Commercialization and the Power of Partnering

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Agenda

- Why is commercialization important
- What goes into a Phase I commercialization plan
  - *Components of a P1 commercialization plan*
    - what should you be thinking about today in terms of the broader picture
    - Importance of customer discovery - *now*
- Partnering
  - *Why necessary*
  - *Types of early-stage partners*
  - *Resources available at DOE*

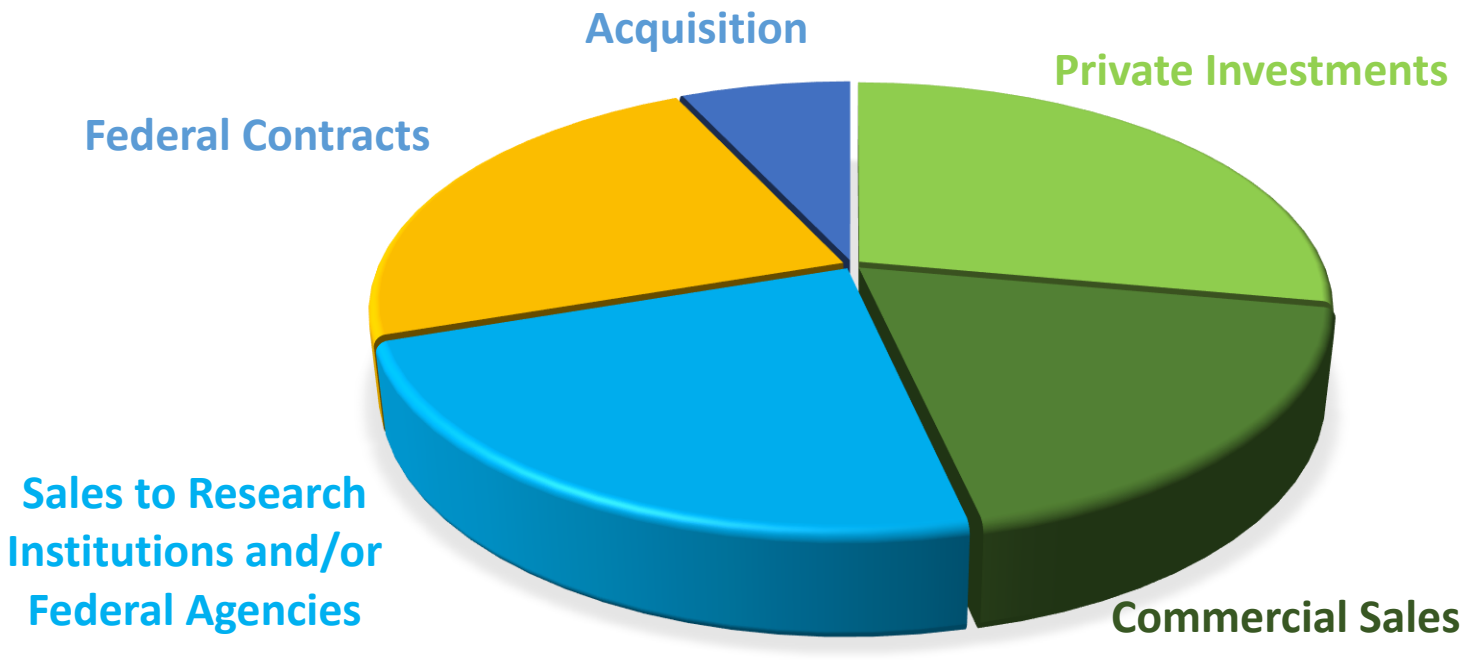
Why is Commercialization Important?

Commercialization is a statutory goal of the SBIR/STTR programs

- *"Increase private sector commercialization of innovations derived from Federal R-R&D, thereby increasing competition, productivity and economic growth."*
- Agencies are required to evaluate the commercial potential of R&D conducted under SBIR/STTR.
- "Commercialization" encompasses different aspects of early commercial activity: product launch, licensing, patenting, raising **non-SBIR** funds.

Commercialization (Phase III) defined

- *Sale of Product/Service*
- License or acquisition
- Government contract (**non-SBIR** funds)



Understand Proposal Review Criteria

1/3 Technical Merit

1/3 Ability to Carry Out the Project

1/3 Impact

Significance of commercialization varies by agency.

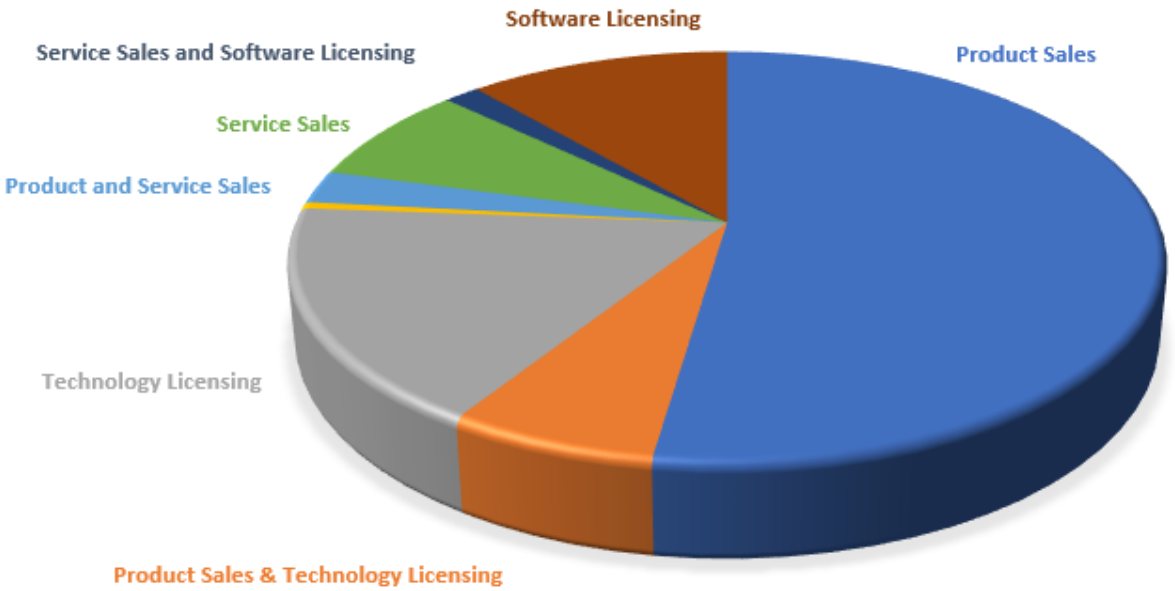
DOE evaluates under IMPACT criteria; even more significance when applying to NSF.

Understand the significance of your ***Company Commercialization Report*** and ***Commercialization Plan***

Myriad of Business Models

Given the diverse technologies supported by the agencies, there are many different business models for revenue generation.

Percentages will vary by agency dependent upon technologies and whether they can be their own customers (mission oriented).



No one “model” fits all; myth that one model is favored over another – figure out which strategy is best for your company and your target industry and provide validation to support your decision.

Phase I Commercialization Planning

What should you be thinking about *now* for successful commercialization?

Phase I Commercialization Plans

Although there are similar key elements, available information varies greatly based on the technology and application (target market).

- For those delivering innovative solutions into an existing market, you will be able to find much more information on your market, potential customers and competitors.

- For those delivering new technologies into emerging markets, the market information will be more challenging to obtain or estimate. Competitors may be unknown and/or less known – very few, if any, commercial products might be available today.

Essential Elements of Commercialization

1. Stakeholders - Customer/End-User; key players; suppliers
2. Value Proposition
3. Market Opportunity
4. Competition
5. Model for Revenue generation (Business Model)
6. Funding for Technology Development  Productization
7. Sustainable Competitive Advantage (IP strategy)
8. Team (***Do you need partners?***)

DOE Phase I Commercialization Plan Specifications

1. MARKET OPPORTUNITY
2. COMPANY AND TEAM
3. COMPETITION AND INTELLECTUAL PROPERTY
4. FINANCE AND REVENUE MODEL

- Use the example plan and PI FOA for guidance; separate 4-page Phase I commercialization plan; 4 individual sections that mirror the DOE Phase II commercialization plan
- Moving from Phase I to Phase II requires you to develop and validate what you suggest in Phase I; taking it from a few pages to 15 pages

DOE Phase I Specifications

ABC LLC estimates sales revenues of $XX and licensing revenues of $XX during the first 10 years of commercialization.

1. Market Opportunity

- *Describe the product or service that you plan to bring to market.*
- *Describe your customers and your competitive advantage and/or value proposition for the customer.*
- *Describe anticipated sales with an explanation of the basis of your revenue forecast. (units x anticipated selling price or subscriptions or service).*
- *Describe your competitors (existing and emerging).*
- *Describe any barriers to entry that may limit or slow adoption of new products; such as, test and demonstration requirements, regulatory or other certifications.*

DOE Phase I Specifications

2. Company/Team
   - *Describe the capabilities of your team specifically as they relate to the commercialization of your technology; do not repeat their technical qualifications which are covered elsewhere*
   - *Include relevant commercialization capabilities of your team that support business model that will be used to generate revenues*
   - *Identify weaknesses (maybe you have no personnel with commercialization experience); speak to your time phased plan to address through new hires, strategic partners, consultants; speak to credentials and timing to have in place*

3. Intellectual Property
   - *Describe both the state of the intellectual property that exists in your intended market and plans to protect your intellectual property.*
   - *Review existing patent literature – is your approach novel and not covered by prior art giving you freedom to operate?*
   - *Keep in mind that patenting is not required for all markets. There will be markets where trade secrets or copyrights will prove sufficient.*

DOE Phase I Specifications

4. Revenue Forecast
   - ***ABC LLC estimates sales revenues of $ and licensing revenues of $ during the first 10 years of commercialization.***
   - *The revenue forecast statement is **mandatory**. DOE asks for estimated revenue during the first 10 years of commercialization because companies vary on when they begin selling product.*
   - *Provide assumptions or sales forecasts to validate, if known*

Reviewed as part of ***IMPACT*** criteria

Phase I Commercialization Plan MUST HAVES

1. Customer discovery –
   - *Is there anyone out there that needs your solution?*
   - *What are they using now and what are the limitations?*
   - *What are they willing to pay for a solution?*
   - *Who are stakeholders?*
2. Understand your target market and the opportunity.
3. Understand your competition and the industry.
4. Team – often strong technically; put together a time-phased plan to incorporate key business functions if not in place today; ***do you need partners?***
5. Strategy for IP
6. Model for revenue generation
7. Funding Required and where it might come from (early but begin to think about it…)

Importance of Customer Discovery

Use customer discovery to answer critical questions for your Phase I proposal

Start Customer Discovery Now (Pre-Phase I)

- Use customer discovery to ***understand your stakeholders***; ***validate the need*** for your technology; and insure you can meet their ***price***, ***specifications***, and ***quality requirements*** as you start development
  - *Customer*
  - *End-users*
  - *Value Chain/Supply Chain and where **YOU** fit*
- As you develop your Phase I proposal you should know these customers/end-users by name. ***Begin developing a relationship*** so that by the time you submit a Phase II proposal you can revisit to build and nurture the relationship getting feedback and letters of support where possible.
- Be realistic in your assessment of potential sales; do not assume widespread and immediate adoption of your technology by the entire customer base. Provide a brief explanation of the basis for your revenue forecast – ***what did you learn during customer discovery (% that need solution)***
- Competitors may be developing new technology that they are not publicly disclosing. Check publications and presentations – look for collaborations with key players. ***Use customer discovery to understand who is supplying solutions today and the limitations. Seek to understand price and customer loyalty where possible***.

Why Customer Discovery *NOW* –

Use interactions with stakeholders to open the door to relationships that can be nurtured ***over time***. Long-term, some may be ***potential partners***.

- *Can I come back to you in a couple of months to talk to you about progress on a potential solution?*
- *Would you be interested in beta-testing a potential solution?*
- *Does your company provide letters of support?*

Don't stop – make customer discovery and interacting with your ecosystem the norm for your company; test and retest hypotheses as you develop new products/services

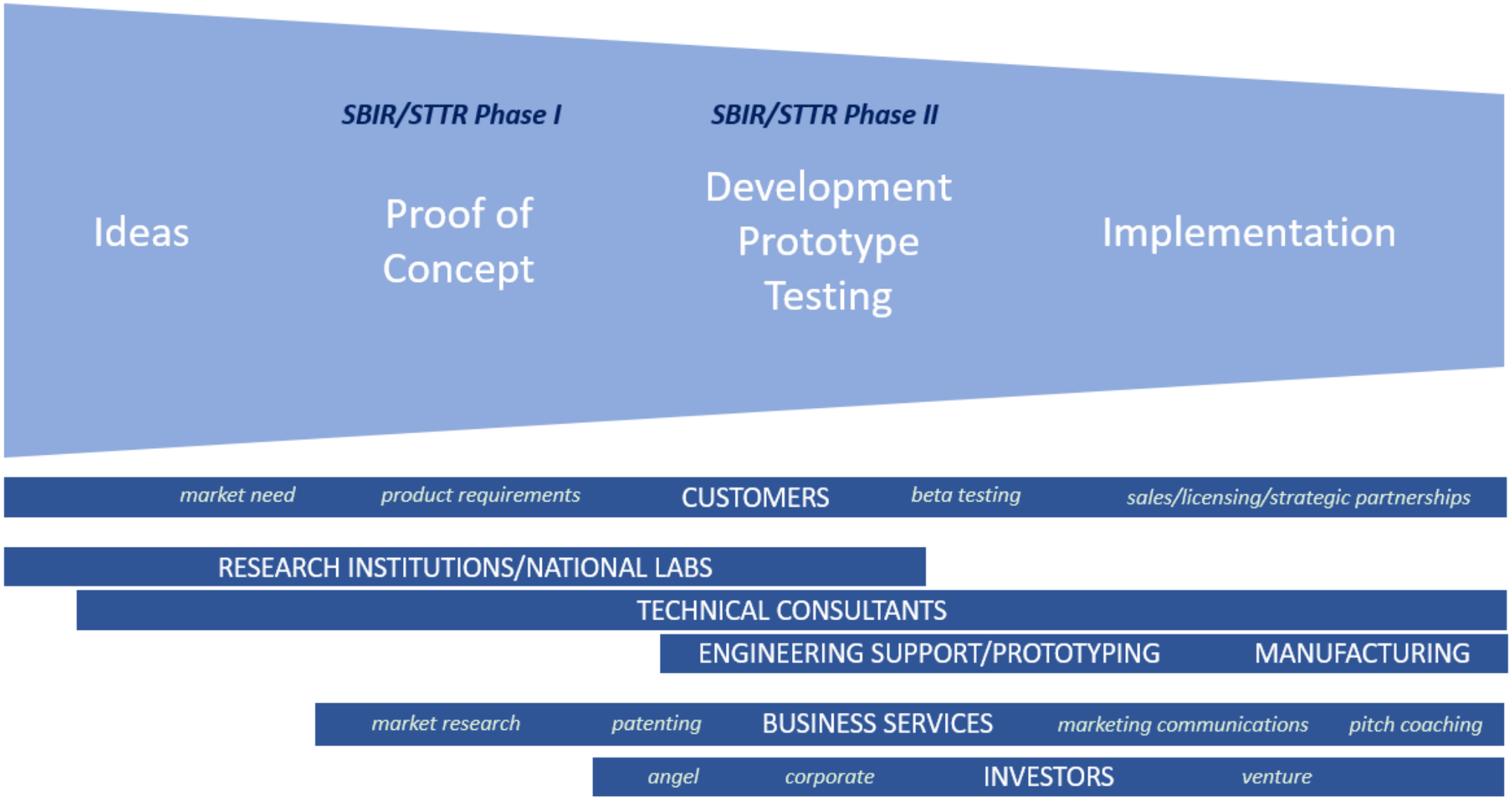
Commercialization is Hard…

- Directorate provides Technical and Business Assistance (TABA) funds - $6.5K in Phase I and $50K in Phase II
- See the FOA for specific tasks that can be covered with TABA funds
- DOE has a Phase I commercialization program (vendor vetted by agency); cannot use both TABA funds and participate in program
- DOE has an abbreviated I-Corps program in Phase I - Energy I-Corps for SBIR to help with customer discovery
- New partnering resources for applicants and awardees

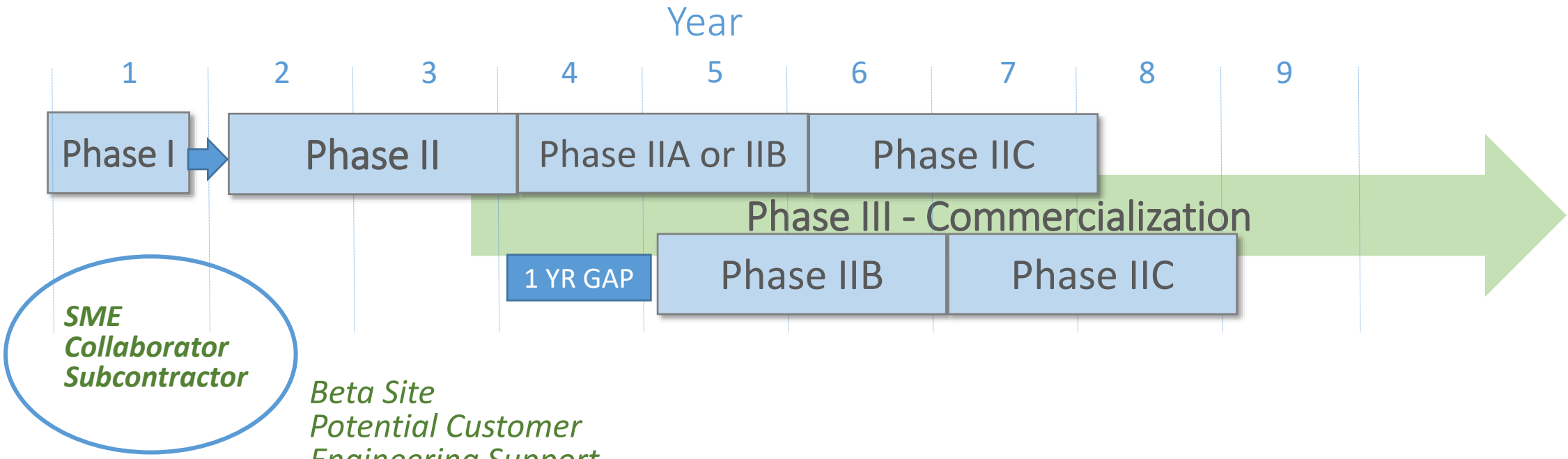
Discover the Power of Partnering

Use partnerships to strengthen your proposal and increase your chances of successful commercialization.

Partners vary by development stage…



Matching Partners to Award Phases



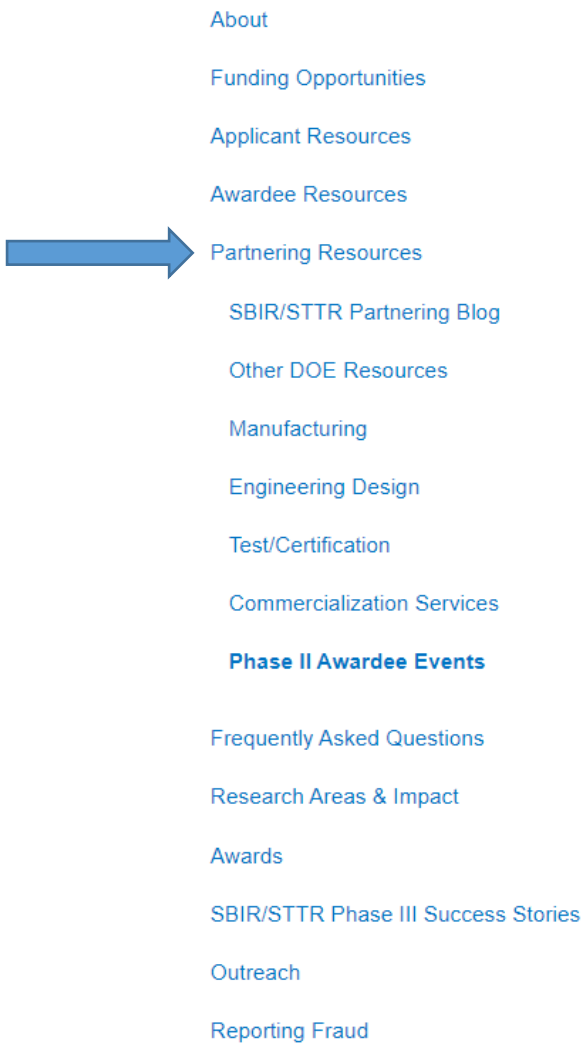
SME
Collaborator
Subcontractor

Beta Site
Potential Customer
Engineering Support
Joint Venture/Funds
Access to additional business functions

Customer Funding
License

Manufacturing/Distribution Joint Venture
Acquisition

Partnering Resources



- Developing public facing, searchable ***SBIR Partnering Platform*** – available July 2023; a repository where SBIR/STTR applicants/awardees (***INNOVATORS***) can find potential partners (***PARTNERS***) and partners can access 1000+ vetted technologies; AI used for matchmaking
- ***Interim*** Solution - Partnering Resources Page: Manufacturing Resources; Engineering Design Resources; Test/Certification Resources; Commercialization Service Resources
- Introduced ***virtual*** Phase II Awardee Partnering Events
- SBIR/STTR Partnering Blog

Partnering Resources Available

- Manufacturing Resources
  - *Manufacturing USA (newer, state-of-the-art) https://www.manufacturingusa.com/institutes*
  - *MEP centers (traditional) https://www.nist.gov/mep/centers*
- Engineering Design Resources
- Test/Certification Resources
- Commercialization Service Resources
  - *Check State and local resources – see, https://www.sbir.gov/resources*

SBIR | U.S. DOE Office of Science(

science.osti.gov/sbir/Partnering-Resources/Engineering-Design

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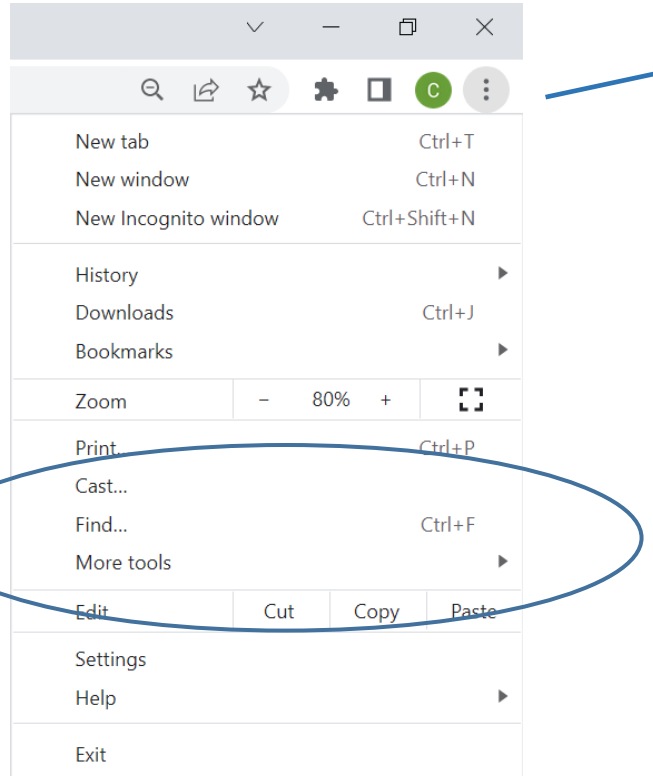
	Fargo, ND 58103	
Applied Chemical Technology	4350 Helton Drive Florence, AL 35630 act@appliedchemical.com	The engineering professionals at Applied Chemical Technology (ACT) in Florence, Alabama provide an integrated approach to your project with engineers,,automation/control,designers, and fabricators all working together under one roof. The team works collaboratively with the client in the engineering of scale-up for process and product development, commercial scale plants, custom equipment, and process improvement.
Applied Rapid Technologies	1130 International Pkwy STE 127 Fredericksburg, VA 22406 info@obsidiansg.com	Experience and expertise. From design to delivery, Applied Rapid Technologies means 3D ASAP in the mid-Atlantic and beyond.
Arizona Vortex Tube Manufacturing Company	19314 W Echo Ln Waddell, AZ 85355 info@arizonavortex.com	Arizona Vortex Tube Manufacturing Company is dedicated to solving manufacturing and industrial needs. Whether you want to Arizona Vortex Tube Mfg. Co. is dedicated to solving industrial and machining cooling problems. Call about your application.
Arkansas Tool and Die Product	1317 Orange St	Our highly skilled product design team combined



Use browser search tool for keyword search

DOE SBIR/STTR Resources

Early-Stage
Innovation
SBIR & STTR

Commercialization
Private Funding

[Applicant Resources]

[Phase 0 Application Assistance]

Sequential Phase IIs

Phase I Commercialization Program

[Energy I-CORPS for SBIR/STTR]

[TABA funds]

[Partnering Resources] and Phase II Workshops

Diversity Supplement for Phase II Awardees

Other DOE Partnering Resources

- Looking for SMEs, facilities, collaborators at National Labs? Visit https://www.labpartnering.org/
  - *Another way to find SMEs, collaborators, subcontractors - review related research being done at research institutes (universities, colleges); check publications*

- Looking for facilities for testing, integration and/or demonstration at National Labs
  - ***Energy Systems Integration Facility (ESIF)**, National Renewable Energy Lab (NREL)*
  - ***Grid Research Integration and Deployment Center**, Oak Ridge National Laboratory (ORNL)*
  - ***Electric Grid Test Bed**, Idaho National Laboratory (INL)*

- Several **additional DOE Resources** are available:
  - ***American-Made Challenges***
  - ***Lab-Embedded Entrepreneurship Program (LEEP)***
  - ***Technology Commercialization Fund (TCF)***

Questions??

We value your feedback to help us improve the DOE SBIR/STTR Programs

Interested in understanding your individual partnering needs

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https://science.osti.gov/sbir

Other DOE Resources

Other DOE Resources

Early-Stage
Innovation
SBIR & STTR

Commercialization
Private Funding

[Partnering with National Laboratories]

[National Labs – POCs and Core Capabilities]

[Technology Commercialization Fund (TCF)]

Demonstration Facilities: [Idaho], [NREL], [ORNL]

[Office of Clean Energy Demonstrations]

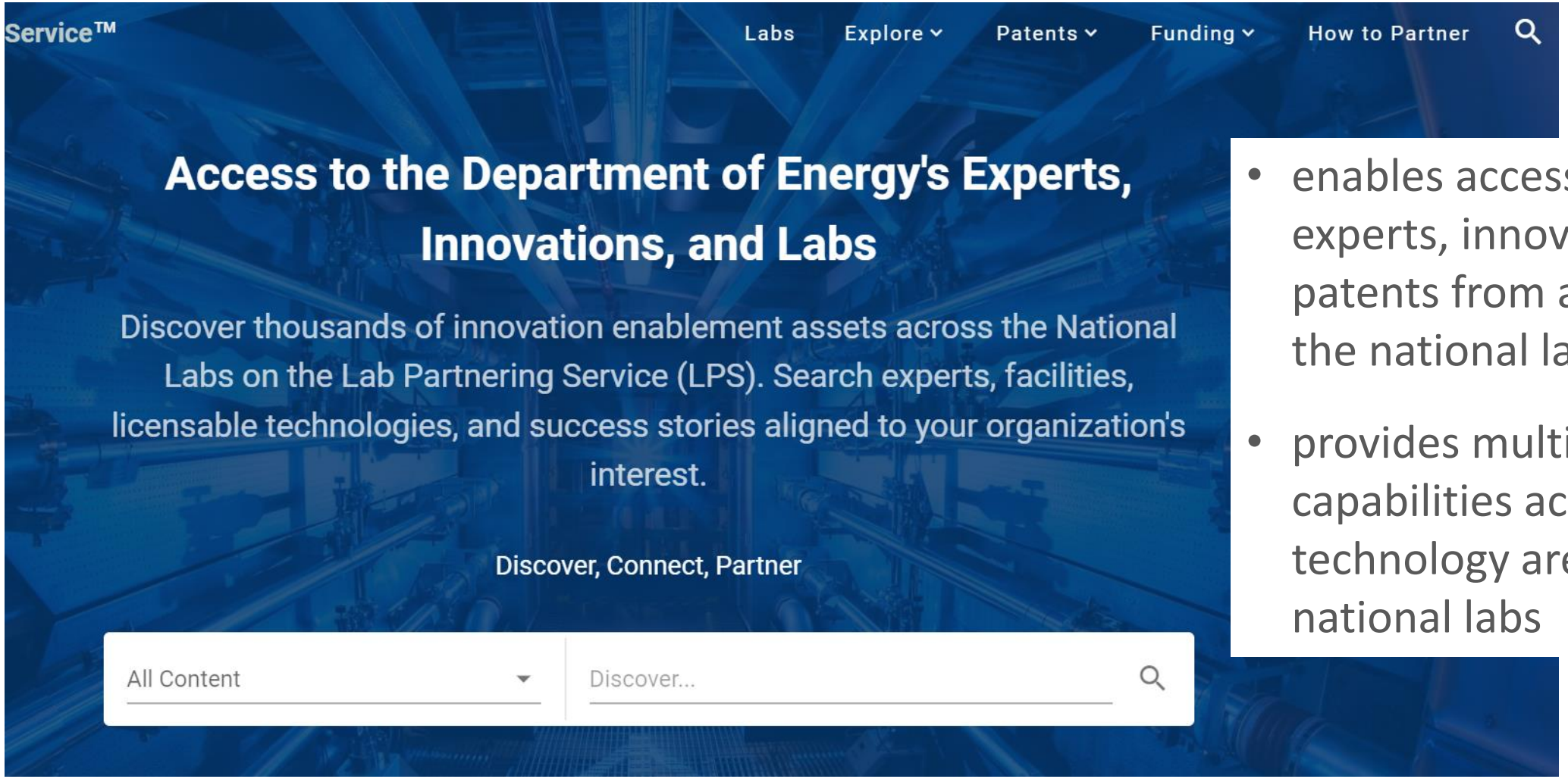
[Loan Programs Office]

[*Lab-Embedded Entrepreneurship Program (LEEP)*]

[American-Made Challenges]

[National Energy Research Scientific Computing Center (NERSC)]

Partnering with the National Labs



- enables access to leading experts, innovations, and patents from across DOE and the national labs
- provides multi-faceted search capabilities across numerous technology areas and the national labs

Demonstration Facilities at the National Labs

- Idaho National Lab
  - *https://factsheets.inl.gov/FactSheets/Electric Grid Security Capabilities.pdf*
- Oak Ridge National Lab
  - *https://www.ornl.gov/gridc*
- National Renewable Energy Lab
  - *https://www.nrel.gov/workingwithus/partnering-facilities.html*
    - Energy Systems Integration Facility
    - Solar Energy Research Facility
    - Wind Field and Technology Research Validation Sites

Technology Commercialization Fund (TCF)

- Operated out of DOE's Office of Technology Transitions (OTT), the TCF is a nearly $30M funding opportunity that leverages funding in the applied energy programs to mature promising energy technologies with the potential for high impact.

- Solicitations look for collaboration between the national labs and the private sector. Solicitations are typically announced at the beginning of the year.

https://www.energy.gov/technologytransitions/technology-commercialization-fund

Lab-Embedded Entrepreneurship Program (LEEP)

- Managed by EERE and sponsored by its Advanced Manufacturing Office (AMO), LEEP provides clean tech scientists turned entrepreneurs with a two-year funded fellowship within a LEEP node
- LEEP nodes are currently located at ***Argonne National Laboratory***, ***Oak Ridge National Laboratory***, ***Lawrence Berkeley National Laboratory*** and ***National Renewable Energy Laboratory***
- Provides funds, scientific and business mentorship and access to state-of-the-art facilities

https://www.energy.gov/sites/default/files/2022-04/CRI_DOE LEEP Flyer_R5_0.pdf

American-Made Challenges

- Clean energy prize competitions administered by the National Renewable Energy Laboratory on behalf of DOE's Office of Energy Efficiency and Renewable Energy (EERE)
- Register to be part of a network of *connectors* that have committed time and personnel to support the prize competitions
- Topics include solar, buildings, advanced manufacturing, geothermal, and geothermal, and inclusive energy innovation

https://americanmadechallenges.org/

Office of Clean Energy Demonstrations

- Established in December 2021 as part of the Bipartisan Infrastructure Law to accelerate clean energy technologies from the lab to market to help our nation reach its climate goals of net zero emissions by 2050.
- Enable clean energy demonstration projects at scale to efficiently commercialize critical clean energy technologies including clean hydrogen, carbon capture, advanced nuclear reactors, grid-scale energy storage, industrial emissions reductions, and more.
- OCED fills the gap between R&D and early-stage demonstration projects within DOE technology offices and initial deployments supported by the private sector and/or other DOE programs.

https://www.energy.gov/oced/office-clean-energy-demonstrations

Loan Programs Office provides…

- Provides access to adequate ***debt capital for final milestones*** to commercialization
- Provides a ***bridge to bankability*** for innovative and high-impact energy technologies
- Provides access to needed loans and loan guarantees when private lenders cannot or will not until a given technology has reached full market acceptance