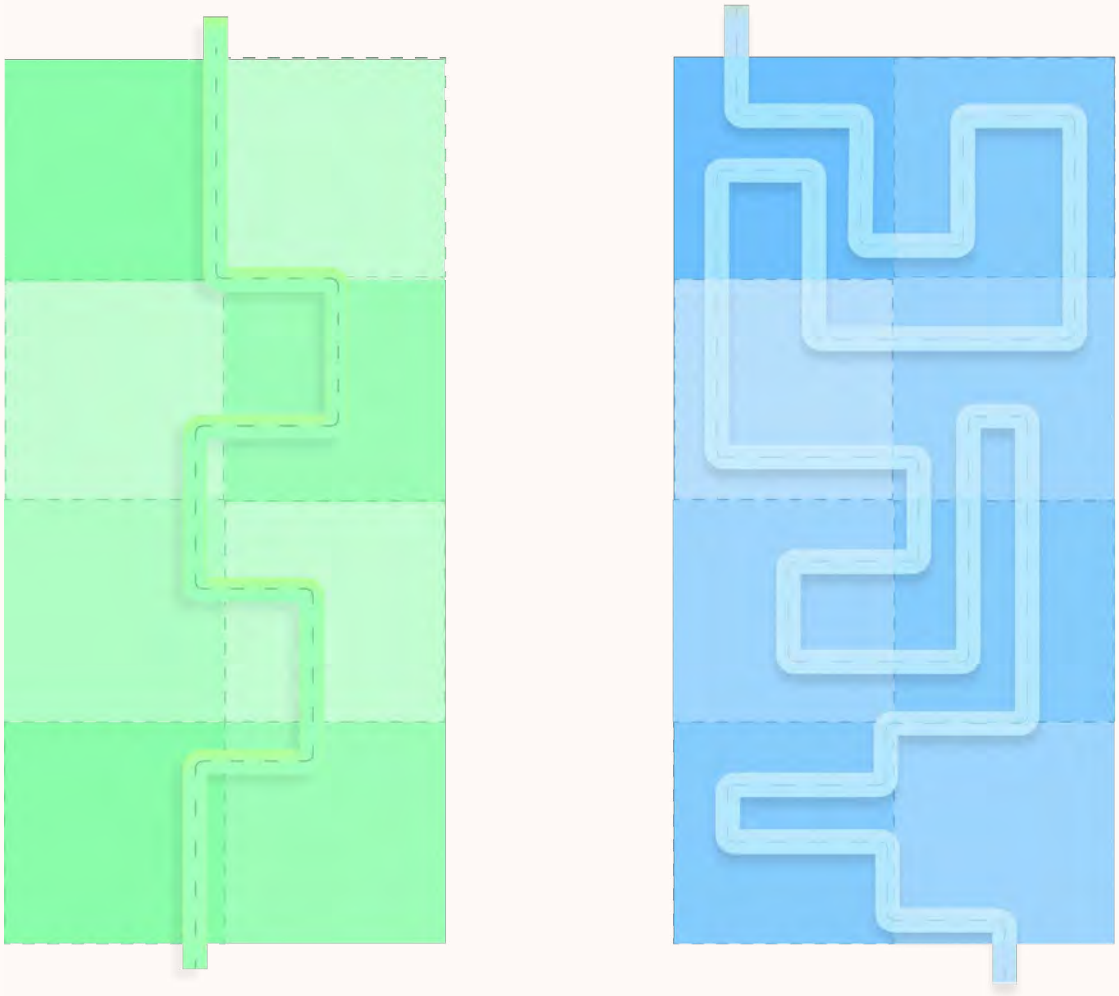
Offices direct small business to perform defiend reasearh tasks

Served well today

Commercialization Accelerator

Startups develop energy tech for the market

not served well



WHAT REFORMS WOULD ADD

Commercial Milestones
Structure Phase II gates on commercialization outcomes

OTC Oversight
Move program to Office of Technology Commercialization

Phase III Matchmaking
Connect portfolio companies to the ecosystem

Outcome Tracking
Continuous monitoring and reporting on results

2.3 No Commercial Path Beyond SBIR

When a company completes SBIR Phase I and Phase II and demonstrates commercial promise, **the program offers no defined pathway into DOE's larger demonstration, deployment, or procurement programs, or into private capital and market offtake.** Regardless of whether the technology addresses a critical energy need or a national priority, the commercialization support architecture stops at Phase II.

No office, document, or program manager formally owns the handoff toward a technology office within DOE that focuses on the later stages of the innovation cycle (e.g., demonstration), if applicable. When transitions do occur, it is because of the proactiveness of dedicated federal staff rather than the institutional design of the program. A company that completes Phase II with a validated prototype has no defined next step within DOE, no coordinated introduction to relevant DOE offices or industry partners, and no assurance of continued engagement from the technology office that originally supported it.

This creates a valley of death for startups and leaves an institutional gap between the parts of DOE that manage SBIR awards and the parts of DOE and the private sector that buy and deploy technology. Without a bridge across that gap, promising technologies have trouble advancing. Prospective funders and customers never get the signal that a company is ready for their attention, making it harder to attract the capital, partnership, and offtake agreements that commercialization requires.

2.4 Topics That Serve the Agency, Not the Market

Beyond structural fragmentation, there is basic misalignment in how DOE determines what topics to release. SBIR topics are written to reflect each Technology Office's internal research priorities. This is a challenge for businesses as topics may appear in one cycle and disappear in the next, based on shifting internal priorities. For early-stage companies operating on limited runways, this episodic structure creates risk: a firm whose technology aligns perfectly with a topic in 2024, but missed that application deadline, may find that topic has vanished by 2025, with no explanation and no alternative pathway for public support.

01

Narrow topics are manageable with limited resources.

The narrowness of SBIR topics is not always an intellectual preference. It is a rational response to a staff capacity or resource constraint. Technical staff responsible for reviewing proposals face fixed, compressed review windows, sometimes as short as two weeks. A narrow topic that generates three applications is manageable within that timeline.

02

Open topics are not sustainable within the current system.

An open topic that generates a hundred applications, on the other hand, each requiring the same depth of technical evaluation, is not. This dynamic is amplified when technology offices have limited funds. If an office can fund only two or three awards and seeks to address a specific technical gap, it is rational to issue a narrowly defined topic. The tradeoff is that every narrow topic forecloses the possibility of funding something the office did not know to ask for.

03

The result is a system that limits the breakthrough ideas.

The absence of applications from companies outside the federal ecosystem is falsely used as evidence that companies do not exist rather than evidence that the program is not reaching a larger pool of innovative energy solutions. Open topics and a simplified application will reveal the actual applicant pool.

04

Creativity and innovation require more.

Where office leadership is strong and where staff time and resources are dedicated, technology offices have run more open topics and made a real impact with SBIR. But such outcomes require sustained, proactive effort by individual staffers over years to resist a default that the system's own incentive structure constantly reinforces. As a result, the SBIR solicitation process selects companies whose technologies happen to match a very specific government research question at a very specific moment, rather than one that identifies the most promising commercial energy technologies and finds ways to support them.

05

Narrow topics produce limited results.

Companies forced to fit their technology into an ill-matched topic description produce proposals that satisfy neither the agency nor their own development logic led to quick rejections, ideally at the Letter of Intent stage, and wasted effort on both sides. The companies Congress envisioned SBIR serving - start-ups and small businesses with commercial potential that need early capital and federal validation - do not organize their R&D calendars around federal solicitation cycles and cannot afford to chase narrow topics that may not reappear. Over time, the program's topic structure has selected them out, leaving a pool of awardees dominated by firms that understand the DOE SBIR system and are willing and able to bend their solutions to fit evolving topic areas.

06

Energy technology commercialization takes a back seat.

This is the mechanism by which the research-versus-commercialization ambiguity described in Section 1 manifests at the operational level. When topics are written to advance a technology office's research agenda and constrained further by the practical need to limit application volume, the program can end up functioning as a small-business research grant program for government-dependent firms only. That is a defensible use of federal R&D dollars, but it is not what Congress intended when it made commercialization one of SBIR's four statutory objectives, nor is it what the program's authorizing language describes. Neglecting this feature of SBIR slows the federal government's support for commercialization of energy technologies that could meet national objectives.

2.5 Structural Causes

The patterns described above are not accidental. Unresolved tension embedded in the original Small Business Innovation Development Act has translated, within DOE specifically, into organizational behaviors that systematically undermine energy commercialization outcomes. Congress gave agencies two jobs (use small businesses to meet federal R&D needs and increase private-sector commercialization) without clarifying which took priority or what success looks like.

2.5.1 The Institutional Logic of Inaction

The DOE SBIR mandate. Congress mandates that agencies set aside 3.2 percent of their extramural R&D budgets for SBIR but does not separately fund the staffing of the program – meaning every hour spent on SBIR is an hour taken from something else. Topic managers in each technology office develop solicitation topics, evaluate proposals, and manage awards on a part-time basis alongside their other duties. The SBIR director and a small team within the Office of Science handle operations of the program and statutory compliance. The result is a program with process but no accountability on outcomes. No one at DOE wakes up in the morning with SBIR recipient success as their primary responsibility.

This has a cascading effect that explains much of what startups experience.

- Narrow topics are not an intellectual preference; they are largely a coping mechanism for understaffed technology offices operating under compressed timelines or constrained budgets.
- The absence of post-award commercialization support is not a philosophical position; like offices gravitating towards narrow topics, it is the consequence of a staffing model in which no one has the bandwidth to provide it and that favors technical subject matter expertise over commercialization expertise in hiring (more on this below).

These shortcomings appear as external barriers to startups but reflect internal constraints: the predictable behavior of an overstretched system and federal staff doing the best they can to keep a program operating and compliant.

That system is now more overstretched than ever. DOE's workforce contracted significantly in early 2025 through hiring freezes and voluntary separations, and the remaining staff now execute the same portfolio with significantly fewer people. SBIR management, already thin, is thinner still and the repercussions are damaging to current and future awardees.

2.5.2 The Skillsets the Program Does Not Have

Even if DOE fully staffed its SBIR operations, a deeper challenge would remain. Running a program that produces commercialization outcomes requires two kinds of expertise that DOE does not currently deploy for SBIR as systematically as possible:This has a cascading effect that explains much of what startups experience.

Operational capacity. SBIR recipients need people inside DOE who understand the federal funding machinery well enough to keep things moving on their behalf:

- Getting an award executed quickly;
- navigating compliance requirements without unnecessary delay; and
- resolving the administrative problems that routinely stall small companies unfamiliar with government contracting.

This is not glamorous work, but its absence is felt acutely by every startup that waits months between selection and the actual availability of funds.

Commercial expertise. SBIR recipients, particularly those with genuine market potential, need access to people who understand the industries they are trying to enter. Federal staff who can:

- Make meaningful introductions to potential customers, partners, and investors.
- Help a company map out logical next steps after a Phase II award ends.
- Speak candidly when a business model is flawed or a market assumption is wrong.

2.5.3 Rules That Are not Rules

A subtle but equally important root of SBIR's structural challenges is the accumulation, over four decades, of internal practices that are inaccurately treated as legal requirements. SBIR staff often cite a compliance requirement as regulatory, however investigation by dedicated staff noted instead these were conservative interpretations of statute and general risk aversion tactics that had hardened into policy through repetition.

For example, DOE's most recent Phase I solicitation (FY2025, DE-FOA-0003504) illustrates how far this has gone. To begin, applicants must register with four separate federal systems: SAM.gov, PAMS, the SBA Company Registry, and Grants.gov. SBA advises starting this process six to eight weeks in advance roughly 40 to 50 pages across fourteen components. SBA estimates the total preparation time for a first-time applicant to Phase I at 150 hours over 12 weeks.[10]

This cannot be overstated – this is for a $200,000 award. The SBIR directive instructs agencies to minimize regulatory burden using simplified procedures that purposely depart from normal government solicitation format. DOE's process is the opposite, and program staff acknowledge most of the required materials do not factor into award decisions, which begs the question why they are required in the first place.

The conservative interpretation of existing statute and risk aversion adding unnecessary layers can negatively affect the program. The gap between what the law requires and what DOE has built is not a matter of interpretation. It is the product of forty years of layered process: each made by someone with reasonable justification, never removed by anyone with the authority or incentive to do so. The application is the most visible example, but the same dynamic runs through every stage of the SBIR lifecycle: the review and selection methodology, the onboarding of new awardees, the management of active awards, the Phase I to Phase II transition, and what happens when a Phase II award ends.

[10] 15 U.S.C. §638(q); SBA SBIR/STTR Policy Directive (May 2023), §9(b) & Appendix I. TABA authorized under P.L. 115-232 (FY2019 NDAA). Agencies may provide up to $6,500 per Phase I and $50,000 per Phase II for technical and business assistance.

2.5.4 No Data, No Accountability, No Learning

No evaluation metrics. Every root cause described - staffing, skills, procedural plaque, fragmented ownership - shares a common feature: they persist in part because DOE has no system for measuring success. DOE submits required data to SBA, which publishes aggregate award statistics about the SBIR program across the federal government. However, DOE does not independently analyze or report on its own program's outcomes, nor connect it to national priorities. There is no public reporting on energy technology commercialization rates by DOE appropriations account or technology office, time-to-award by program, success rates for new versus repeat applicants, post-award revenue generation, or the rate at which SBIR-funded energy technologies reach customers (government or private sector).

Enduring resistance to change. When the National Academies attempted to assess DOE's SBIR outcomes for their 2020 review, DOE declined to share its tracking data, citing privacy concerns - refusing to provide outcome data to a Congressionally mandated review of its own program. Other agencies have made different choices: the Department of Defense maintains the Company Commercialization Record, a centralized longitudinal database of post-award outcomes; and the National Institutes of Health operates a contractor-administered mentoring program for Phase II awardees that includes structured outcome tracking. DOE collects less, publishes less, and as a result, knows less about its own program's performance than either of those agencies.[11]

The result is a self-reinforcing cycle. A DOE technology office producing strong commercialization outcomes has no way to demonstrate that fact; and one producing none has no pressure to change. An SBIR director who wanted to shift resources toward higher-performing approaches has no evidence base to justify the change. Without evidence of underperformance, there is no urgency to reform the program. Without reforms, the data infrastructure needed to measure performance never gets built, and the potential SBIR has to enable energy technology commercialization outcomes for an array of solutions falters

2.5.5 No One Owns Energy Commercialization

TABA is a missed opportunity for commercialization support. The Technical and Business Assistance program (TABA), while well intentioned, is not appropriately designed or used to support startups and technology commercialization. TABA was created to provide SBIR awardees with commercialization support that small firms typically lack, including business planning, market analysis, intellectual property strategy, and other non-technical needs. The SBA Policy Directive authorizes agencies to provide up to $6,500 per Phase I award and $50,000 per Phase II award for commercialization support within the TABA program. In concept, it is exactly the kind of mechanism that should connect the technical work DOE funds via SBIR to the commercial outcomes Congress intended when SBIR was enacted.

In practice, it is ill timed. A first-time applicant, already navigating a fourteen-item application package, is unlikely to know what kind of commercialization help it will need months later, much less which vendor to name in advance, and DOE does not provide any guidance to help. The companies most likely to benefit from TABA are the ones least equipped to request it when the system requires it. The SBA Policy Directive makes TABA permissive rather than mandatory, so there is no penalty for leaving the money unspent and no reporting requirement. No one at DOE is accountable for the result.

[11] National Academies of Sciences, Engineering, and Medicine, SBIR/STTR at the Department of Energy (National Academies Press, 2016), Appendix A. https://nap.nationalacademies.org/catalog/23406 See also National Academies (2020). DOD requires commercialization outcome reporting via the Company Commercialization Record; see https://www.sbir.gov/performance-benchmarks. For NIH's Commercialization Accelerator Program, see NIH Notice NOT-OD-19-129.

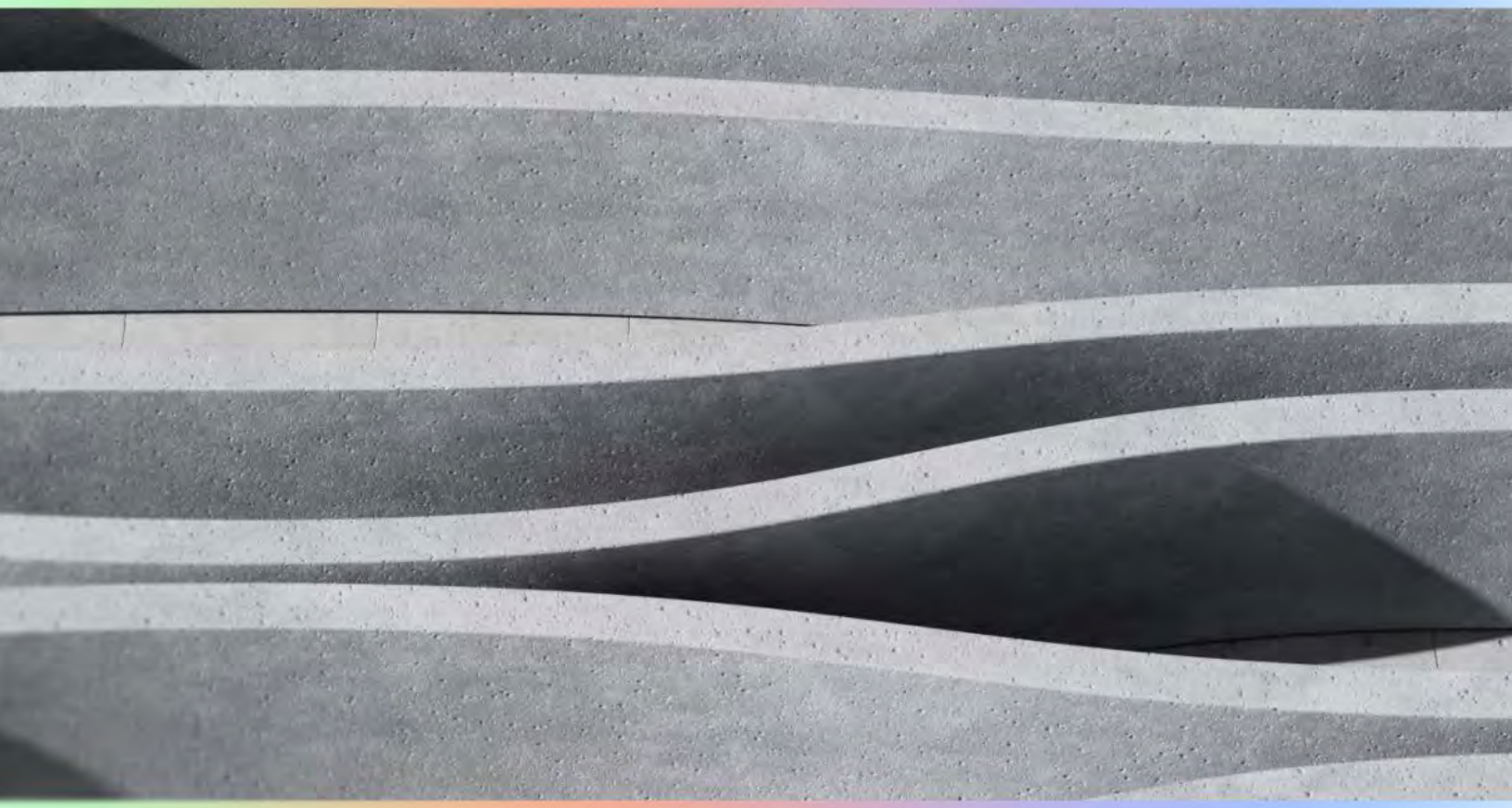
2.5.6 The Status Quo Persists

By the standards of those responsible for the program, SBIR is working. Funding is generated automatically every year, flows through solicitations, reaches legally defined small businesses, and is spent with relatively little fraud and within reasonable timeframes. The SBIR Programs Office director can demonstrate basic statutory compliance, and from an administrative and oversight perspective, the program is functional.

The problem is that success is not measured by whether the startups or companies SBIR funds actually reach the market.

A Blueprint for DOE SBIR Reform

A program that drifted, over four decades, from its statutory mandate requires a structural remedy.



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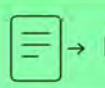
Section 3 addresses four areas:



→ DESIGN & RELEASE

The solicitation process needs a fundamental redesign of the management structure, topic areas, and the confusing four-release schedule. This includes leveraging newer DOE mechanisms – like FESI and the PIA – and building intentional connections across thirteen technology offices.

APPLY & SELECT

The application process needs to be rebuilt, including how opportunities are communicated, what materials are actually required, and how Phase I and Phase II transitions are structured.

AWARD AND MANAGE

SBIR needs to be managed as a portfolio, not administered as a compliance exercise. This requires new management structures, connections to internal technical expertise, and external validators that link funded work to commercial applicability.

CONNECT & MEASURE

A restructured TABA, an ecosystem partner network, and a new role for FESI can together connect awardees to the private sector. And metrics that are systematically connected and publicly reported need to be the foundation for accountability.

Administrative and Congressional Actions. Notably, most of what follows can be enacted by DOE without new authorizations. Where Congressional action is needed is within Section 4. Most changes require only DOE leadership decisions, a policy revision, and a reallocation of existing staff time. A smaller number of recommendations require a Secretarial memorandum or appropriations report language.

3.1 Design and Release

Structural reform begins with where the program sits organizationally, how topics are developed and approved, and what newer authorities like the PIA and FESI make possible for the success of the SBIR program.

3.1.1 New Management and Staffing Needs

OTC should manage DOE's SBIR program. An optimized DOE SBIR program needs an organizational home with the mandate, resources, and expertise to run it. The Office of Technology Commercialization (OTC) is the best choice. Its years of Technology Commercialization Fund (TCF) administration, national laboratory technology transfer coordination, and department-wide collaboration have built exactly the right connections SBIR reform requires.

As of publication, the transfer of SBIR from SC to OTC is underway. That move is necessary but not sufficient; OTC must receive the resources and mandate to execute the program at the level this paper describes, or the structural problems identified will follow the program.

If OTC receives the staffing, budget, and senior leadership support, it is the right institution to run a modernized SBIR. If OTC is not sufficiently staffed, they cannot execute the calendar, enforce deadlines, or build the commercial evaluation capability that reforms require to effectively accelerate the path to market.

Should DOE want to explore other options, there are two which could be possible:

- **A standalone SBIR office reporting to the Under Secretary for Science and Innovation.** Rather than embedding SBIR in an existing office, DOE could create a dedicated SBIR office within its own budget line and staff, and a direct reporting relationship to the Deputy Secretary. This avoids the resource competition that OTC faces (where SBIR competes for staff bandwidth with TCF, LEEP, vouchers, and FESI) and the cultural risk of overloading ARPA-E. A standalone office could be built specifically around the needs of the reformed program, but the cost and timeline for creation are challenging. The cost is that creating a new office in the federal government is slow, requires appropriations language or reorganization authority, and faces the bureaucratic resistance that accompanies any new organizational entity. It would also lack the existing relationships and infrastructure that OTC and ARPA-E already have, requiring a longer ramp-up period before the office could execute at the level the reforms demand.

- **ARPA-E.** If OTC fails to secure adequate resources or senior leadership support wanes, ARPA-E is the most likely fallback. ARPA-E has operational infrastructure that most of DOE lacks: it executes awards in 90 days under the same legal framework that takes the rest of DOE 12 to 18 months, it has experience with milestone-based program management, and its staff have the technical and commercial judgment to evaluate early-stage technologies. RPE (Research Partnerships and Engagement), ARPA-E's office responsible for external engagement and tech transfer, could absorb SBIR administration without building new infrastructure from scratch.

  The problem lies in how it is staffed and institutional design. ARPA-E is staffed by program directors and technical staff that are term employees (~4 years per appointment) hampering their ability to work across DOE and operate a complex program. In addition, ARPA-E operates independently by design: its program directors have wide discretion, its processes are deliberately streamlined, and its engagement with other DOE offices is largely optional. That independence is a feature. It is what allows ARPA-E to move at a pace the rest of DOE cannot match. For both these reasons, ARPA-E has the wrong organizational characteristics for running SBIR DOE-wide.

OTC needs additional resources to be effective stewards of SBIR. OTC is currently a 15-to-25-person office whose annual budget has declined from roughly $22M to $10M. The 3% SBIR administrative fund pilot authority provides approximately $9M annually; this is insufficient to effectively steward a $300M-plus program that is optimized to bring more energy technologies to market.[12] Additional resources are required.

[12] OTC budget figures reflect public appropriations data. The 3% SBIR administrative fund pilot, authorized under P.L. 112-81, §5141 (2011), provides approximately $9M annually. Authority renewed under P.L. 117-183 (2022) and included in S. 3971, passed March 2026, pending presidential signature.

Recommendation

OTC Should Form Four Functional Teams and Leverage PIA Support

1. **Operations** manage day-to-day program execution in close coordination with technical staff in the relevant technology offices. This team has visibility across the full SBIR portfolio, it serves to identify recurring issues and develop solutions to benefit future awardees.

2. **Commercialization** manages review and selection, coordinates with technology offices on topics and reviewers, facilitates Phase II gate decisions, and maintains cross-office portfolio visibility. This team needs experienced tech-to-market professionals – credible to founders and investors– with backgrounds in entrepreneurship, venture capital, or commercialization. It should not attempt to replicate subject matter expertise that exists in technology offices; its role is to ensure technical experts have what they need to conduct thorough reviews and make sound decisions.

3. **FESI Engagement** serves as OTC's primary interface with FESI, supporting the connection activities.

4. **Contracting** treats SBIR as its primary workload, operates with standard terms, and is structured for rapid execution; this is a deliberate departure from the Field Office model that has contributed to chronic award delays.

PIA Collaboration. OTC should also engage one of DOE's PIA partners to support SBIR review and administration. PIAs offer a faster, lower-cost alternative to lab-based administration and reduce dependence on overburdened Field Offices – a meaningful improvement on how the program is currently run.

3.1.2 Clear Authorities

The Optimal Authority Structure. A central tension in DOE's SBIR structure has been the division of authority between the Office of Science and the other thirteen technology offices. Technology offices possess the expertise essential for evaluating how or if a proposal addresses a technical need. But if those offices control the review timeline, the calendar is unenforceable because any office can delay the process as a whole. The question is not whether technology offices should participate in SBIR topic design and review (they must), but how much authority they hold over selection decisions and their timing, and how that authority shifts between Phase I and Phase II. This question sits on a spectrum with two clear endpoints. Neither extreme below is workable on its own. The right design involves a different balance for Phase I and Phase II, and several independent levers determine where on this spectrum each element of the lifecycle sits.

- **OTC Full Authority.** At one extreme, OTC holds full authority and controls solicitation development, review recruitment, evaluation, and selection. Technology offices provide topics and may submit written technical assessments but have no decision authority. This produces clean lines of authority and an enforceable calendar - but removes the most knowledgeable evaluators from substantive influence, risks funding proposals that miss technical needs and faces significant political resistance from offices accustomed to controlling their own reviews.

- **Technology Office Full Authority.** At the other extreme, each technology office runs its own review, recruits its own reviewers, applies its own criteria, and makes its own selections. OTC handles logistics and compliance. This preserves domain expertise in selection decisions but makes the calendar unenforceable, produces inconsistent review quality across offices, and prevents portfolio-level management across a shared pool of federal dollars.

Table 4: Options for Division of Authorities Between OTC and Technology Offices

Coordination Stage	All OTC	All Technology Offices	Optimal Authority Structure (Middle Ground)
Reviewer Recruitment and Assignment	PIA-managed reviewer database as the primary reviewer identification and assignment.	Each Technology Office recruits its own panel for each topic.	OTC and Technology Offices identify a mixed panel, with commercialization experts identified by OTC and technical experts by the Technology Offices. OTC ensures that every application receives at least one review from a commercial perspective and one from a technical perspective.
Scoring Criteria	OTC sets criteria for the SBIR program entirely.	Technology Offices establish their own bespoke criteria.	OTC sets uniform criteria across the program, but technology offices can customize weights within a common framework.
Selections	OTC has full discretion over selections without input from the Technology Offices.	Technology Offices have full discretion with limited input from OTC.	Inputs are received from Technology Offices, including ranking of priorities, with lists agreed mutually between the Technology Offices and OTC. For Phase II, where the stakes are higher and the evidence base is richer (because companies have completed Phase I work), OTC should play a heavier role in evaluation, with more structured discussion of disagreements between OTC and Technology Office assessments before selections are finalized.

Award Selections Authority

Authority around SBIR Phase I and II award selections is harder to resolve than simply scoring criteria or reviewer assignments. Technology office buy-in is essential for technologies to be adopted in subsequent portfolios, while OTC's involvement is necessary for commercialization outcomes to move at the pace needed to achieve economic competitiveness and decarbonization goals. Neither office should hold unilateral authority.

- **Award generation and reconciliation.** Both technology offices and OTC should independently generate lists of applications they consider fundable, then reconcile differences at the appropriations account office level (e.g., CMEI, HGEO, NE, etc.). Technology offices should evaluate technical merit and mission relevance; OTC should evaluate commercial potential and portfolio balance. Where the lists overlap, selection is straightforward. Where they diverge, the account-level authority resolves the disagreement informed by both perspectives. This is where Section 309 pooling (aggregating SBIR funds at the appropriations account-level) becomes operational: the account-level authority has visibility across all offices within that account and can make tradeoffs that no individual office can see. At Phase II, where the stakes are higher and the evidence base richer (because companies have completed Phase I work), OTC should play a more intense evaluative role. There should also be structured discussion of disagreements between OTC and technology office assessments before selections are finalized.
- **OTC's ability to select across the pool of applications.** At the OTC-authority end of the spectrum, the selection official should have the authority to fund any application from any topic area, including strong proposals that a technology office may have ranked lower. This allows the office with a birds eye view of DOE to ensure that technologies that may fall between technology offices (e.g., batteries) have an advocate for funding when they benefit DOE's goals. At the SBIR program-office end, OTC ratifies selections that offices have already made. The recommended middle ground gives OTC cross-pool selection authority for an open-topic track. OTC continues to defer to technology office rankings for narrow-topic applications tied to specific technology office mission needs.

Deadline enforcement. Every SBIR stage should have a firm deadline regardless of where the design lands on the spectrum of authority. Technology offices that miss deadlines will forfeit their influence on selections that cycle. An office that fails to submit SBIR Phase I and II selections will show up in the data reported to DOE leadership, which is a powerful motivator before timeline compliance. OTC could enact this on its own, but a memo from the Secretary or the Deputy Secretary establishing this firm-deadline structure as binding would give this recommendation the strongest foundation.

Recommendation

DOE Should Take the Middle Ground Approach

OTC should work synergistically with the technology offices so the that be best of each of their expertise is brought to bear across all coordination stages.

The specific configuration of these levers is addressed in Section 4.

3.1.3 Open the Door for Game Changing Technologies

DOE's current SBIR program, with its focus on narrow topics, can overly filterfor federal grants expertise (working around the wonky system) rather than commercial innovation potential (i.e., having groundbreaking energy technology than can meet an energy sector need or national priority). Some technology offices, such as the former Water Power Technologies Office and the former Solar Energy Technologies Office, have avoided this issue by running targeted outreach.

The SBIR statute pulls in two directions on topic design. The commercialization mandate argues for casting a wide net and attracting companies the current program misses. The mission-needs mandate argues for letting technology offices target funding toward specific research challenges. Open topics serve the first; narrow topics serve the second (with tradeoffs as described in Section 2), and the design choice determines who applies to the program. This shapes every downstream decision about review, selection, and outcomes. Open topics are run at the appropriations office level and should be open to any ideas that meet the overall scope and mission of that office.

The evidence that topic openness changes who applies to SBIR is well known across the federal government. AFWERX, which houses the Air Force's open-topic SBIR program, found that 43% of open-topic awardees had no prior federal contracts, compared to 14% for conventional topic awardees. Open topics attracted three times as many first-time participants without sacrificing quality. [13]

There are various approaches DOE could take for SBIR topic design:

- **Fully open topics across all 13 DOE Technology Office accounts.** Companies propose technology solutions and DOE evaluates them on their merit regardless of which office's budget funds the award. This maximizes new-entrant access and innovation capture, but at a steep institutional cost. Applicants submit to a single open topic, with DOE performing the review and selection process at the Section 309 authority level. **The tradeoff**: Technology offices lose the ability to direct SBIR funding toward specific research gaps, application volume rises significantly, and offices like the Office of Science, where SBIR has historically functioned as targeted research procurement, may find the new model unacceptable.

- Open topics restricted to new applicants only. Each appropriations account office runs broad technology-area solicitations, but only firms without prior SBIR or federal contract awards may apply. This limits application volume while opening the aperture as wide as possible, restricting participation by history rather than subject matter. **The tradeoff:** Technology offices lose the ability to signal strategic research directions, specific mission challenges go unaddressed (which is a valid statutory purpose), and experienced firms with genuine commercial momentum are excluded from funding they may need.

[13] GAO, Small Business Research Programs: Air Force Had Success in Some Areas with New Awards Process, GAO-22-105223 (July 2022). https://www.gao.gov/products/gao-22-105223

- **Targeted topics only, with broader problem statements**. Every topic is written by a technology office but framed as meeting an energy sector need or research challenge rather than a procurement specification. For example, instead of "develop a 5-kW solid oxide fuel cell stack with a degradation rate below 0.5% per 1,000 hours," the topic would read "develop scalable approaches to improve solid oxide fuel cell durability for grid applications."

The tradeoff: This preserves office control while broadening who can respond. This tends to deliver the worst of both approaches: not open enough to capture disruptive solutions from outside the federal ecosystem, and not specific enough to give offices precise control over what they are funding. Finding and interpreting even broadly written federal solicitations still favors the experienced applicant with the resources to work around the bureaucratic system, so the new entrant effect is modest.

Recommendation

A mixed model with open topics and office-defined narrow topics running simultaneously

The recommended model would blend open and targeted topics under two tracks within a single release. This will give OTC cross-portfolio visibility across all of SBIR, while preserving technology office influence over mission-driven funding. A new applicant scoring boost would define broad technology areas where any company can propose a solution. This includes:

- **Track 1 - 20% Floor for Open Topics at the Section 309 Authority Level:** A 20% floor of each participating account's SBIR budget is allocated to open topics, treated as an appropriations account-level commitment under Section 309 pooling authority across CMEI, Electricity, HGEO, Cybersecurity Energy Security and Emergency Response (CESER), and SC. With a range of pooled budget sizes, a 20% floor is enough to do meaningful open topic efforts in both Phase I and II.
    - **Applications Not of Interest.** Rather than publishing areas of interest, which creates process friction, DOE publishes "areas NOT of interest" for open topics.
    - **Section 309 does not cover Nuclear Energy.** Therefore, this requires future appropriations language to ensure nuclear is incorporated.
    - **Binding this 20% Floor for Open Topics** requires appropriations or authorization language. An advisory floor can be established administratively.

- **Track 2 – Pursue Targeted Opportunities Driven by R&D Topics:** Technology Offices define topics that specify particular challenges where small business innovation could advance their mission. These vary in specificity depending on the nature of the need. An office might frame a narrow topic as a research challenge such as, "develop scalable approaches to improve solid oxide fuel cell durability for grid applications," or where a well-defined problem with a clear internal customer exists, something more specific. These do not need to be separated into sub-tracks.

- **One SBIR Release:** Both tracks should be released simultaneously and should be evaluated in the same decision window, so the selection official has visibility across the full SBIR portfolio. Technology offices can weigh the two tracks differently based on mission needs. The structure also maps cleanly to the statute: the open track serves the commercialization and innovation mandate, while the targeted track serves the mandate to use small businesses for federal R&D needs. The tradeoff is a more complex solicitation design and a guaranteed open-topic allocation they do not fully control.

The recommended mixed model pairs the open approach with the narrow approach and allocates the SBIR budget between them. If DOE wants to begin cautiously, modernizing the SBIR program could start with the mixed model at a lower open-topic floor (<20%) and increase it over time based on application quality and new-entrant data.

3.1.4 Lock the Calendar

Once the front door is open to increase access to SBIR funding, **the next question is when and how money flows to awardees.** Under current practice, SBIR topic development, solicitation release, review, and selection decisions are spread across the fiscal year in a sequence that maximizes uncertainty for applicants (i.e., startups that cannot afford to have uncertainty) and program managers alike.

Solicitations are often delayed due to the Congressional budget process leading to unpredictability. Selection decisions can land as late as July, a point when discretionary budgets (extra funds offices could be used to support SBIR) are mostly committed to other activities, and the gap between Phase I and Phase II forces startups to seek bridge financing from the private sector. Having a predictable calendar allows applicants, awardees, and DOE staff to better schedule their time and resources.

DOE has historically violated SBA's 90-day review timeline by taking five to six months from submission to selection. The proliferation of technology office-run incubators and challenge competitions is in large part a response to SBIR being too slow to be useful or have an impact on energy technology commercialization, despite the potential to speed the path to market for all technologies in which the federal government invests.

Key timeline questions must be resolved. Specifically: when solicitations are released, how budget uncertainty is managed, and how Phase I and Phase II reviews are sequenced.

3.1.4.1 Solicitation Release

The strategic question is not just "when" solicitations should be released, but "when relative to the appropriations cycle and the staff workload cycle." Congress has been delayed in enacting annual appropriations for years. When a full-year budget passes - typically between January and March – technology offices have maximum discretion over allocating funds above their planning minimums. SBIR decisions that land at that moment give managers a ready answer for budget meetings: a strong application pool is a credible case for funding more awards.

Recommendation

One Release at the Very End of the Fiscal Year (FY)

Fall Release, Spring Decisions:

A solicitation is released in September, at the end of each FY, with applications due in early January, producing selection decisions by March and awards by April.

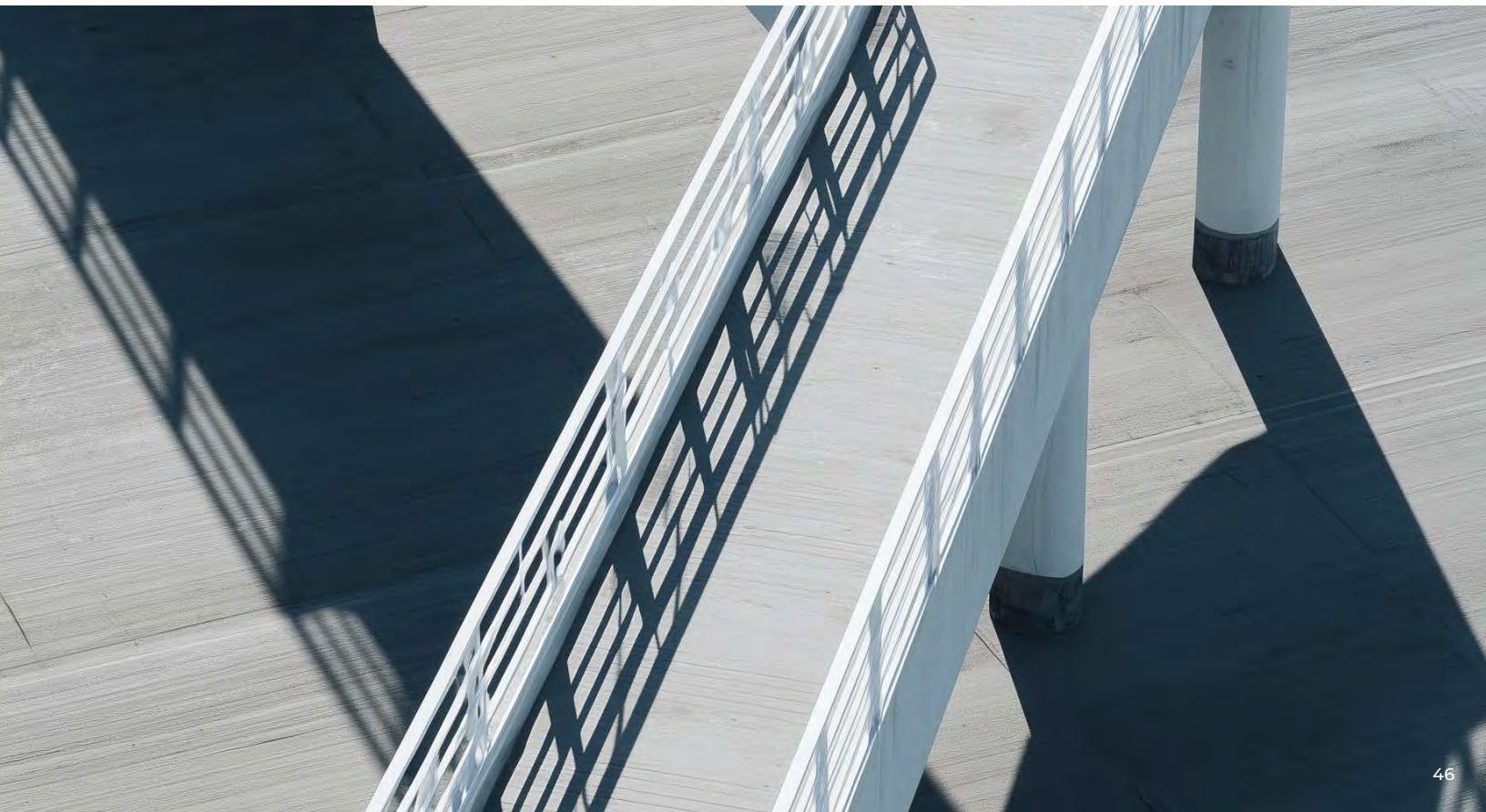
Recommended Timeline:

- A **September opening** gives applicants a full fall window for outreach, SAM registration, and preparation. In a Phase I prize model (more in the Apply and Select section), this serves as the active competition period.
- Applications arrive at DOE in **early January** when staff are freshest and least distracted by holiday schedules. Reviewer recruitment can happen in the fall before annual funding announcements consume technology office attention.
- Reviews are complete **within three weeks of assignment**; technology offices and appropriations account office leadership develop priority rankings within one additional week; OTC finalizes selections by **late February or March.**

- The **30-day selection-to-award target** puts money in companies' hands by April, when full-year appropriations have typically passed and offices are making above-minimum operating budget allocation decisions. A manager looking at a strong SBIR cohort has a ready answer for where to direct discretionary funds.
- A **mid-year check-in in October** for existing Phase I awardees at their six-month mark distributes administrative burden across the year and creates a faster path for standout performers without requiring a second full solicitation.

DOE could consider two other options:

- **A spring release, with fall decisions.** This avoids fall workload compression but lands decision making late in the fiscal year when budgets are already committed, eliminating the opportunity for offices to fund additional awards. Staff are also reviewing SBIR applications while executing their main funding actions for the year.
- **Two full cycles per year.** This doubles application opportunities and provides more frequent decision points, but also doubles the administrative burden, fragments reviewer attention, and makes portfolio-level visibility harder to achieve since selections happen in two separate windows.



3.1.4.2 Increasing Budget Certainty

Every reform made to the SBIR timeline is undermined if technology or appropriations account offices do not know how much of their budgets they have available when making SBIR selections. Budget uncertainty as a result of delays in Congress' annual Energy and Water Development appropriations bill has historically delayed many steps of the SBIR process.

Recommendation

Release SBIR late in the same FY as funds were appropriated

Releasing the solicitation in September means spending funds appropriated for the FY that began the previous FY (October 1).

- By **September**, the appropriation for SBIR is known, enacted, and allocated. Offices know exactly how much SBIR budget they have. The solicitation can include a standard disclaimer reserving DOE the right to fund additional qualified proposals if budget conditions permit, creating a flexible upper bound while establishing a clear minimum commitment.
- This eliminates the budget uncertainty that plagues current practice – no funding ranges, projections, or mid-cycle revisions. The money being spent is already appropriated.
- There is precedent for running a program this way. For example, SETO arrived at the same approach with the American-Made Solar Prize: by timing the prize to run on enacted prior FY funds, SETO could release competitions against a known budget rather than projected appropriations, with the final demo day landing at a major industry event as planned.

3.2 Apply and Select

The SBIR application and selection process needs a complete overhaul. A simpler application and open topics will increase application volume, making review infrastructure a first-order design question.

3.2.1 Simplify the Application

How much information does DOE need from an applicant to make a high-quality selection?

The right approach to reforming the application itself is to look at the founding statute rather than audit the current SBIR application. Auditing means every existing component has a built-in defender. Starting from scratch is the best approach.

The **statute** requires:

- A technical narrative,
- evidence of scientific merit and commercial potential,
- a budget,
- key personnel,
- a small business certification, and
- a statement that most of the work will be performed by the awardee.

Recommendation

Build a Streamlined Phase I Application

A streamlined Phase I application that satisfies the statute would be approximately 3-5 pages. That application for a $200,000 award contains sufficient information for a reviewer to evaluate scientific merit, commercial potential, and team competence, and it could be submitted in days rather than months. (The Phase II application, submitted by prior-year Phase I awardees, is a separate document discussed in Section 4.5.)

3.2.1.1 Outreach Improvement

Evidence from every agency across the federal government (e.g., NASA and NSF) that has broadened SBIR participation shows a simpler application is necessary but not sufficient. External outreach by DOE to startups and small businesses is also needed to strengthen applications. Companies that have never interacted with the federal system need to learn the program exists, understand it has changed, and get enough support to submit a competitive application.

At present, most of the outreach is conducted by the technology offices. This includes models like the former Water Power and Solar Energy offices relying on the American Made Challenge platform to support advertisement of options.

Recommendation

A coordinated PIA-plus-FESI model

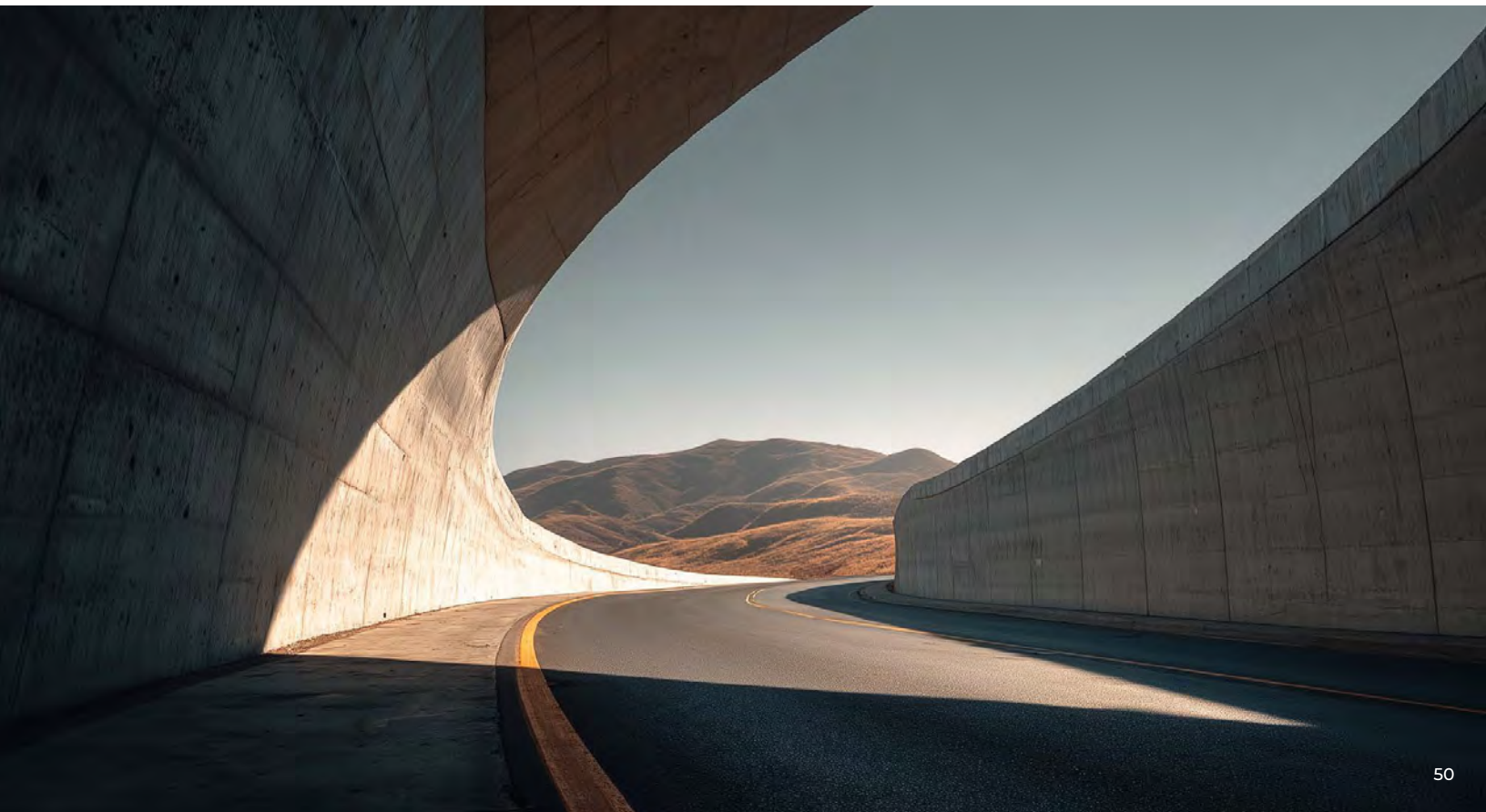
- **The PIA** launches large-scale outreach before each solicitation: awareness campaigns, webinars, digital application guides, and SAM registration drives designed to reach companies that have never heard of SBIR.
- **FESI**, while in its infancy, has the potential to work the other side, conducting intentional and targeted outreach year-round through its connections with incubators, accelerators, national laboratory entrepreneurship programs, university technology transfer offices, and regional economic development organizations. Neither organization filters companies nor decides who should apply.
- The **PIA's outreach is broad; FESI's outreach** is through trusted relationships in ecosystems where innovative companies already exist.
- Funding pre-application work is a real question. TABA's authority is broad but currently extends only to awardees.
- **A legislative fix could extend TABA to pre-application activities.**
  But this is not a prerequisite: a program that issues awards in 30 days from selection, accepts five-page applications, and runs open topics will attract companies the current program repels.

Alternative options include:

- **OTC-led outreach with contracted support for the near-term.** OTC hires staff directly or contracts with incubators, accelerators, and technology transfer offices to conduct outreach. This is faster to stand up and is not dependent on FESI's institutional development but is constrained by OTC's budget and bandwidth. This is a reasonable interim model as FESI builds capacity.
- **FESI-led outreach at scale for the long-ter**m. FESI takes primary responsibility for outreach through its partner network, creating continuity between outreach, application support, and post-award mentoring. The critical constraint is capacity: FESI currently lacks the staffing, budget, and formalized connections for sustained national outreach at the scale a reformed requires deliberate investment in FESI staff and resources to reach operational readiness.

3.2.1.2 The perpetual grantee problem

A small number of firms capture a disproportionate share of SBIR awards without generating meaningful commercial outcomes. SSTI found that 0.7% of recipients captured more than 21% of all awards over 2009 to 2019.[14] The solution must distinguish between firms that accumulate awards without commercializing and firms that receive multiple awards because they are genuinely productive. It should create a natural rotation that prevents serial capture of the open-topic track without penalizing firms that technology offices actively want to fund through narrow topics.



Recommendation

Institute structural limits on open-topic eligibility and Phase II commercial metrics as go/no-go

- **Limit Open Topic Eligibility:** For open topics, where the purpose is to attract new entrants and broaden the applicant pool, a company that wins an open-topic Phase I award should not win another open-topic Phase I award in the following cycle.
- **Do Not Limit Narrow Topic Eligibility:** A firm that can, regardless of award history, remains eligible for narrow topics where a technology office has identified a specific need that the firm is uniquely positioned to address.
- **Enhance Phase II Milestones tied to Metrics:** Phase II go/no-go milestones include commercial metrics calibrated to Phase II maturity: a letter of support from a potential customer confirming fit with their needs, a secured partner to test the product, a third-party review confirming cost targets and assumptions are reasonable, or a letter of commitment from a prospective buyer. A firm that cannot demonstrate customer engagement should not advance.

Alternative options for DOE include:

- **Performance based eligibility caps.** The INNOVATE Act proposes performance-based eligibility standards. Hard limits on lifetime SBIR receipts directly reduces award concentration and are politically straightforward. The cost is the bluntness of the approach: prior SBIR awardees with strong commercial momentum would be excluded alongside ones without direct results.[15] In specialized fields like quantum computing or advanced nuclear materials, where the federal government is the only early customer, repeat awards to technically excellent firms may be entirely appropriate.
- **Rely on reviewer judgment.** Trust the review process to evaluate each application on its merits, regardless of award history. This avoids the complexity of designing eligibility mechanisms. The problem is that the current approach is not working. Reviewers assess technical merit but do not systematically check whether past awards have led to commercial outcomes.

[14] State Science and Technology Institute (SSTI), SSTI Analysis Reveals SBIR Mills Take Outsized Portion of the Program's Awards (September 2020). https://ssti.org/blog/ssti-analysis-reveals-sbir-mills-take-outsized-portion-programs-awards

[15} S. 853 / H.R. 4777, INNOVATE Act, 119th Congress. https://www.congress.gov/bill/119th-congress/senate-bill/853

3.2.2 AI-Assisted Review

Structural constraints artificially limit SBIR applications. DOE SBIR currently receives 1,500 Phase I proposals per year.[16] That number is not a measure of true demand or what DOE would receive if all topics were open, DOE did greater outreach, and the barrier to submitting an application were lower.

The current review infrastructure is justified by over-filtering and therefore over-limiting due to capacity. DOE has an opportunity to leverage automated tools to reduce the burden of compliance reviews to achieve greater outcomes.

Recommendation

A phased approach: compliance only in Year 1, parallel operation in Year 2, expanded role in Year 3 and beyond

- In Year 1, AI handles only administrative compliance checking: valid registrations, required components, eligibility, debarment status, and budget audits. During this stage experimental AI scores could be recorded (time and resources permitting) to see how close they align with actual decisions made by human reviewers.
- In Year 2, AI screening runs alongside human review in parallel, with AI results shown to reviewers only after they complete their independent assessments.
- In Year 3 and beyond, if parallel operation demonstrates reliable correspondence, AI takes a larger role in administrative triage: flagging alignment with DOE's portfolio and identifying duplicative submissions before review begins, then generating structured comparison briefs that reviewers see only after completing their independent assessments.

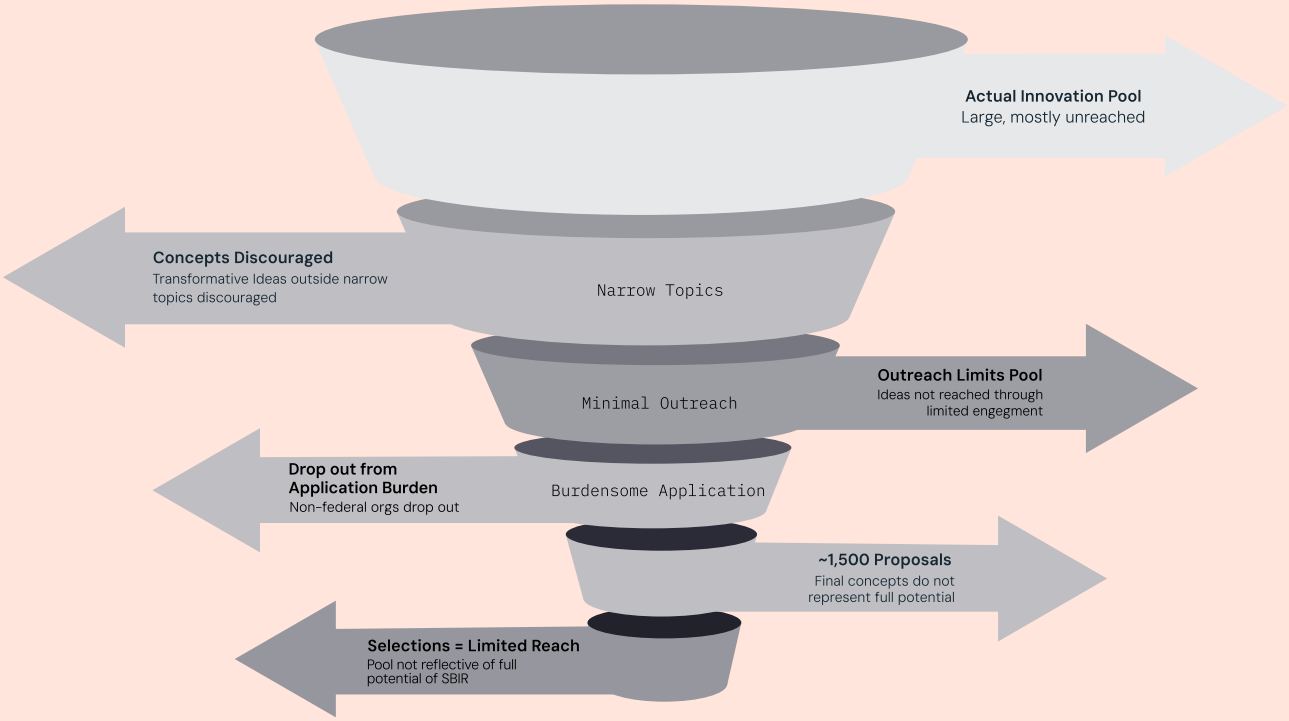
The critical principle is that the program works with humans alone. AI is an efficiency gain, not a prerequisite. No one should wait for AI before implementing the rest of the reforms.

DOE could also choose not to use AI if preferred.

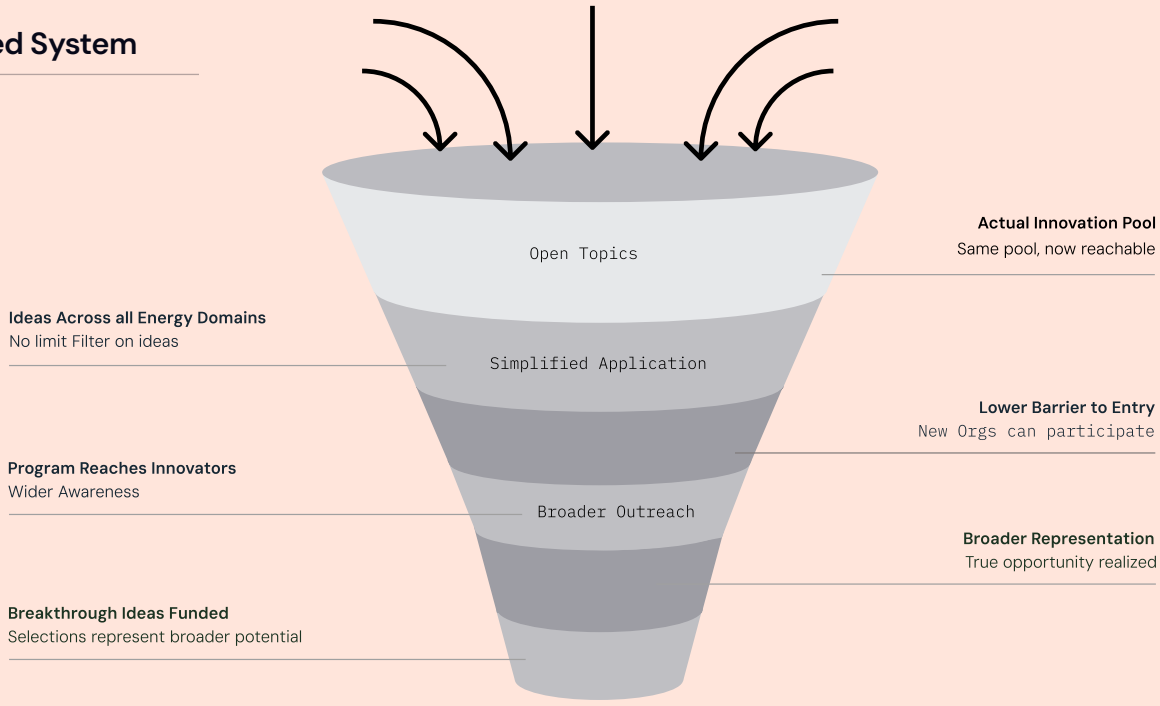
- **No AI Role.** The alternative to building AI-assisted review is relying entirely on human effort within a constrained and reduced federal workforce. That is the most defensible approach but comes at the cost of handling increased application volume entirely through additional human reviewers and staff time, which is more expensive and slower.
- If human review capacity cannot scale to match the volume open topics produce, the practical result is pressure to narrow topics back down, eliminating the single largest reform opportunity available to the program.

[16] DOE, SBIR/STTR FY2025 Phase I Release 2, DE-FOA-0003504 (December 2024). https://science.osti.gov/grants/FOAs/FOAs/2025/DE-FOA-0003504 DOE receives approximately 1,500 Phase I proposals per release cycle. See also National Academies (2020), Chapter 3.

Current System



Reformed System



DOE SBIR currently receives roughly 1,500 Phase I proposals per year. That number is not a measure of true demand, but an artifact of narrow topics, burdensome applications, and minimal outreach. The current eview infrastructure is justified by over-filtering and therefore over-limiting due to capacity.

The result is a system that limits the breakthrough ideas absence of applications from companies outside the federal ecosystem evidence that companies do not exist rather than evidence that the program is not reaching a larger pool of innovative energy solutions. Open topics and a simplified application will reveal the actual applicant pool

3.3 Award and Manage

The solicitation is not the end point for the work. The mechanisms used to make awards, the structure of Phase I and Phase II, and the connections built between awardees and the broader ecosystem are all critical to a company's ability to reach the market in a timely fashion.

3.3.1 Streamline Phase I

As a reminder, SBIR Phase I is a $200,000 feasibility study. It does not need the administrative machinery of a $2 million development award. The purpose of Phase I is to let companies explore a promising technical idea quickly and cheaply. DOE's involvement should therefore be minimal potentially as little as three touch points: an introductory call, a midpoint check-in, and a pre-gate conversation on Phase II readiness. Regular milestone reviews and structured mentoring at this stage consume bandwidth without producing commensurate value.

To give awardees maximum ability to operate, DOE should focus on using funding mechanisms that delivery funding up front. There are two funding instruments to accomplish this: fixed price grants and prizes. One of these options should be used.

Of these two, prizes do offer some distinct advantages.

The competition period itself serves as a lightweight merit review. Companies submit deliverables at defined intervals, and the evaluation of actual work performed replaces the traditional proposal review.

The structural advantages are significant. Because no federal funds are disbursed until the competition concludes and Phase I winners are selected in March, prizes require limited to no Research, Technology, and Economic Security (RTES) or National Environmental Policy Act (NEPA) clearance.

Prizes are more straightforward. A company with a novel idea that wins a prize gets a check and funds become non-federal with no strings attached. The cost is real but bounded - companies must fund their own exploratory work before receiving government support, and DOE cannot object if the awardee abandons further work on their winning solution (which has not occurred over 100 prize competitions). In practice, most companies pursuing a technology idea are already investing their own resources in early-stage development. The exception is pure paper studies, precisely the proposals least likely to demonstrate commercial momentum.

The principal legal constraint to these recommendations above is that the SBIR statute directs agencies to administer the program through funding agreements, which SBA interprets as grants, cooperative agreements, or contracts. A prize is none of these. Two paths resolve this.

The first is a legal interpretation: if Phase I operates as a prize competition as opposed to a funding agreement, it functions as the competitive merit-based review process the statute requires before Phase II funding agreements are issued. The prize does not replace the SBIR award; it establishes the basis for one in Phase II. Congress mandated a competitive process to identify promising small businesses, not a specific instrument for the initial screening stage.

The second is legislative: Congress could expressly authorize prizes as a Phase I instrument, updating the statute to reflect a funding approach that did not exist when the original law was written but that better serves its intent. Neither path is risk-free, but neither requires DOE to wait. The prize model is available today under American COMPETES Act authority, and the question of whether it satisfies the SBIR statute's requirements is one DOE's General Counsel can evaluate now.

Recommendation

Prizes for Phase I awardees

DOE should move its Phase I to a prize model, or mimic all of the beneficial attributes of prizes. This prize would serve as the catalyst for the feasibility study and have a phased model that moves from prizes into negotiated cooperative agreements for Phase II. This may require notification with Congress to ensure compliance with existing authorities. DOE could elect to phase this prize with a total amount of $200k as well, should there be a need for more risk reduction.

However, if using prizes is not practical, DOE should use fixed-price grants.

There are other options for Phase I that are not recommended:

- **A fixed price grant.** Fixed Price Grants (or Fixed Amount Awards) are authorized under 2 CFR 200.201(b). The recipient gets a set dollar amount upon achieving defined milestones with no cost documentation required. The federal government does not audit actual expenditures; the company just has to demonstrate the work was accomplished.

  There is significantly reduced administrative burden, and this approach is well-suited to startups and small companies without robust cost accounting systems. The tradeoff is that the awardee bears cost risk, so the fixed amount needs to be upfront and set realistically. Uniform milestones across the SBIR portfolio are essential for this model to work consistently.

A drawdown grant with expenditure reporting.
For a $200,000 feasibility study, this instrument imposes accounting overhead that is fundamentally disproportionate to the award size and falls hardest on companies without federal grants experience. Process-wise, DOE awards the grant and loads funds into the Treasury's ASAP system, and the company draws down as it incurs costs. The company then reconciles actual expenses against the approved budget each quarter, maintains an audit trail for every drawdown, and files periodic financial reports.
This process is more flexible than classic cost-reimbursement (the company does not wait for DOE to process invoices before accessing funds), but it still requires detailed budget justification at proposal, quarterly financial reconciliation, and the accounting infrastructure to track expenditures at the level federal auditors expect. This turns, turning a $200,000 early-stage exploration into an exercise in compliance and reporting rather than innovation.

Project Intermediary Agreement Structure.
OTC could opt to use a PIA Agreement to help with award management and execution. This would allow OTC to tap more capacity by contracting with an intermediary to manage the projects and function as an interface between the projects and DOE staff. However, this would put a party between DOE staff and awardees limiting awareness into projects progress, personal engagement to hear from teams, and leads to a more hands-off approach for DOE. Given current staffing constraints, a PIA can be attractive, but it would impede the ability of DOE staff to connect awardees to other DOE funding programs.

A prize-based Phase I would work as follows:

- DOE announces the competition in September.
- All companies applying to Phase I perform technical work during the September-to-January competition period using their own resources.
- Winners are announced in March alongside Phase II selections from the prior year's Phase I prize cohort.
- Each Phase I winner receives $200,000 with no expenditure reporting, cost-reimbursement accounting, or federal acquisition regulation (FAR) overhead.

DOE has direct experience with prizes of this design through the 100-plus prizes it has run through American-Made Challenges and other national-laboratory-administered competitions.[17]

[17] DOE American-Made Challenges program (est. 2018). Over 80 prize competitions across energy sectors. https://americanmadeprogram.org See also Challenge.gov case study (October 2024).

3.3.1.2 Preparing for Phase II

Two substantive activities must run concurrently with a company's Phase I work to ensure the program's speed for the awarding of Phase II (details on the full Phase II gate review are discussed in Section 3.3.2.2).

Recommendation

Run Concurrent Processes to Smooth Phase II Transition

First, the technology office negotiates a potential Phase II statement of work with each Phase I, including the commercial milestones. This is what allows Phase II cooperative agreements to be executed quickly when a company has sufficiently completed Phase I, per the technology office.

Second, RTES screening and NEPA review begin during the Phase I period and run concurrently with the company's technical work. This allows clearance to be substantially complete by the time a Phase II decision is made. These are not support activities; they are required reviews that can slow the transition to Phase II if not done ahead of time.

Structuring Phase I in this way allows DOE to concentrate its limited support bandwidth on Phase II companies, where the stakes are higher, the development challenges harder, and the path to commercialization requires real partnership.

3.3.2 Reorient Phase II

Phase II awards of $1 million fund development work that requires active collaboration between the company and DOE program staff. Instrument design determines how much structure that collaboration imposes on the work.

Recommendation

Cooperative agreements with negotiated milestones for Phase II

The core mechanism that makes commercialization outcomes possible is conditioning Phase II funding on demonstrated progress toward those outcomes. Milestones include both technical deliverables and commercial metrics: customer engagement, partner commitments, and third-party validation of cost and market assumptions.

OTC leads the negotiation (in collaboration with relevant technology offices) of Phase II milestones during the Phase I period. When a company clears the gate, the cooperative agreement can be executed quickly rather than initiating a months-long negotiation from scratch. This serves the dual purpose of a measurable output and signal of good project management over the Phase I award period.

The cooperative agreement gives DOE substantive involvement in the work (distinguishing it from a grant, where the government provides funding but not direction), and creates a structural mechanism for conditioning continued funding on demonstrated progress.

As with Phase I, there are other options available to DOE that are not recommended:

- **A firm fixed-price grant for Phase II.** This maximizes company autonomy and minimizes DOE administrative burden. However, it removes DOE's ability to actively shape the work or enforce commercial milestones during the award period, unless this were used in a milestone-based payment format, which has been proven by DOE previously. For a $1 million award with a commercialization mandate, this level of disengagement is difficult to justify.
- **A drawdown grant with technical objectives (current practice).** The program's persistent difficulty producing commercial outcomes is at least partly a consequence of an instrument that monitors expenditures rather than milestones. Under the current drawdown grant structure, DOE sets objectives at proposal submission rather than negotiating them based on Phase I results, giving DOE limited leverage to condition continued funding on commercial progress. The quarterly reconciliation process is administratively familiar but imposes accounting overhead that falls hardest on small companies without dedicated grants staff — and tells DOE how money was spent, not whether the company is getting closer to market.
- **Project Intermediary Agreement Structure.** Similar to Phase I, OTC could opt to use a PIA Agreement to help with award management and execution. The challenges noted in Section 3.3.1 would persist as DOE would have less direct contact with awards. Engagement with awardees in Phase II is critical for DOE staff to understand awardees' needs for further development and help direct them to other funding options.

3.3.2.1 Updating TABA for Phase II

As discussed in Section 2.5.5, TABA can have more impact if it is not incumbent upon applicants to identify the commercialization support they need at the time of application to Phase II.

Recommendation

Amend TABA for Phase II

TABA can serve as a critical resource for companies as they are navigating through the implementation of Phase II. At present, TABA is limited to either companies proposing a vendor or defaulting to the approved vendor. This limits companies' abilities to find the right type of TABA partner and increase the likelihood of their commercial success. The following are recommended approaches to improving TABA:

- TABA redesigned as $50,000 voucher facilitated by FESI and administered by PIA, for commercialization services.
- A list of TABA providers should be maintained jointly with FESI and the PIA.
- Phase II awardees should be able to access TABA support at any time during the phase instead of having to apply with the TABA support already identified.
- Connecting TABA providers with other OTC programs, like the Energy Program for Innovation Clusters, will help increase connection between TABA and DOE investments.

3.3.2.2 Phase I and Phase II Review Timeline

Under the current system, Phase I and Phase II run on separate timelines with separate application and review processes. The gap between completing Phase I and receiving Phase II funding can stretch to months, forcing startups to seek bridge financing.

The design question is whether these two decisions should remain separate processes or be integrated into a single portfolio decision.

Recommendation

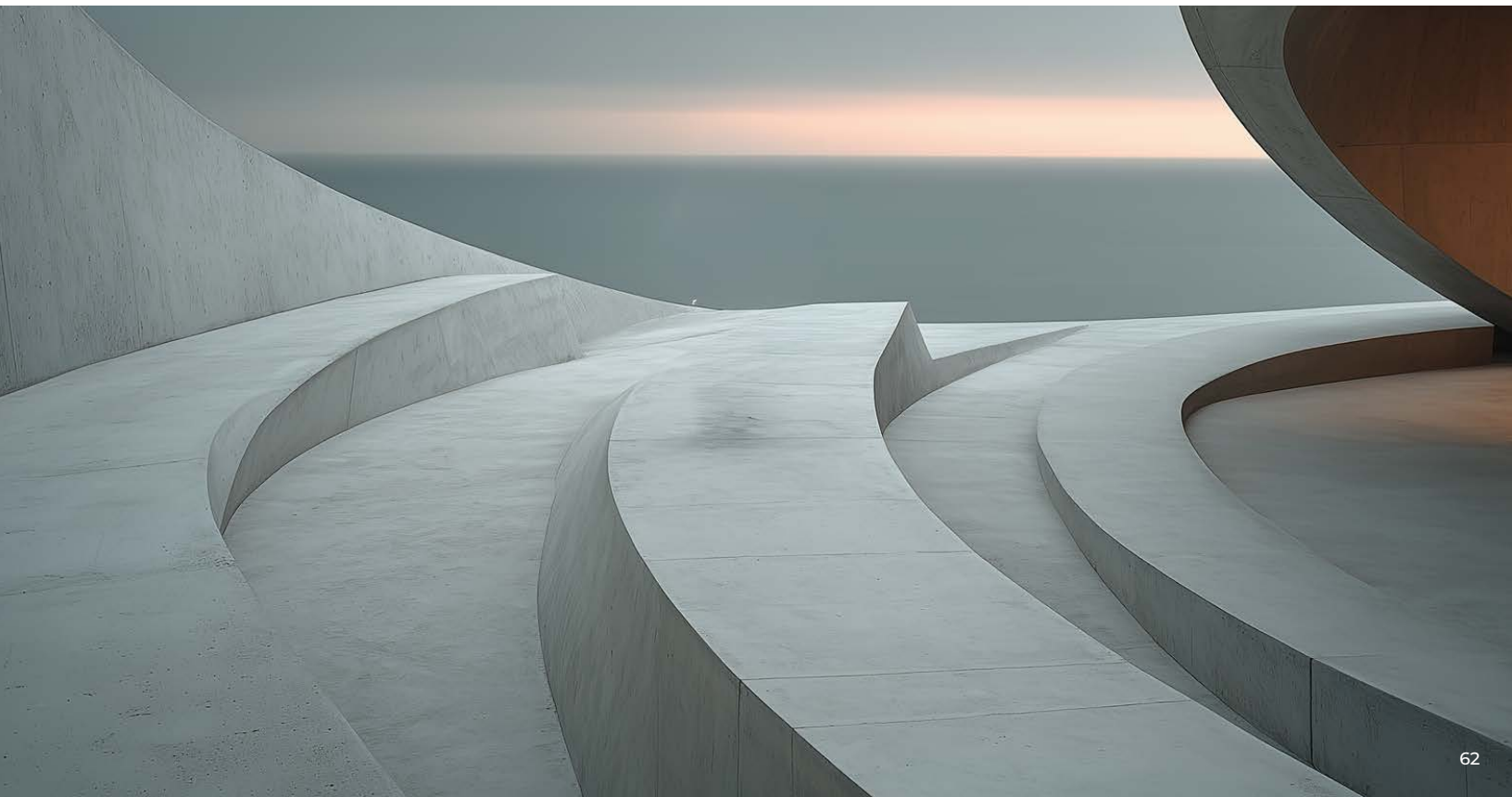
Simultaneous evaluation of new Phase I applicants and prior-year Phase I awardees seeking Phase II, within the same annual cycle

Using the principles outlined in locking in the calendar, the cycle would be tied to the January apply period.

- **Each January,** DOE receives two pools of applications: new Phase I proposals from the current solicitation and Phase II proposals from companies that received Phase I awards in the prior cycle.
- **Both pools** are reviewed in the same window and selections are made together, giving the selection official visibility across the full portfolio and the ability to balance investment between early-stage exploration and later-stage development.
    - If an outstanding class of Phase II candidates emerges, the selection official can allocate a larger share of budget to Phase II.
    - If the Phase II cohort is weak, budget shifts toward Phase I, allowing DOE to select a larger number of promising early-stage companies and replenish the pipeline.
    - The cost is an increased complexity and workload due to more reviews and decisions. There is efficiency gained in doing it all together.

Alternatives that DOE could consider:

- **Combined Phase I/Phase II awards.** DOE selects companies once and commits the full $1.2 to $2.3 million at selection, eliminating the valley of death entirely. Administration is simpler: one selection process, one award action, one set of milestones. For the company, this provides maximum certainty and continuity of effort. This convenience eliminates the screening function that Phase I is supposed to provide.
- Rather than funding a broad cohort cheaply to identify the most promising fraction, combined awards commit full funding upfront to a smaller number of companies selected before any work is performed. The program loses its ability to take cheap bets across a wide range of approaches — the entire rationale for a two-phase structure — and forfeits the portfolio flexibility from making Phase I and Phase II decisions in the same window. This approach has gained favor at DOE for its simplicity but constrains early-stage risk-taking and limits overall portfolio impact.
- **Sequential phases with a compressed Phase II timeline.** Phase I and Phase II remain separate, but the Phase II application is simplified and the review timeline compressed. This preserves the two-phase screening function and is least disruptive to current practice, but the funding gap persists. The selection official cannot make tradeoffs between phases or balance the portfolio across both decisions simultaneously.



3.3.2.3 Phase II Gate Review

The Phase II gate is the program's central quality-control mechanism, where DOE shifts from funding exploration broadly to concentrating resources on companies best positioned to deliver commercial results.

Three design questions converge. What a company must demonstrate to advance, how security screening is integrated without blocking the pipeline, and what happens when a company's work leads it in a different direction than originally proposed.

Gate Requirements

Phase II exists to fund development work by companies that have proven, through Phase I, both technical capacity and enough commercial traction to justify a larger public investment. The gate standard is evergreen, not specific to any solicitation cycle, and consists of three elements:

- Evidence that the technical approach works or has been intelligently revised based on what was learned,
- a credible path to a paying customer, and
- a work plan that DOE program staff have reviewed and believe is achievable.

These are published at the time of Phase I award so every company understands what it must accomplish. Under the recommended design, companies do not submit a traditional Phase II application. During the Phase I period, each awardee works with technology office staff and OTC to develop a Phase II scope of work, including technical milestones and commercial metrics. That negotiated scope, along with evidence of Phase I progress and updated commercial engagement, should constitute the new Phase II submission.

A company that has undergone significant Phase I work and engaged with its technology office during the award period arrives at the gate with a largely complete Phase II submission. A company that has not done that work will find it difficult to assemble a credible submission, which is exactly the screening function the gate is designed to provide.

Recommendation

Transparent Requirements for Phase II Consideration

Clear requirements that do not change year to year, are published in each solicitation, and assess the awardee on the most critical aspects of their work: technical progress and commercial traction.

- **Requirement 1: Demonstrated Progress on Phase I Technical Objectives**

  The threshold is evidence of meaningful work, not perfection. A company that pursued an approach, learned it would not work, and pivoted to a more promising direction has met this requirement. A company that took the Phase I funds and made no discernible progress has not. Phase I is a feasibility study, and the most valuable outcome of a feasibility study is sometimes the discovery that the original approach should be abandoned. The question for the technology office is whether the company demonstrated the capacity to do rigorous technical work and reached an informed conclusion, not whether the conclusion matched the original hypothesis.

- **Requirement 2: Negotiated Phase II Work Plan with Commercial Milestones**

  This is the statement of work developed in consultation with DOE program staff during the Phase I period. It includes the proposed scope, a budget, technical milestones, and the commercial metrics: evidence of customer or partner engagement, third-party validation of cost and market assumptions, or a letter of commitment from a prospective buyer. The technology office leads this negotiation and, together with OTC, decides whether the gate requirements have been met and there is sufficient funding. Because the work plan reflects what the company has learned during Phase I and what program staff have shaped through ongoing engagement, it is not a proposal that re-argues the case for the technology from scratch. It is a plan for what comes next, grounded in evidence from what already happened.

How should RTES and NEPA be integrated?

RTES screening exists for legitimate reasons. DOE has an obligation to ensure that federally funded research does not create national security vulnerabilities. The issue is integration with the program timeline.

In a recent SBIR cycle, internal discussions indicate the RTES process adds approximately 60 days uniformly, regardless of whether the award was a $200,000 Phase I or a multimillion-dollar Phase II.

Recommendation

Proportional, Parallel Screening

The approach depends on the Phase I instrument. Under a prize model, RTES and NEPA requirements are significantly reduced or eliminated during the Phase I competition period because no federal funds are disbursed until the prize is awarded.

Screening begins when winners are announced and runs concurrently with Phase II application preparation; clearance is substantially complete by the time Phase II cooperative agreements are ready for execution. This is one of the prize model's structural advantages: it eliminates the RTES/NEPA bottleneck for Phase I entirely. Under a grant model, three principles resolve the timeline conflict.

Proportionality: A $200,000 fixed-price Phase I grant presents a fundamentally different risk profile than a $1 million cooperative agreement potentially involving access to national laboratory facilities and sensitive technical data. Phase I awards should receive an initial RTES waiver and a NEPA categorical exclusion for Phase I-level activities, both achievable through a Secretarial memorandum.

Parallel processing: RTES screening begins the day the Phase I award is executed and runs concurrently with the company's technical work, so that by the time the company reaches a Phase II review window, screening is either complete or far enough along that remaining issues can be identified.

Prior clearance recognition: Companies that have previously completed RTES screening for other DOE awards receive streamlined screening focused on new staff or owners rather than a full company review.

The alternative is to maintain the current approach:

- **Uniform screening regardless of phase.** Every award, Phase I and Phase II alike, receives the same RTES and NEPA review. This is the most conservative approach from a security perspective and requires no Secretarial action. The cost is approximately 60 additional days in the timeline for every Phase I award, which undermines the 90-day application submission to award announcement and 30-day award execution target adding months to a process designed for speed.

3.4 Connect and Measure

Connecting awards to the broader ecosystem is critical – whether that's connections within the agency, to other agencies, and utilizing authorities. Section 3.4 addresses two complementary priorities: activating the connections that allow SBIR-funded companies to reach the next stage and building the data infrastructure that makes the program accountable over time.

3.4.1 Activate & Connect

The SBIR statute does not end at Phase II. **Phase III is the statutory extra commercialization phase; it comes with one of the most powerful and least understood authorities in federal innovation policy.**

In practice, Phase III almost never happens at DOE. Most SBIR companies do not know the authority exists, most federal contracting officers have never heard of it, and most offices at agencies outside DOE have no visibility into DOE's SBIR portfolio. In addition, the problem extends beyond Phase III contracting.

DOE has built substantial commercialization infrastructure across the department:

- Prize competitions,
- Lab-embedded entrepreneurship programs,
- Technical Assistance Voucher programs,
- The Technology Commercialization Fund,
- ARPA-E SCALEUP, and
- Technology office funding for pilot projects and demonstrations.[18]

Each component works reasonably well on its own terms. But they were built and many continue to be managed in separate offices, under separate authorities, with separate application processes and separate measures of success.

UNDER 15 U.S.C. 638R (4)

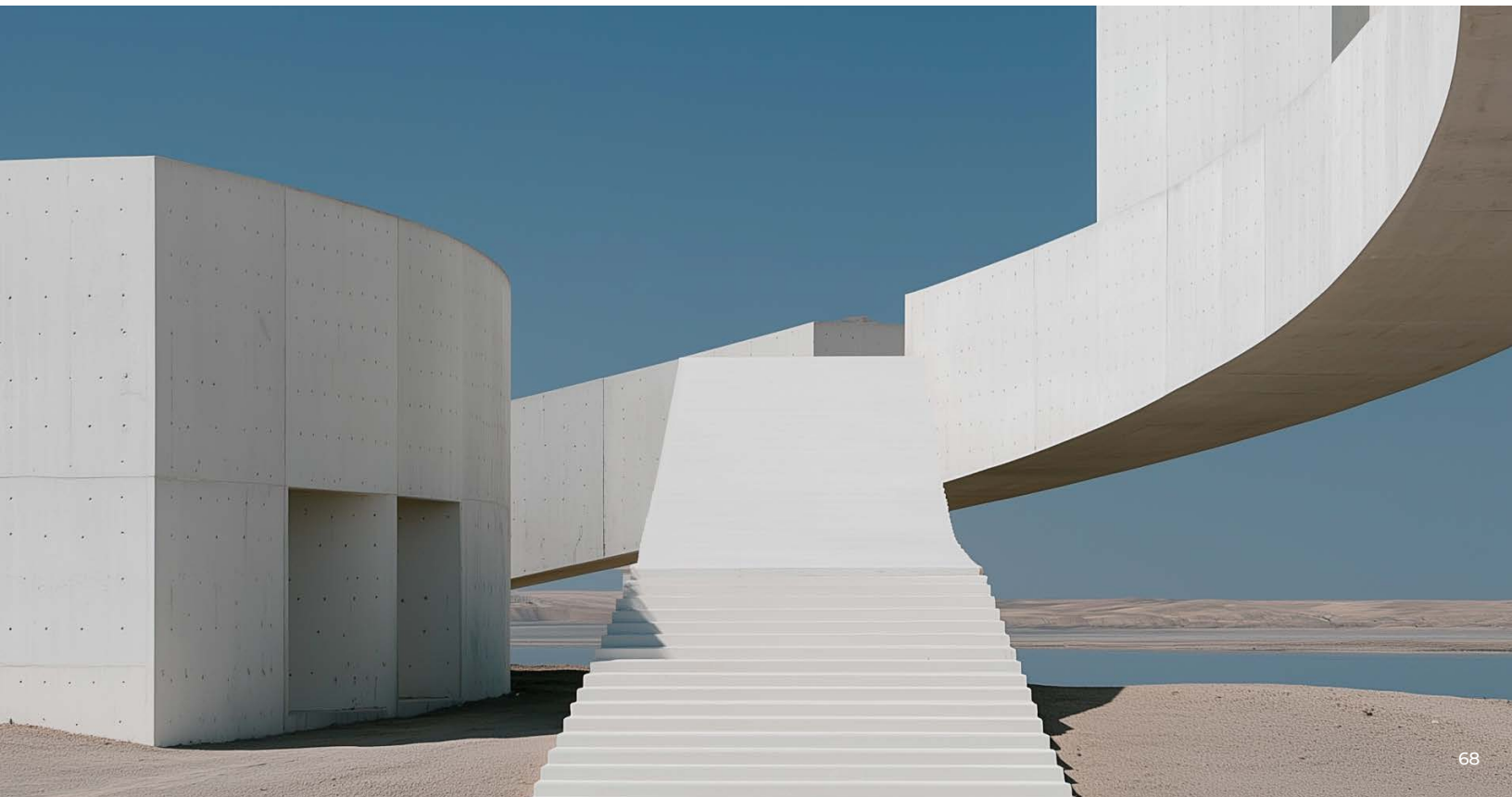
Any federal agency can enter into a sole-source contract with an SBIR awardee to continue the work funded under Phase I or Phase II, or to apply the technology to the agency's mission needs. These contracts have no dollar cap, no time limit, and no restriction on contract type. The authority exists precisely to connect technology development with operational deployment, to ensure the government's investment in early-stage innovation translates into technologies that are actually used. This applies across the entire federal government, not just the agency that made the original SBIR award.

[18] DOE commercialization mechanisms: Technology Commercialization Fund (https://www.energy.gov/technologycommercialization/technology-commercialization-fund); Lab-Embedded Entrepreneurship Program (https://www.energy.gov/eere/ammto/lab-embedded-entrepreneurship-program); DOE Voucher Program (https://www.energywerx.org/vouchers/overview); ARPA-E SCALEUP (https://arpa-e.energy.gov/technologies/scaleup).

A company that completes an SBIR Phase II award has no clear pathway to any of the other DOE commercialization programs and tools. Technology offices manage their own post-award relationships, but no one coordinates across offices, and there is no systematic tracking of how companies move through DOE's innovation programs over time.

The point is not preferential access for SBIR awardees. Awards from any DOE program should continue to be made on merit. Companies completing Phase II have demonstrated technical feasibility with DOE funding. They are a known quantity that DOE's own infrastructure should be able to identify and route to relevant next steps. Building this connectivity does not require giving SBIR companies an unfair advantage, it requires giving them visibility.

This is the gap that post-award Phase II support must fill. The question is not whether to build an elaborate mentoring program for every SBIR company, but how to connect companies DOE has already vetted and funded to the federal and private-sector buyers who need what they are building. That requires three things: cross-office visibility so the right people can find each other, active matchmaking so introductions are deliberate rather than accidental, and support calibrated to the company's stage. The level of engagement should differ sharply between Phase I, Phase II, and Phase III, a distinction most SBIR reform discussions fail to make.

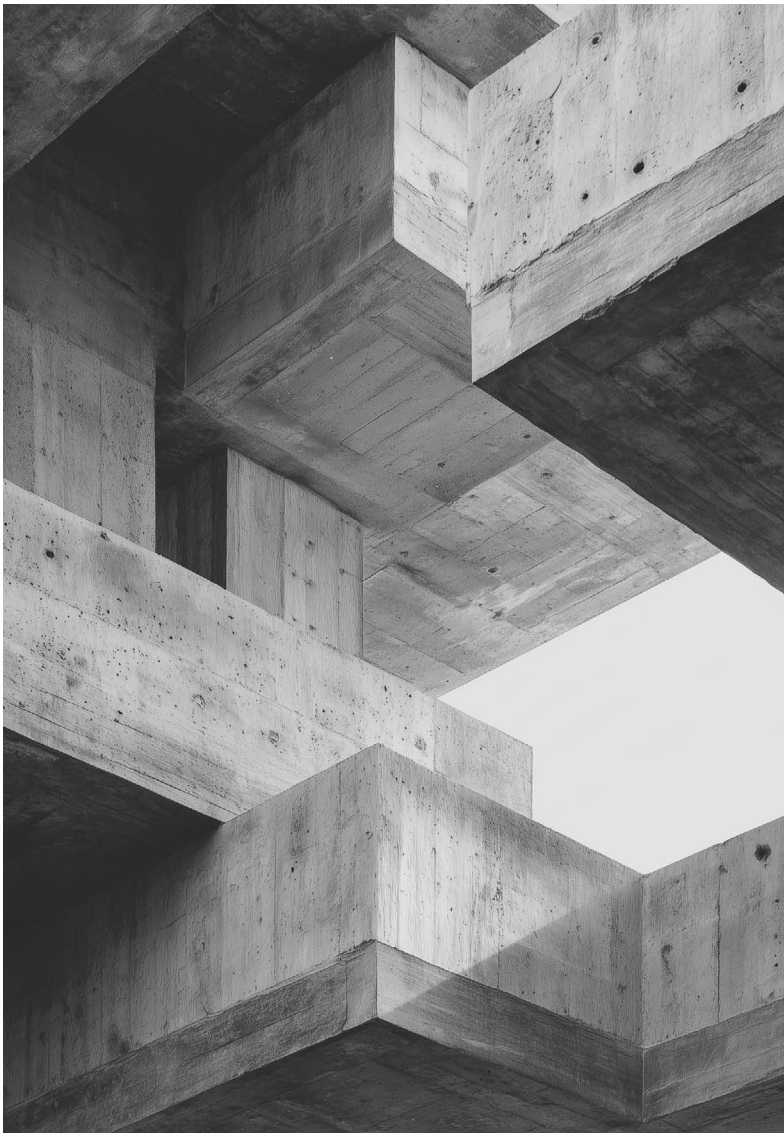


3.4.1.1 Active Partnership and Cross-Office Visibility

Cross-office portfolio visibility is the foundation for opening projects to additional funding. Every SBIR awardee, regardless of which technology or appropriation account office's budget funded Phase I, should be visible to all participating offices through a shared tracking platform, enabling technology offices to identify Phase I awardees working in adjacent technology areas, engage them before the Phase II decision, and offer supplemental funding or help shape Phase II scope. At Phase II, FESI, using the tracking platform and its industry connections, assists in identifying federal agencies and private-sector buyers whose needs align with the company's technology, beginning preliminary outreach, and helping the company understand the landscape it will enter when Phase II concludes. This is specific, portfolio-informed matchmaking that begins while the company still has DOE funding and attention, not after both have ended.

The goal is not to distract SBIR companies from the technology offices that understand their technology but to add the cross-office dimension that currently does not exist. When a program manager sees a company's Phase II results on the portfolio platform and learns that a counterpart at another office is already exploring a Phase III contract for the same technology, the power of SBIR grows and will be seen as a value add to existing funding portfolios.

While this section focuses on Phase II and what follows, companies that complete Phase I without advancing to Phase II should not simply disappear; FESI should maintain those relationships and facilitate connection with other parts of DOE's portfolio where their work has value.



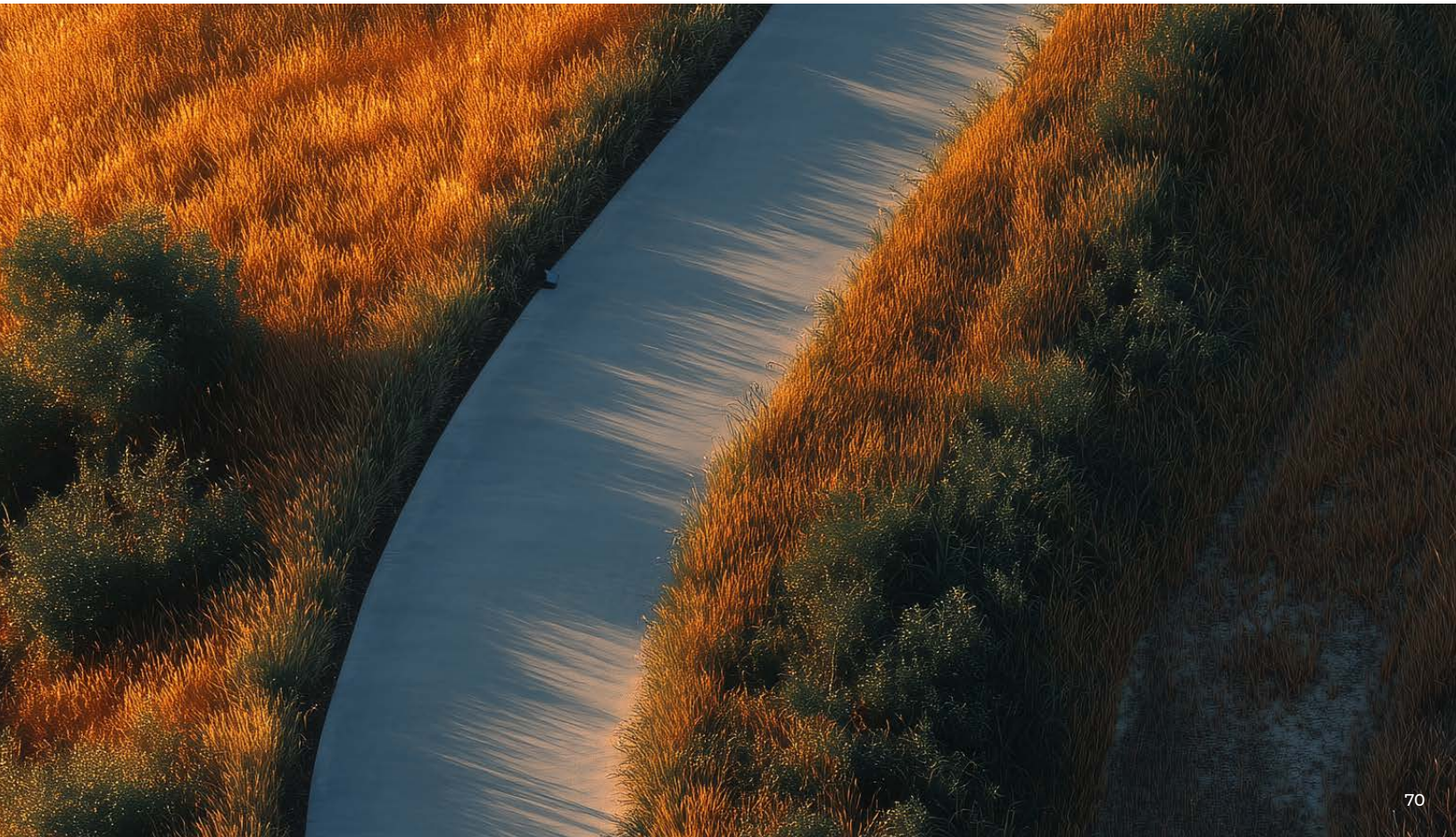
3.4.1.2 Phase III: Building the Pathway to Market

FESI could fill the Phase III gap. Phase III authority can be critical for commercialization, but it is currently accidental rather than deliberate. FESI should change facilitate connections at industry conferences and convene an annual showcase to bring together active Phase II awardees, federal procurement and technical leadership, and private-sector buyers. Such an event would give DOE a concentrated window into its active portfolio while giving companies direct access to the people who can accelerate their path to market.

To be clear about what FESI would not do in this role: it makes no merit determinations, conducts no application screening, and exercises no selection authority. Its role would be ecosystem coordination and pathway development, not filtering or gatekeeping. Companies would not need FESI's approval or endorsement to apply for or advance within the SBIR program.

The broader principle is that post-award support should not be a separate program bolted onto the end of the SBIR process. By the time a Phase II award concludes, FESI is already engaged, the PIA is already tracking progress, and technology offices already have visibility.

The handoff to what comes next, whether a Phase III contract from a DOE technology office or another federal agency; a connection to private capital; or technical assistance with manufacturing scale-up, regulatory compliance, or market entry strategy, should be a natural extension of existing relationships, rather than a cold introduction to new staff and new requirements.



Recommendation

Establish a Phase III Buyers Alliance and Platform

The SBIR statute grants any federal agency the authority to award a Phase III contract to an SBIR awardee on a sole-source basis, without competition, on the grounds that the work derives from or extends prior SBIR-funded research. This authority exists precisely to convert federally funded development into federal procurement — and is almost never used at DOE.

FESI is positioned to change this:

- **FESI establishes and maintains a standing federal buyers consortium:** a structured network of procurement and technical staff from across DOE and other federal agencies who receive regular, curated exposure to DOE's active Phase II portfolio and are trained on how to invoke Phase III sole-source authority.
- **FESI conducts active matchmaking** — not passive showcasing — by maintaining a tracked pipeline of Phase II companies approaching completion, mapping their technologies against known federal procurement timelines, and initiating introductions before the Phase II award ends and DOE's leverage disappears.
- **FESI leads contracting officer education,** working with OTC to ensure that the staff responsible for executing Phase III awards understand the authority, have seen it used, and know how to document it correctly.

These three functions operate as a system: the consortium creates the buyer relationships, the pipeline creates the timing, and the education creates the institutional capacity to close.

3.4.2 Measure and Refine

Without data, every reform described in this section will be evaluated by anecdotes, defended by advocates, and eventually eroded by the same institutional inertia. Other agencies have shown that collecting data for SBIR programs is feasible: DOD's Company Commercialization Record provides a longitudinal view; NIH conducts structured interviews with awardees.

Publishing this data creates natural accountability. Commercialization rates by technology and appropriations account office create an incentive for underperforming offices to improve. Time-to-award data makes procedural delays harder to defend. New-applicant rates force a conversation about whether the front door is actually open. None of this requires new legislation. A single policy memorandum from the Secretary or Under Secretary could establish the reporting requirements.

Recommendation

Track Process from Beginning to End and Use Lessons Learned for Constant Improvements

DOE must build the data infrastructure to track:

- Commercialization rates by office (technology and appropriations level offices) and by solicitation release, tracked annually and published publicly.
- Time from solicitation close to award execution, measured against the SBA's 90-day statutory target.
- Success rates for new versus repeat applicants, disaggregated by office and topic type (open versus narrow).
- Post-award revenue, follow-on private investment, and follow-on federal funding for Phase II completers.
- Rate of customer adoption of SBIR-funded technologies, including federal procurement (Phase III conversions) and private market offtake.
- New-versus-repeat awardee ratios by office, with year-over-year trending to assess whether front-door reforms are reaching new entrants.
- Employment growth among Phase II awardees, as a proxy for company health and commercial momentum.
- Phase III conversion rate by office, tracking how often SBIR-funded technologies advance to federal procurement or additional DOE program funding.

3.5 How Reforms Are Implemented

Acknowledging the current underperformance of SBIR by DOE leadership and having leadership as the main driver of reform means the organization has permission to accept the transition costs of the first year, that process imperfections are expected costs of a redesign rather than evidence the reform was premature, and that technology offices do not get to relitigate the design at every quarterly review.

Recommendation

Full Implementation in a Single Cycle

The core elements are interdependent: a single annual calendar, open and narrow tracks releasing simultaneously, simplified applications, the chosen Phase I instrument (whether prize or fixed-price grant), Phase II cooperative agreements, the review model with firm deadlines, the PIA managing operations, and FESI coordinating the ecosystem. Running the open-topic track on a new model while the narrow-topic track continues under the old process does not test the reform. It tests a fragment that lacks the very integration that makes the design work. What scales over time is not the structure but the sophistication: AI screening begins with compliance tasks, FESI's convenings grow as the portfolio expands, cross-office engagement deepens as offices experience the value of visibility, and the down select rate calibrates as DOE collects data on what predicts commercial success.

A decision to phase reform over multiple years is possible but less efficient.

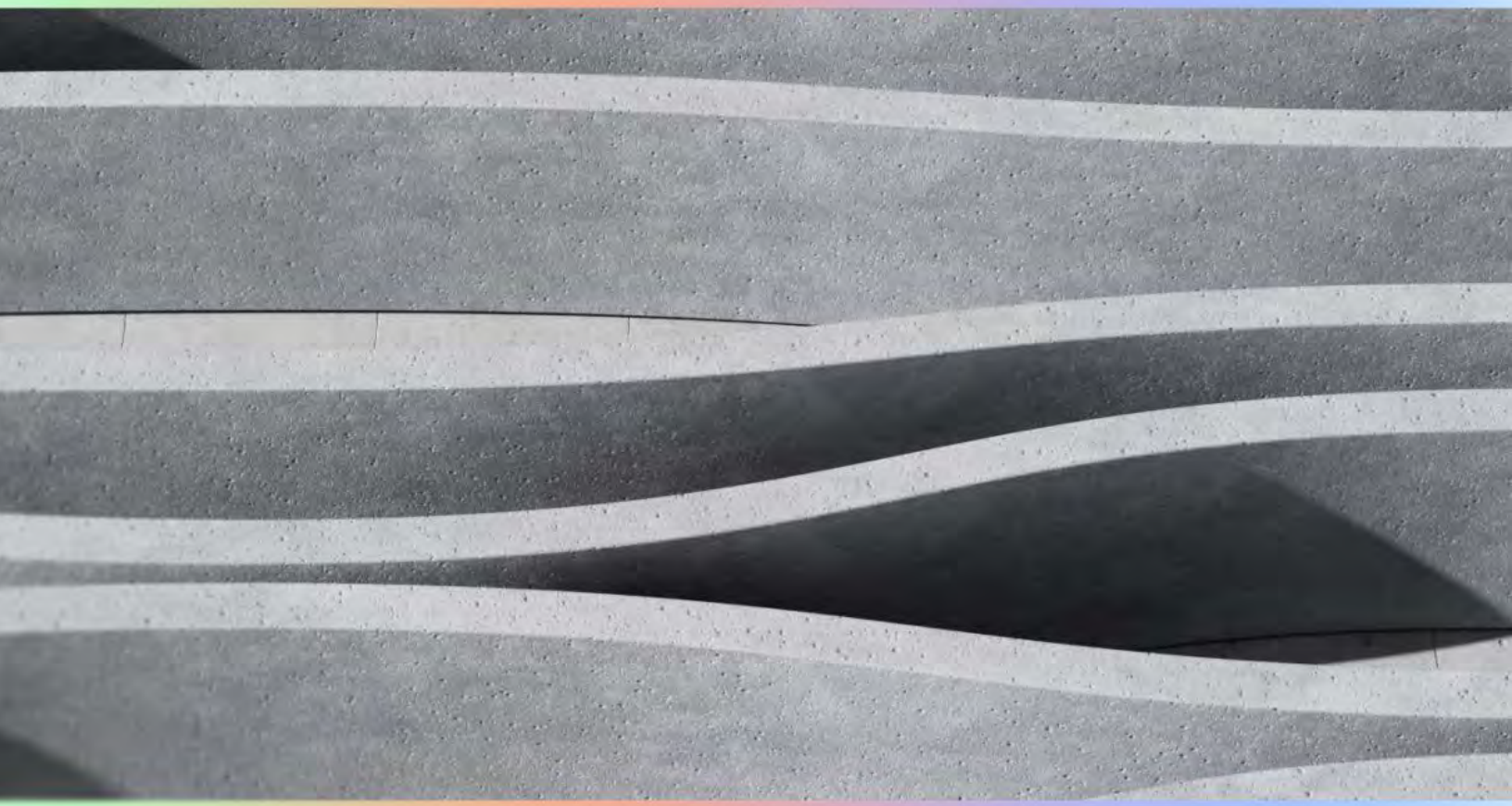
Phased rollout over two to three years. Year 1 launches the calendar reform and simplified application with a single pilot account. Year 2 expands to all Section 309 accounts. Year 3 introduces the full review architecture and Phase II gate. This approach reduces institutional shock and allows each element to be tested before the next is added. The cost is that the elements are interdependent. That is, a simplified application without open topics still filters for the wrong population. An enforceable calendar without central selection authority is not actually enforceable. A phased approach risks testing fragments in isolation and declaring them as failures, rather than acknowledging the process was designed to work as a system.

In addition, incremental rollouts risk souring leadership and staff on changes that were never fully realized, and leadership turnover can kill incomplete programs before their impact can be assessed.

Whichever path DOE chooses, implementation will be uneven. A program that has operated the same way for decades will not transition cleanly in a single cycle. Offices will miss deadlines. The first open-topic cohort will surface problems nobody anticipated. Reviewers accustomed to the old process will push back. These are the normal costs of building something new – but DOE has a pattern of interpreting early turbulence as evidence the reform was premature, and responding by pulling back: reassigning staff, moving the program, layering compliance requirements back onto a streamlined process, or withdrawing visible leadership support. Each of those responses is more damaging than the problem it is trying to fix. DOE should hold steady on these reforms to ensure maximum programmatic impact in the long run.

How the New Program Works

Section 3 laid out the design choices. This section assembles them into a single operating system: what happens, in what order, by whom, and under what authority. A reader who wants the rationale behind each decision should start with Section 3. A reader who wants to see how the reformed program actually runs – from the summer when topics are written through the moment a Phase II company reaches the market – start here.



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4.1 Summary of Recommendations

The table below maps every major recommendation in this paper, grouped by the four phases of the program cycle. Section 3 references point to the detailed rationale and design options for each choice.

Design & Release

Section	Topic	Recommendation
3.1.1	New Management	DOE moves SBIR to OTC with Adequate Mandate and Resources
3.1.1	Staffing and Resourcing	Build Four Functional Teams with PIA Support
3.1.2	Clear Authorities	Mixed Authority Model: Defined roles for OTC and Technology Offices
3.1.3	Open the Front Door	Dual-Track Topics: Open Topic Floor (20%) Plus Narrow Office-Defined Topics Release Simultaneously
3.1.4.1	Lock the Calendar	Fixed Annual Cycle: September Release Against Prior-Year Appropriations
3.1.4.2	Increasing Budget Certainty	Prior-Year Funding: Spend Already-Appropriated Dollars

Apply & Select

Section	Topic	Recommendation
3.2.1	Simplify the Application	Rebuild Application from Statutory Minimum (~5 Pages, 4 Core Questions)
3.2.1.1	Outreach Improvement	FESI-Led Outreach at Scale with OTC Contracted PIA Support
3.2.1.2	Addressing the Perpetual Grantee Problem	Commercial Milestone Filters with Published New-vs-Repeat Ratios
3.2.2	AI Assisted Review	Phased AI Integration: Compliance Screen to Primary Initial Review

Award & Manage

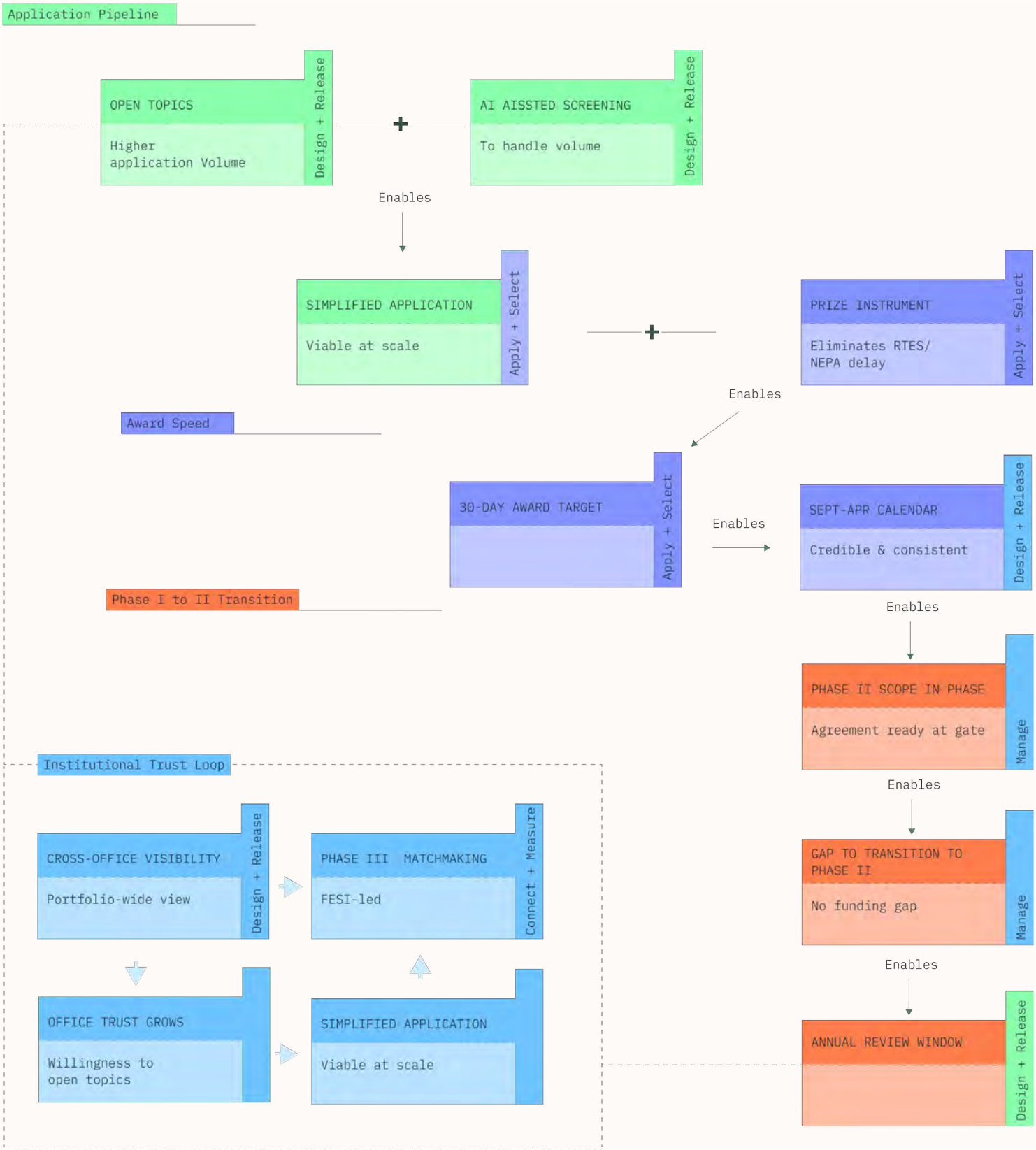
Section	Topic	Recommendation
3.3.1	Streamline Phase I	Prize for Full $200K at Award, No Expenditure Reporting
	TABA for Phase I	Facilitated by FESI and PIA for Administration
3.3.1.2	Preparing for Phase II	Negotiate Phase II SOW and Begin RTES/NEPA During Phase I
3.3.2	Reorient Phase II Mechanisms	Cooperative Agreement with Negotiated Technical and Commercial Milestones
3.3.2.1	Phase II Improvements - TABA	Amend TABA for Phase II to Shape as a Voucher and Ecosystem Connection
3.3.2.2	Phase I and Phase II Review Timeline	Joint Phase I and Phase II Evaluation in a Single January Window
3.3.2.3	Phase II Gate Review	Gate Decision Based on Phase I Performance and Draft SOW
3.3.2.3	Phase II Review Accelerant	Proportional Parallel Screening for RTES/NEPA

Connect & Measure

Section	Topic	Recommendation
3.4.1.1	Active Partnership and Cross Office Visibility	Create SBIR Visibility Platform
3.4.1.2	Phase III: Building the Pathway to Market	Establish a Phase III Buyers Alliance and Platform
3.4.2	Measure and Refine	Track Process from Beginning to End and Use Lessons Learned for Constant Improvements

Implementation

Section	Topic	Recommendation
3.5	How Reforms are Implemented	Full Implementation in a Single Cycle


Application Pipeline
OPEN TOPICS
Higher application Volume
Design + Release
AI AISSTED SCREENING
To handle volume
Design + Release
Enables
SIMPLIFIED APPLICATION
Viable at scale
Apply + Select
PRIZE INSTRUMENT
Eliminates RTES/ NEPA delay
Apply + Select
Enables
Award Speed
30-DAY AWARD TARGET
Apply + Select
Enables
SEPT-APR CALENDAR
Credible & consistent
Design + Release
Phase I to II Transition
Enables
PHASE II SCOPE IN PHASE
Agreement ready at gate
Manage
Enables
Institutional Trust Loop
CROSS-OFFICE VISIBILITY
Portfolio-wide view
Design + Release
PHASE III MATCHMAKING
FESI-led
Connect + Measure
GAP TO TRANSITION TO PHASE II
No funding gap
Manage
Enables
OFFICE TRUST GROWS
Willingness to open topics
SIMPLIFIED APPLICATION
Viable at scale
ANNUAL REVIEW WINDOW
Design + Release

The recommendations were designed to work together, and the interactions between them are where much of the value lies.

- Open topics produce higher application volume, which justifies AI-assisted screening. This makes the simplified application viable at scale.

- The prize instrument eliminates RTES/NEPA delays for Phase I, which makes the 30-day award target achievable, and makes the September-to-April calendar credible.

- Phase II scope negotiation during Phase I produces a ready-to-execute cooperative agreement at the gate, which eliminates the valley of death, and makes the single annual review window sufficient.

- Cross-office portfolio visibility feeds FESI's Phase III matchmaking, which produces commercial outcomes, builds technology and appropriations account offices trust in the centralized process, and makes offices more willing to engage with open topics in the next cycle.

Each recommendation strengthens the others, and removing any one of them weakens the balance.

4.2 How the Cycle Moves

This explains the journey of the program and how a company would proceed through it over two years from Phase I submission to Phase II award execution.

Summer through September: Topic Development and Portfolio Reconciliation

Under the reformed design, topic development is itself a portfolio exercise, not an aggregation of individual office requests. Account-level authorities see both the narrow topics their technology offices submitted, and the open-topics areas OTC is coordinating, and they reconcile overlaps before the solicitation goes out. When two technology offices submit energy-storage topics and rank different companies, one authority sees both rationales and can shape a coherent set rather than allowing fragmented, duplicative reviews and selections. With the cross-office view from OTC, this reconciliation is possible because Section 309 pooling gives the account-level authority a budget that spans participating technology offices. If the account-level authority declines to weigh in, OTC decides. The result is a solicitation that is a deliberate portfolio position.

The solicitation that results from this process runs on two parallel tracks: a narrow-topic track where technology offices define specific research problems, and an open-topic track where OTC coordinates topic areas with technology and appropriation account offices. Notably, OTC accepts proposals from companies that would not find a home in any office's specific priorities. OTC maintains the open track at a minimum of 20% of total funding across participating offices. Both tracks release on the same calendar starting in September, review in the same January window, and draw from the same pooled budget, making the portfolio balancing in Stage 3 possible.

September through January: The Open Window

When the solicitation is released in September, the fixed calendar becomes the coordinating mechanism the entire ecosystem runs on. Companies, reviewers, FESI, and the PIA all plan around the same dates. Since the calendar is unmoving, every downstream commitment becomes credible.
A company considering its first SBIR application can confidently plan around it. The set February timeline is what makes reviewer recruitment feasible — an unpredictable, year-round process would deter participation. FESI and the PIA organize outreach around the same schedule. The fixed open window allows the support infrastructure to converge on a single annual entry point.

January: Dual-Stream Evaluation and Portfolio Balancing

The January deadline produces two application streams simultaneously: new Phase I proposals from the current solicitation cycle and Phase II submissions from companies who received Phase I awards in the prior year cycle, including both a narrow-topic and open-topic pool for each. The selection official and technology offices evaluate both streams against the same budget in the same window. This is the mechanism that makes portfolio-level balancing possible. If an exceptional cohort of Phase II candidates emerges, budget shifts toward Phase II. If the Phase II cohort is weak, budget shifts toward Phase I. This funds a broader class of early-stage companies and replenishes the pipeline. Evaluating the phases separately, as under the current design, forecloses that tradeoff entirely: allocations lock in before the quality of either cohort is known.

January through April: From Selection to Executed Award

The April award target (30 days from selection to executed award) is the output of two decisions made before the solicitation opened, not the product of effort applied at award time. Those upstream decisions are what make a fast award mechanically possible; the calendar is what makes it expected. First, a fixed-price Phase I instrument (prize or grant) requires no cost negotiation, so the 30-day selection-to-award target is achievable. Second, proportional RTES screening means that $200,000 Phase I awards receive an initial waiver rather than the same 60-day review applied to multimillion-dollar cooperative agreements. When both upstream conditions are in place, April awards are achievable and the calendar retains credibility. When either condition is missing, the same delays that plague the current system reassert themselves, and the calendar becomes aspirational rather than binding.

April through December: Phase I Execution and the Work That Happens in Parallel

Phase I execution is where the program departs most visibly from current practice. The company works. The technology office is present at three scheduled touchpoints and otherwise stays out.

Phase II scope development. During Phase I, the technology office and OTC work with the company to support a Phase II statement of work, including technical milestones, commercial metrics, and budget. By the time the gate decision arrives in December, the cooperative agreement exists in draft.

The second is security screening. RTES review runs concurrently with Phase I technical work, so clearance is substantially complete before the Phase II window opens in September. Together, these parallel tracks eliminate the valley of death between phases.

December through January: The Phase II Gate

At the Phase II gate, both the technology office and OTC make a joint assessment: Did the Phase I work answer the technical question, and is the company positioned to develop the technology further with a larger public investment? When they agree, the pre-negotiated cooperative agreement is executed. When they disagree, the disagreement goes to the Deputy Secretary for resolution. The escalation path matters less for the cases where it is invoked than for the discipline it imposes on cases where it is not; knowing that a disputed decision will be documented and reviewed concentrates attention on reaching a genuine joint assessment rather than a perfunctory one. The gate is the program's central quality control moment, and the joint structure gives it credibility with both OTC and the technology offices whose budgets fund the awards.

Year Two and Beyond: Phase II Execution and Ecosystem Connection

Once Phase II is underway, the cooperative agreement's milestone structure gives the program binding authority over commercial progress, not just technical completion. The midpoint review is a real decision point: redirect, extend, or wind down. FESI works the commercial side throughout, building connections between companies and buyers or funders, facilitating Phase III introductions, and deploying TABA vouchers that give each company access to commercialization services of their own choosing. The portfolio visibility platform is what makes FESI's matchmaking systematic rather than accidental. It is also what allows OTC to manage SBIR as a department-wide portfolio rather than a collection of disconnected office programs.

4.3 What Emerges from the Combined Design

Systemic reform will produce more effective systemic operation.

The program controls volume without restricting entry. The most common objection to open topics is that the review infrastructure cannot handle the volume. Under the current system, this is true; each technology office absorbs the full administrative weight of every application to its topics. The reformed design addresses this problem differently. The PIA, and eventually AI tools, handles compliance screening. Proportional RTES prevents security review from bottlenecking the pipeline. The three-perspective evaluation distributes reviewer workload. AI screening, once mature, further reduces the human review burden for initial triage. The result is a program that can accept a larger, more diverse applicant pool because it built the infrastructure to process it, rather than one that restricts entry because it never did.

A credible calendar makes everything recruitable. Prior-year funding is usually described as a budgeting mechanism, but its deeper function is to make the fixed calendar survivable. A continuing resolution delays new appropriations but does not prevent obligation of prior-year balances, so the April award date holds through the single most common source of federal program disruption. Once the calendar is credible, every actor in the system plans around it. Companies, reviewers, FESI, and technology offices can all schedule against the same fixed dates. None of this coordination is possible if the fixed calendar is aspirational. Prior-year funding is what makes it binding.

Portfolio visibility turns technology offices from skeptics into advocates. The portfolio visibility platform quells potential anxiety about technology office loss of control. When a program manager in the Office of Electricity sees that a CMEI-funded company is developing a grid-storage technology directly relevant to their portfolio, and that FESI has already begun exploring a Phase III contract with a third agency for the same technology, the program's value becomes tangible rather than isolated. Offices can see the full portfolio and find technologies and companies with whom they want to engage.

Data creates a self-improving institution. Annual outcome reporting does more than satisfy Congressional oversight. It creates a feedback loop the current program has no access to. If open-topic awards outperform narrow-topic awards on commercial metrics, the portfolio balance shifts. If certain technology or appropriations account offices consistently under select at the Phase II gate, the program and OTC investigate whether gate strategy needs adjustment. If the scoring boost for new applicants produces weaker commercial outcomes than expected, the mechanism is recalibrated. Over time, the cycle compounds - better data leads to better topic design, which attracts stronger companies, which produces better outcomes, which strengthens the program's case to Congress.

Partial implementation is likely to fail. These dynamics explain why launching fragments of the reform without the supporting architecture would produce confusion and reversion to the status quo. Open topics without OTC selection authority get captured by individual offices. Milestones without cooperative agreements revert to advisory. A fixed calendar without prior-year funding compresses under the first continuing resolution. FESI without portfolio visibility cannot identify the companies and technologies it is supposed to connect. Each element supports the others, and removing any one does not merely weaken the system; it breaks a dependency that the remaining elements rely on. The argument is for full launch in Year 1, accepting that some elements will take two to three years to reach full capability.

4.4 Authority and Implementation: What DOE Can Do Now

The system described requires three levels of authority: administrative decisions within OTC's existing mandate, internal DOE policy direction, and statutory changes from Congress. Mapping each reform to its authority requirement reveals that most of the operating design can launch without waiting for new legislation.

Summary of Reforms by Authority Required

Reform	Authority Required	Whose Action
Simplify Phase I application to 5-10 pages	Administrative	OTC
Implement open topics with 20% advisory floor	Administrative	OTC + technology offices
Fix annual calendar (Sept release, Jan submit, Apr award)	Administrative	OTC
Prior-year funding for April awards	Administrative	OTC + CFO
Expand PIA engagement for operations	Administrative	OTC
Redesign TABA as voucher system	Administrative	OTC + PIA
Begin data collection and annual reporting	Administrative	OTC + PIA
Cross-office portfolio visibility platform	Administrative	OTC + PIA
FESI engagement for outreach and Phase III	Administrative	OTC + FESI
Consolidate reviewer database	Administrative	OTC + PIA
Phase II cooperative agreements with milestones	Administrative	OTC
Proportional RTES screening framework	Administrative	Internal DOE
Formalize OTC selection authority	Administrative	Internal DOE
Establish technology office deadline expectations	Administrative	Internal DOE

Summary of Reforms by Authority Required

Reform	Authority Required	Whose Action
Establish Phase II gate protocol	Administrative	Internal DOE
Allocate 3% administrative funding to OTC	Administrative	Internal DOE
Make 20% open-topic floor binding	Congressional	Congress
Extend Section 309 to Nuclear Energy	Congressional	Congress
Extend TABA to pre-application activities	Congressional	Congress
Clarify prize authority for Phase I	Congressional	Congress
Add prizes and other transactions to SBIR instruments	Congressional	Congress

Appendix 4 has a proposed implementation timeline discussing how the program can evolve over multiple years.

Conclusion

DOE sits at the center of the most consequential technology transition in a generation. The companies that will build the next 50 years of our world's energy systems are forming now. Many of them are small businesses and startups. Many are undercapitalized and have never considered SBIR.

What makes this moment different is not just the lapse in authorization, it is the convergence of critical opportunity from the bill. DOE has access to more tools in their toolkit: capable general purpose AI tools, partnership intermediary infrastructure, FESI, a focus on TABA, and Section 309 fund flexibility. None of these tools existed when DOE had past conversations about SBIR reform.

There are precedents across government of these types of reforms. AFWERX, SETO, WPTO, ARPA-E, and NASA have proven, under the same legal framework as DOE, that federal innovation programs can be fast, open, rigorous, and commercially productive.

There are credible leaders within DOE that can build this ship. The people who built TCF from an accounting exercise into a functioning program, stood up FESI, negotiated the first partnership intermediary agreements, assembled the commercialization infrastructure described are leading efforts within DOE. These experts have built programs under worse conditions with fewer tools than are available today.

The reforms in this paper do not require DOE to become something it is not. They require DOE to apply the same rigor to a $300 million small business program it applies to billion-dollar demonstration projects. Track the outcomes, publish the data, and hold the program accountable for whether companies reach the market.

The companies DOE should be funding are not waiting patiently for the program to reform itself. The best small businesses and startups likely looked at the process, decided the return was not worth the investment, and never applied. They either found other public (non-DOE) or private sector support or failed for lack of the early capital that SBIR was designed to provide to critical technologies. DOE never crosses paths with these companies. They do not appear in the program's data because they never entered the pipeline. Every cycle that passes without reform is another cohort of startups the program never reaches. The cumulative cost is measured in technologies that did not deploy, markets that did not develop, and an energy transition that moved slower than it needed to.

This blueprint offers an opportunity for change grounded in what works inside DOE and across the federal government. The nation and our federal workforce deserve a program that matches the scale of the responsibility, quality of the innovators it should be reaching, and the urgency of the technologies companies are building.

Appendix 1: Guide to DOE Office Terminology in This Paper

DOE has undergone significant organizational change over the last two years, with the most recent restructuring announced in November 2025. These changes have produced multiple iterations of DOE's organizational chart - creating, renaming, and merging offices that hold key equities in SBIR. Further complicating the discussion, many of the announced changes have not been accepted by Congress or reflected in authorizations and appropriations yet.

Understanding prior and current office placement and relationships is useful context for understanding the reform proposals in this paper.

This appendix is not a comprehensive explainer of DOE's reorganization. It is meant to orient the reader to specific roles in executing SBIR can and should reside, based on the reforms this paper proposes.

1. Term Definitions for Reading the Paper

Term	Definition	Examples	SBIR Role	Budget Relationship
SBIR Programs Office	The central management unit currently within SC (and proposed to move to OTC) that publishes solicitations, manages compliance, and coordinates the calendar.	Office of Science (SC); Office of Technology Commercialization (OTC)	SC currently manages the central SBIR Programs Office. OTC is the proposed new institutional home.	SC and OTC operate at the department level, coordinating across all participating offices.
Appropriations Account Office ("Account-Level")	A major DOE organizational unit whose budget constitutes a Congressional appropriations account (e.g., CMEI, NE, SC). May contain multiple technology offices.	CMEI (formerly EERE), OE, HGEO (formerly FECM), CESER, Science, NE	Budget authority for SBIR set asides. Section 309 pooling operates at this level. The assistant secretary or designee reconciles selections.	Congressional appropriations flow to these accounts. SBIR's 3.2% set-aside is calculated from each account's extramural R&D budget.
Account-level authority	The person who holds selection and budget authority across technology offices within an appropriations account.	Assistant secretary or designee	Reconciles selections across technology offices within their account; resolves disagreements between OTC and technology office rankings.	Decision maker for Appropriations Account Office funding.

1. Term Definitions for Reading the Paper

Term	Definition	Examples	SBIR Role	Budget Relationship
Technology Office	A DOE office focused on a specific technology area that develops topics, recruits reviewers, reviews applications, makes selection recommendations, and manages awards	Offices under CMEI: Office of Energy Technology, Office of Critical Minerals, etc. Offices that were under EERE: Solar Energy Technologies Office, Water Power Technologies Office, etc.	Develop topics, recruit reviewers, conduct technical review, recommend selections, manage post-award relationships.	Operate under an appropriations account. Multiple technology offices may share one account (e.g., Office of Energy Technology within CMEI, or, previously, SETO within EERE).
Field Office	DOE office that handles financial processing, compliance review, and grants management for SBIR awards.	DOE Chicago Field Office	Award execution, grants management, fund obligation.	Funded separately; executes awards on behalf of the program.
Program Manager	Individual in charge of running a funding program in a technology office or appropriations level office.	Federal employees working in a technology office	Individual in an office helping run SBIR or individual in an office that may be interested in funding SBIR projects from other offices	Make recommendations to office leadership on selections and programs to run

2. Pre-Reorganization: the Thirteen SBIR-Participating Offices

Prior to the November 2025 reorganization, the following thirteen offices participated in DOE's SBIR program. Six sit within the Office of Science (SC), and seven are applied energy, national security, or environmental management offices that report independently to the Secretary or Under Secretaries.

Pre-Reorg Office	Parent Organization	SBIR Role
Office of Advanced Scientific Computing Research (ASCR)	Office of Science	Topics in computing and networking for science
Office of Basic Energy Sciences (BES)	Office of Science	Topics in materials, chemistry, and geosciences research
Office of Biological and Environmental Research (BER)	Office of Science	Topics in biological systems and environmental science
Office of Fusion Energy Sciences (FES)	Office of Science	Topics in plasma physics and fusion technology
Office of High Energy Physics (HEP)	Office of Science	Topics in particle physics instrumentation and detectors
Office of Nuclear Physics (NP)	Office of Science	Topics in nuclear science instrumentation
Office of Cybersecurity, Energy Security, and Emergency Response (CESER)	Reports to Secretary	Topics in grid security, energy resilience
Office of Energy Efficiency and Renewable Energy (EERE)	Under Secretary for Science & Innovation	Topics across solar, wind, water, vehicles, buildings, manufacturing, hydrogen, bioenergy, geothermal

Pre-Reorg Office	Parent Organization	SBIR Role
Office of Environmental Management (EM)	Under Secretary for Science & Innovation	Topics in environmental cleanup technologies
Office of Fossil Energy and Carbon Management (FECM)	Under Secretary for Science & Innovation	Topics in fossil energy and carbon capture
Office of Defense Nuclear Nonproliferation (DNN)	NNSA	Topics in nuclear detection and nonproliferation technologies
Office of Nuclear Energy (NE)	Under Secretary for Science & Innovation	Topics in nuclear reactor technologies and fuel cycles
Office of Electricity (OE)	Under Secretary for Science & Innovation	Topics in grid modernization, energy storage, transformers

3. How the November 2025 Reorganization Changed the Map

On November 20, 2025, DOE released a restructured organizational chart. Several offices that participated in SBIR were renamed, merged, or relocated. The table below maps each pre-reorg SBIR participating office to its current or successor entity. An updated internal CMEI org chart was released in January 2026 with further detail on sub-office structure.

Pre-Reorg Office	Pre-Reorg Office	Notes
ASCR	Remains in Office of Science	No structural change.
BES	Remains in Office of Science	No structural change.
BER	Remains in Office of Science	No structural change.
FES	Moved to new Office of Fusion (OF)	OF is a standalone office under S-4 (Under Secretary for Science). FES was extracted from SC.
HEP	Remains in Office of Science	No structural change.
NP	Remains in Office of Science	No structural change.
CESER	Remains; reports to Secretary	No structural change to SBIR participation.
EERE	Replaced by CMEI (Critical Materials and Energy Innovation)	CMEI absorbs EERE, SCEP, MESC, and OCED. Geothermal Technologies Office moved to HGEO. CMEI reports directly to the Secretary. Jan 2026 org chart shows three technology sub-offices: Office of Energy Technology, Office of Critical Minerals, Materials, and Manufacturing, Office of Innovation, Affordability and Consumer Choice

Pre-Reorg Office	Pre-Reorg Office	Notes
EM	Remains	No structural change reported.
FECM	Renamed to HGEO (Hydrocarbons and Geothermal Energy)	Absorbed Geothermal Technologies Office from EERE. Some carbon capture programs shifted to NE and HGEO. Name change signals shifted priorities.
DNN	Remains in NNSA	NNSA significant changes
NE	Remains; absorbed some OCED programs	Received Advanced Reactor Demonstration Program from OCED.
OE	Remains	No structural change reported.

Additionally, the reorganization created or elevated offices relevant to SBIR's proposed reform:

New / Reorganized Entity	Status	Relevance to SBIR Reform
Office of Technology Commercialization (OTC)	Now under Office of Science (S-4)	Proposed new institutional home for SBIR in this paper. Formerly the Office of Technology Transitions (OTT), which was eliminated from the org chart.
Office of Fusion (OF)	New standalone office under S-4	Extracted from SC. Will need to be a SBIR participating office if fusion topics continue.
Office of AI and Quantum (AIQ)	New standalone office under S-4	May generate SBIR topics in AI and quantum computing.
FESI (Foundation for Energy Security and Innovation)	External partner (PIA)	Separate non-profit to support DOE work, but it is not part of DOE org chart. Proposed role in ecosystem coordination for reformed SBIR.

Appendix 2: Background and Legislative History of SBIR

SBIR traces its origins to a period of acute national focus about American economic competitiveness. Throughout the 1970s, the United States was grappling with stagflation, rising energy costs, and the growing perception that it was losing its technological edge – not too dissimilar to current affairs. At the same time, researchers like David Birch at the Massachusetts Institute of Technology and later Zoltan Acs and David Audretsch[19] were demonstrating that small firms were playing an increasingly important role in both job creation and the invention of new technologies. .

The disconnect was glaring. Small businesses were producing a disproportionate share of the country's innovations but receiving only about 3.5 percent of federal R&D dollars. Federal procurement systems were oriented toward large, complex systems and the established contractors that could supply them. Small firms with genuinely innovative ideas were effectively locked out.

The intellectual architect of what became SBIR was Roland Tibbetts, a senior program officer at the National Science Foundation (NSF) who had spent 20 years in the private sector before joining NSF in 1972. Tibbetts identified what he described as a dual paradox[20]: at the idea stage, the risks were too great for all but a few private investors. Thus, many promising technologies simply failed for lack of capital. Concurrently, the federal government was spending billions on R&D but not efficiently converting that investment into commercial products, partly because funding was concentrated among large incumbents with less incentive to pursue high-risk work. His proposed solution was a program providing early-stage, competitive funding to small businesses based on scientific merit; while also ensuring the government obtained R&D it could not otherwise get from the private sector alone.

In 1977, NSF launched a small pilot program based on Tibbetts's design. It proved remarkably successful, with early awardees including the software company Symantec. Tibbetts made several consequential design choices that still define the program. He and his advisors concluded that because the technologies involved were inherently high-risk, it was better to make many smaller bets before making a few larger ones. This led to the phased structure: Phase I would fund a short feasibility study (up to $50,000), Phase II would provide more substantial R&D funding (up to $500,000), and Phase III would receive no SBIR funds at all, requiring companies to attract private investment or agency procurement dollars to commercialize results. The phased approach created natural decision gates, limiting federal dollars at risk per innovation while progressively filtering fewer promising concepts.

Success at NSF attracted congressional attention, particularly from Senator Edward Kennedy and the Small Business Administration, and on July 22, 1982, President Reagan signed the Small Business Innovation Development Act (P.L. 97-219) into law. The legislation established four statutory objectives: (1) stimulate technological innovation, (2) use small businesses to meet federal R&D needs, (3) foster participation by minorities and disadvantaged persons in technological innovation, and (4) increase private-sector commercialization of innovations derived from federal R&D. It required every federal agency with an extramural R&D budget exceeding $100 million to set aside a percentage of those funds for SBIR, starting at 0.2 percent in fiscal year 1983 ($45 million total) and growing to 1.25 percent over six years. The bill's sponsors believed that by shifting even a small fraction of funding from large corporations and universities to small innovative companies, the government would get better research at lower cost and small businesses would develop products for both government and commercial markets.

[19] David L. Birch, The Job Generation Process (MIT Program on Neighborhood and Regional Change, 1979);
Zoltan J. Acs & David B. Audretsch, Innovation and Small Firms (MIT Press, 1990).
[20]Roland Tibbetts, "Reauthorizing SBIR: The Critical Importance of SBIR and Small High Tech Firms in Stimulating and Strengthening the U.S. Economy" (NSF, May 2008). https://sbtc.org/wp-content/uploads/2022/12/Roland_Tibbetts_SBIR_Paper_5-28-08.pdf See also National Research Council, An Assessment of the SBIR Program at the National Science Foundation (National Academies Press, 2008).

Appendix 2: Background and Legislative History of SBIR

Congress also included a sunset clause requiring periodic reauthorization, an intentional design choice reflecting the expectation that the program would need ongoing evaluation and adjustment. The program has been reauthorized six times since, with the most recent authorities having expired on September 30, 2025. Each reauthorization has adjusted the set-aside percentage (now 3.2 percent), raised award ceilings, and added reporting requirements, but none has fundamentally revisited the program's structural architecture: the phased model, the topic-driven solicitation process, or the relationship between agency procurement needs and commercial outcomes. As of this report, the program remains lapsed. The House passed a clean one-year extension (H.R. 5100) unanimously in September 2025, but the Senate has not acted, in part because competing proposals, including the INNOVATE Act and the broader SBIR/STTR Reauthorization Act of 2025, seek to attach structural reforms to any extension. The result is that for the first time in the program's 43-year history, eleven federal agencies are legally constrained from issuing new SBIR solicitations or making new awards.

A deeper tension is embedded in the original statute that has never been fully resolved. The 1982 Small Business Innovation Development Act established four objectives that pulled in different directions: stimulating technological innovation, meeting federal R&D needs, broadening participation, and increasing private-sector commercialization.

But it provided no framework for prioritizing among them and no clear definition of what program success would look like. A program optimized to fund many small exploratory research projects looks very different from one designed to move a smaller number of technologies toward operational use by government agencies or commercial markets. Congress left that question open, and forty years of reauthorizations have left it open still.

Nowhere is this tension more consequential than at the Department of Energy (DOE). DOE manages one of the largest SBIR portfolios in the federal government, roughly $300 million annually, and deploys it across a uniquely fragmented organizational landscape, from the Office of Science to appropriations account offices like CMEI, ARPA-E, the NE, and HGEO. The reasons for this fragmentation are partly accidental.

On October 12, 1982, Secretary of Energy James Edwards assigned management of DOE's new SBIR program to the Office of Energy Research (OER), the predecessor to today's Office of Science. The choice was understandable: OER managed DOE's extramural R&D budget, which was the budget that triggered the SBIR set-aside, and it had the competitive grant-making infrastructure that the technology offices at the time largely lacked. But OER was fundamentally a basic science organization. Its culture was oriented toward scientific merit, publishing in peer-reviewed journals, and long-horizon research, not toward commercialization relevant timelines, market validation, or startup acceleration. That original assignment has never changed

Appendix 2: Background and Legislative History of SBIR

More than four decades later, the central SBIR Programs Office still resides within the Office of Science, even as the program now coordinates across thirteen technology offices, including technology offices that did not exist in their current form in 1982. The path dependence is significant: the administrative norms, review culture, and institutional assumptions that shape how DOE runs SBIR were established by an office whose primary mission is basic research, and they have persisted even as the program's mandate and the broader DOE landscape have evolved dramatically around them.

What the creators of SBIR got right, fundamentally, was the identification of a market failure and a structural mechanism to address it. Small businesses had the innovation capacity but lacked access to capital and to the federal R&D system. The federal government had the capital and the R&D needs but lacked efficient mechanisms to tap the innovation potential of its most prolific technology producers at small businesses. SBIR was designed to bridge that gap through competitive, merit-based awards with built-in stage gates, without requiring the government to pick winners. The program has since grown to approximately $4 billion in annual awards across eleven federal agencies, been replicated in countries from the United Kingdom to India to Taiwan, and has seeded companies including Qualcomm, Symantec, and iRobot.

Whether the program's current structure still effectively serves the intent Congress established in 1982 is the central question underlying the reforms proposed in this paper. The startups DOE funds are working on hardware-intensive, capital-intensive energy and climate technologies where the path from laboratory to market is long, expensive, and dependent on infrastructure, regulation, and customer adoption in ways that software ventures are not. For these companies, the unresolved question at the heart of SBIR (is this a de facto procurement tool leveraging small businesses to solve discrete government needs, or a commercialization accelerator meant to solve market needs) is not abstract. The current lapse in authorization, and the congressional debate it has triggered over whether to simply extend the program or fundamentally reform it, creates a rare window for the kind of structural rethinking this paper proposes.

Appendix 3: SBIR Phase III: Statutory Authority, Strategic Value, and Utilization

What Phase III Is

SBIR is commonly understood as a two-phase program, with Phase I funding feasibility research at roughly $200,000 and Phase II funding prototype development at roughly $1.1 million over up to two years. The statute, however, also establishes a third phase that is less widely understood. Phase III is the commercialization stage, where SBIR-funded technologies are expected to transition into products, services, or capabilities purchased by the federal government or the private market. Phase III carries no dedicated SBIR funding and is not an award phase the way Phase I and Phase II are.[21] Its primary authority allows federal agencies to award follow-on contracts to SBIR companies without requiring a new competition.

Phase III can accomplish two primary things:

1. Provide a fast-track, non-competitive option for the original funding agency to continue supporting the company, or.
2. Enable other agencies to rapidly provide support if the solution clearly addresses a mission or procurement need.

That authority comes from the sole-source contracting provision under 15 U.S.C. § 638(r), under which the prior competitive selection of an SBIR Phase I or Phase II award is deemed to satisfy federal competition requirements for any follow-on Phase III work, meaning no new competition or justification is required.[22] Under Phase III, any federal agency, not just the one that funded the original SBIR award, can award a follow-on contract to an SBIR company for work that derives from, extends, or completes its SBIR-funded research without issuing a new solicitation or running a new competition. The only requirement is that the work connects to the original SBIR research, and the provision applies across the entire federal government, meaning a technology developed under a DOE SBIR award could be procured by the Department of Defense, NASA, or any other agency with a relevant need. For small businesses selling to the government, where competitive procurement processes can take months or years and are difficult for small firms to win, this kind of direct pathway from completed R&D to a federal contract is unique.

[21] SBIR.gov, "Apply for SBIR/STTR Funding." https://www.sbir.gov/apply
[22] 15 U.S.C. §638(r); SBA SBIR/STTR Policy Directive (May 2023). https://www.sbir.gov/sites/default/files/documents/SBA%20SBIR_STTR_POLICY_DIRECTIVE_May2023.pdf

How Other Agencies Have Used It

The Department of Defense has been the most visible and systematic user of Phase III authority across the federal government.[23] The Air Force, through AFWERX, has made Phase III a central piece of its small business strategy and used the sole-source authority to move SBIR-funded technologies into operational contracts, with AFWERX reporting $1.44 billion in FY2024 Phase III contract transitions, with $7.5 billion in cumulative Phase III contracts since the program's inception in FY2019.[24] The Navy and Army have built their own Phase III infrastructure as well, with the Navy publishing a dedicated Phase III Guidebook for contracting officers and the Army maintaining a formal Phase III transition process.[25] [26] What makes DOD's approach effective is that it is backed by data infrastructure: the Company Commercialization Record database tracks post-award commercial outcomes for all DOD SBIR/STTR awardees, which means a contracting officer who wants to procure a technology can look up what companies have built, how the technology performed, and whether it is ready.[27]

NASA has used Phase III selectively, mainly where SBIR-funded sensor, materials, or propulsion technologies showed clear mission utility during Phase II,[28] while the National Institute of Health (NIH) has connected SBIR-funded biotech and medtech companies with commercialization pathways through its Commercialization Accelerator Program, though NIH's focus is less about federal procurement and more about private-market transition. [29]

[23] Cross-agency Phase III comparison data is not reliably available. See GAO, Agencies Need to Strengthen Efforts to Realize Benefits of the SBIR Program, GAO-14-96.
[24] AFWERX/SPACEWERX FY2024 Annual Report. https://afwerx.com/wp-content/uploads/2024_AFWERXSPACEWERX_AnnualReport_Cleared_AFRL-2025-2954.pdf
[25] Department of the Navy, SBIR/STTR Phase III Guidebook, Version 2 (2020). https://www.navysbir.com/docs/DON-SBIR_STTR_Phase-III_Guidebook_V2-2020.pdf
[26] U.S. Army SBIR/STTR Phase III. https://armysbir.army.mil/phase/phase-iii/
[27] DoD SBIR/STTR Company Commercialization Report (CCR). https://www.dodsbirsttr.mil
CCR data is self-reported; GAO has noted reliability limitations (GAO-14-96).
[28] NASA SBIR/STTR Phase III. https://www.nasa.gov/sbir_sttr/phase-iii/
[29] NIH Commercialization Accelerator Program (CAP). See NIH Notice NOT-OD-19-129. https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-129.html

DOE Failure to Activate Phase III

DOE has the same Phase III statutory authority as DOD and NASA but has rarely used it, and the reasons are structural, cultural, and informational in ways that reinforce each other. The most basic problem is awareness: SBIR companies funded by DOE likely do not know the authority exists. Neither the application process nor Phase II closeout emphasize to awardees that they have a statutory basis for sole-source follow-on contracts. In addition, the program officers within technology offices and contracting officers who would need to execute a Phase III contract have, in most cases, not been briefed on the provision or processed one. Alternatively, some technology offices may be aware of Phase III but prefer to have Phase II winners compete for other funding programs their office has instead.

That awareness gap is compounded by the absence of any mechanism for potential buyers to evaluate what DOE's SBIR portfolio has produced. While basic award data is available through the government-wide SBIR.gov portfolio database, DOE does not maintain anything equivalent to DOD's Company Commercialization Record, which tracks commercialization outcomes, technology readiness, and post-award performance.[30] A contracting officer at another agency who knew about Phase III and wanted to buy an SBIR-funded energy technology could find that DOE made an award, but would have no way to assess whether the technology is ready for procurement, what the company has done since the award ended, or whether the capability matches their need. A program manager at DHS looking for a grid-resilience solution has no practical way to learn that DOE funded one two years ago, even though the technology, the authority, and the potential buyer all exist.

Behind the awareness and visibility problems is a deeper cultural misalignment. Phase III assumes that the funding agency views its SBIR portfolio as a source of technologies someone might actually purchase, license, or otherwise fund. DOE, having managed SBIR as a basic research program within the Office of Science for over four decades, does not naturally adopt that orientation.[31] The institutional reflex is to treat awards as research grants, and a research culture asks, "what did we learn?" rather than "who would buy this?". This misalignment can be further complicated by the technology offices managing the project, not believing the technology is ready for purchase and that further R&D should be done, funded publicly or privately, before its ready for commercialization and market adoption.

Given these factors, the opportunity of Phase III is rarely discussed and only used in a handful of situations each year by the Office of Science to procure items for their work. The institutional ownership problem makes all of this harder to fix. DOD, AFWERX and the Defense Innovation Unit have taken explicit responsibility for Phase III facilitation, while at DOE no office is charged with identifying Phase III opportunities, connecting companies with federal buyers, or helping contracting officers execute a Phase III contract. The SBIR Programs Office manages Phase I and Phase II, and Phase III belongs to everyone in theory and no one in practice.

A note on Phase III applicability for continued DOE support: in some cases, a Phase II project has shown such strong technical progress and commercial potential that a Phase III decision is fairly clear - continued funding would unambiguously provide value to the company and the funding agency. In most cases, however, the decision is less clear. It may not be clear to technology offices whether the Phase II project offers a stronger opportunity than others that might be selected through a competitive solicitation. In those cases, the technology offices are more likely to encourage the Phase II companies to apply, and assess future funding decisions as a portfolio rather than in isolation. If we accept this as a reasonable approach to build a successful portfolio and manage risk, it implies that even if DOE addresses the friction points that have limited Phase III utilization, Phase III projects would remain the exception rather than the rule.

[30] SBIR.gov portfolio database. https://www.sbir.gov/portfolio. DOE does not maintain a separate commercialization outcome tracking system comparable to DoD's CCR. [31] DOE Office of Science, SBIR/STTR Programs. https://science.osti.gov/sbir/About

DOE Failure to Activate Phase III

Companies that completed Phase II with demonstrated technical feasibility, technologies that DOE's own reviewers judged meritorious, have left the program with no connection to the agencies and buyers who need what they built. Some found their way independently, but many did not, and technologies that DOE invested public money in have gone unused because nobody connected the company to the customer. This is an institutional challenge, not a market one, and it is the gap that the reforms proposed in this paper are designed to close.

The operating design in Section 4 addresses Phase III underutilization directly through portfolio visibility so technologies and buyers can locate each other, active matchmaking through FESI, and contracting officer education so Phase III contracts can actually get executed when the opportunity arises.

Appendix 4: Implementation Timeline

The operating design launches with full functionality in Year 1, though some elements mature over time. Because the transition catches DOE mid-cycle, Year 1 also includes a bridge Phase II round for existing Phase I awardees who completed their work under the old system but were never considered for Phase II advancement.

Year 1 (FY2027 cycle) is the full program launch: simplified applications, open topics at the 20 percent floor, fixed calendar, prior-year funding, PIA operational consolidation, human-only compliance screening with parallel experimental AI tools to see if they correlate, proportional RTES/NEPA screening, Phase II cooperative agreements, formalized OTC selection authority, and the Phase II gate structure. Before the first new-format Phase I solicitation closes, OTC conducts a one-time transitional Phase II review covering legacy Phase I awardees across all technology offices. This ensures that companies who completed Phase I under the prior system are not stranded without a path to Phase II simply because the transition changed the process around them. FESI begins Phase III consortium development. The reviewer database consolidation completes. Data collection begins on the FY2027 cohort. No mid-year October window yet. Expected outcome: approximately 200-240 Phase I awards and 80-100 Phase II awards (including transitional awards), with 20 percent in open topics and 1-2 new companies per office entering SBIR for the first time.

Year 2 (FY2028 cycle) ntroduces parallel AI and human compliance and initial screening. he October mid-year selection window opens for standout Phase I performers. FESI's consortium reaches 5-10 federal agencies with designated Phase III liaisons. The TABA voucher system is fully operational and the portfolio visibility platform provides cross-office analytics. The first annual SBIR outcome report is published, covering the FY2027 cohort. Office deadline compliance approaches 95 percent. FESI facilitates 3-5 Phase III contracting discussions and 1-2 contract awards.

Year 3 (FY2029 cycle) and beyond represents mature operation. AI compliance review and application screening serves as the primary filter with human review focused on applications that perform best against the scoring criteria and goals of the DOE and the program. FESI's consortium expands to 15-20 federal agencies. Outcome data enables office-level performance comparison and portfolio calibration. If certain topic areas produce higher Phase III conversion, the program adjusts portfolios. If outcome data shows employment or commercialization gains, the program communicates results to Congress and justifies continued investment. Deadline compliance approaches 98 percent. The system can now improve based on evidence rather than anecdote.