U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

DOE EERE Program Office Perspective: Lessons Learned from Managing SBIR/STTR Projects and Portfolios.

October 29, 2019
DOE 2019 SBIR/STTR Phase I Release 2 PI Meeting

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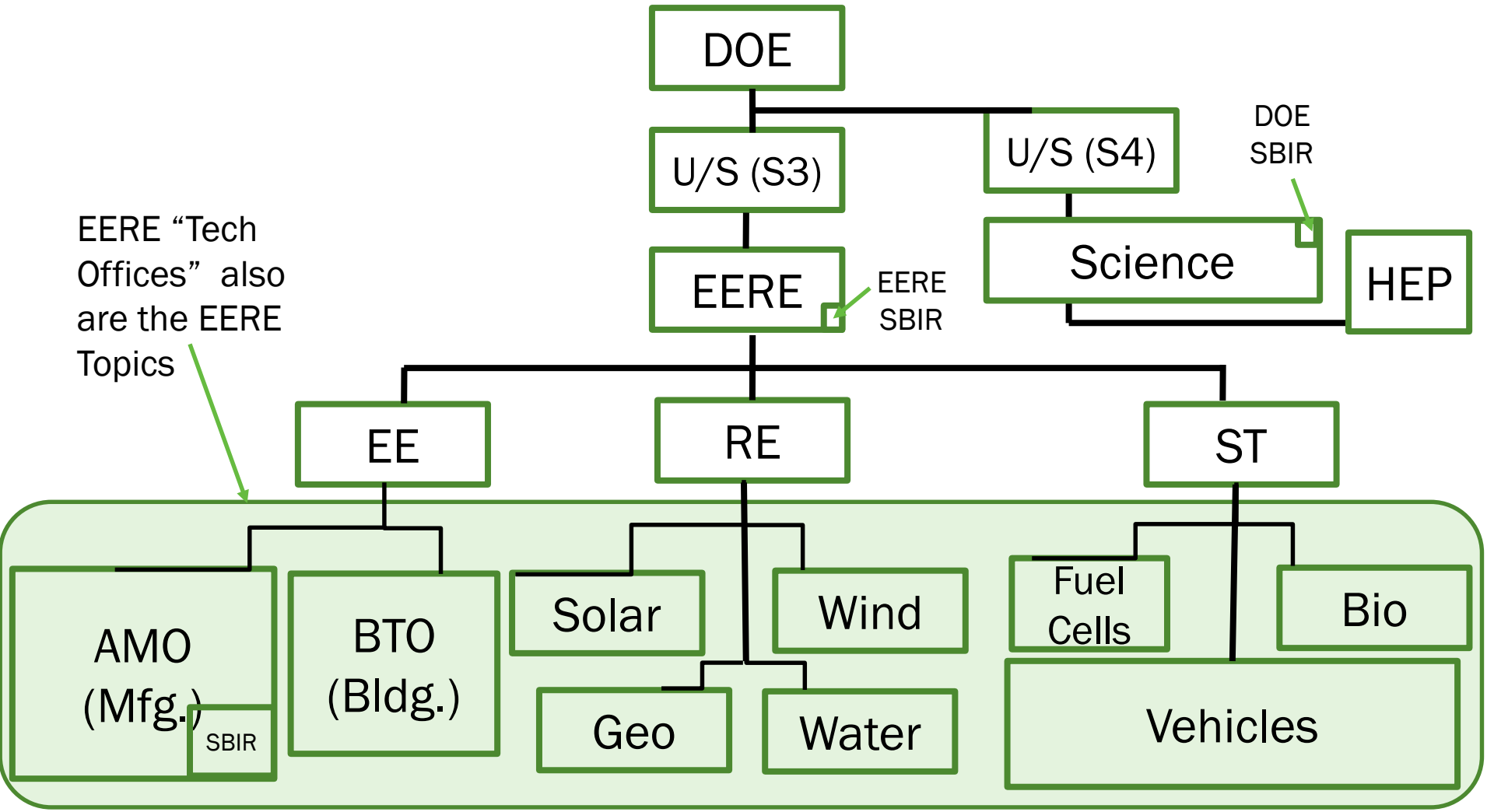
www.manufacturing.energy.gov

Summary of Talk

- **About Me, AMO**
  - Org Charts, Mission, Responsibilities etc.
- **About You**
  - Studies, Statistics
- **How to work together**
  - Advice for Applicants/Grantees
- **Questions?**

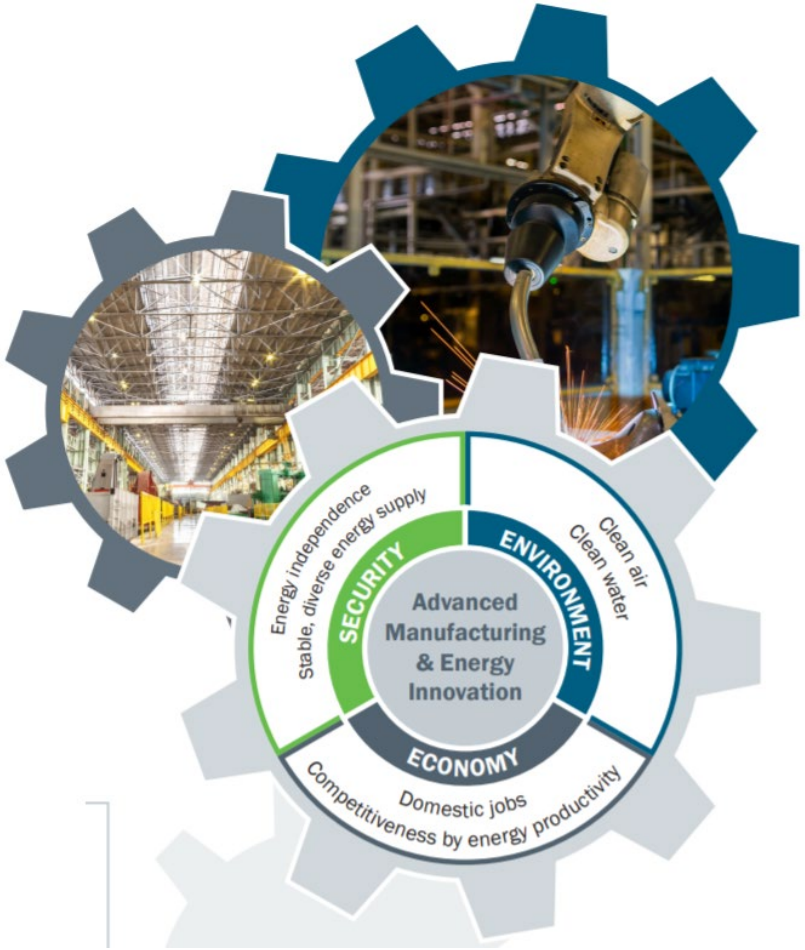
DOE Org Chart (EERE, HEP excerpts)



AMO Vision and Mission

VISION: U.S. global leadership in sustainable and efficient manufacturing for a growing and competitive economy.

MISSION: Catalyze research, development and adoption of energy-related advanced manufacturing technologies and practices to drive U.S. economic competitiveness and energy productivity.



Project Manager* Responsibilities (DOE-SBIR)

* aka Technical Topic Manager (TTM)

- Develop topic or subtopic
- Contact for internal/external questions on topics or subtopic
- Present at DOE-SBIR topics webinar
- Participate in One-on-one meetings at the PI meeting
- Recruit and assign reviewers (redact reviews) in PAMS
- Review LOIs, applications, score and rank award selections in PAMS
- Review interim and final reports
- Track projects closely enough to be able to make recommendations about likely Phase II awards
- Role limited to technical management

Current SBIR/STTR Funding

- Federal: ~ $3,000,000,000
- DOE: ~ $300,000,000 (10% of Federal)
- EERE: ~ $60,000,000 (20% of DOE)
- AMO: ~ $11,000,000 (18% of EERE)

In FY19 funded:

- 14 Phase I proposals
- 8 Phase II proposals

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Federal SBIR/STTR Impact- (1983 to 2018)

- **Awards**
  - ~115,000 Phase I and ~46,000 Phase II awards
  - ~$47 B award funding
  - ~26,000 small business awardees
- **Patents**
  - 132,216 U.S. Patents
  - 10-12 Patents per day issued to SBIR-involved firms
- **Business Investment**
  - **One in very six Venture Capital dollars in the U.S. goes to an SBIR-involved firm**

FY 2019 Release 2 Topics/Subtopics

Release 2: **34 topics, 143 subtopics**

Cybersecurity, Energy Security, and Emergency Response: (1 topic, 2 subtopics)

Defense Nuclear Nonproliferation: (3 topics, 13 subtopics)

Electricity: (2 topics, 4 subtopics)

Energy Efficiency and Renewable Energy: (12 topics, 40 subtopics)

Regular: (ADVANCED MANUFACTURING Topic) (1 topic, 3 joint topics, 8 subtopics)

- *07a Manufacturing Cybersecurity*
- *07b Atomic Precision for Gaseous Separations*
- *07c Covetic Processing of Critical Materials and Strategic Materials*

Technology Transfer Opportunity (AM topic)

- *07d TTO: Electrochemical Recycling Electronic Constituents of Value (E-RECOV)*

Joint Office (separate Topic – includes subtopics):

- *17b AMO-GTO Desalination and Critical Material Recovery Systems from Other Energy Sources*

Environmental Management: (1 topic, 1 subtopic)

Fossil Energy: (3 topics, 9 subtopics)

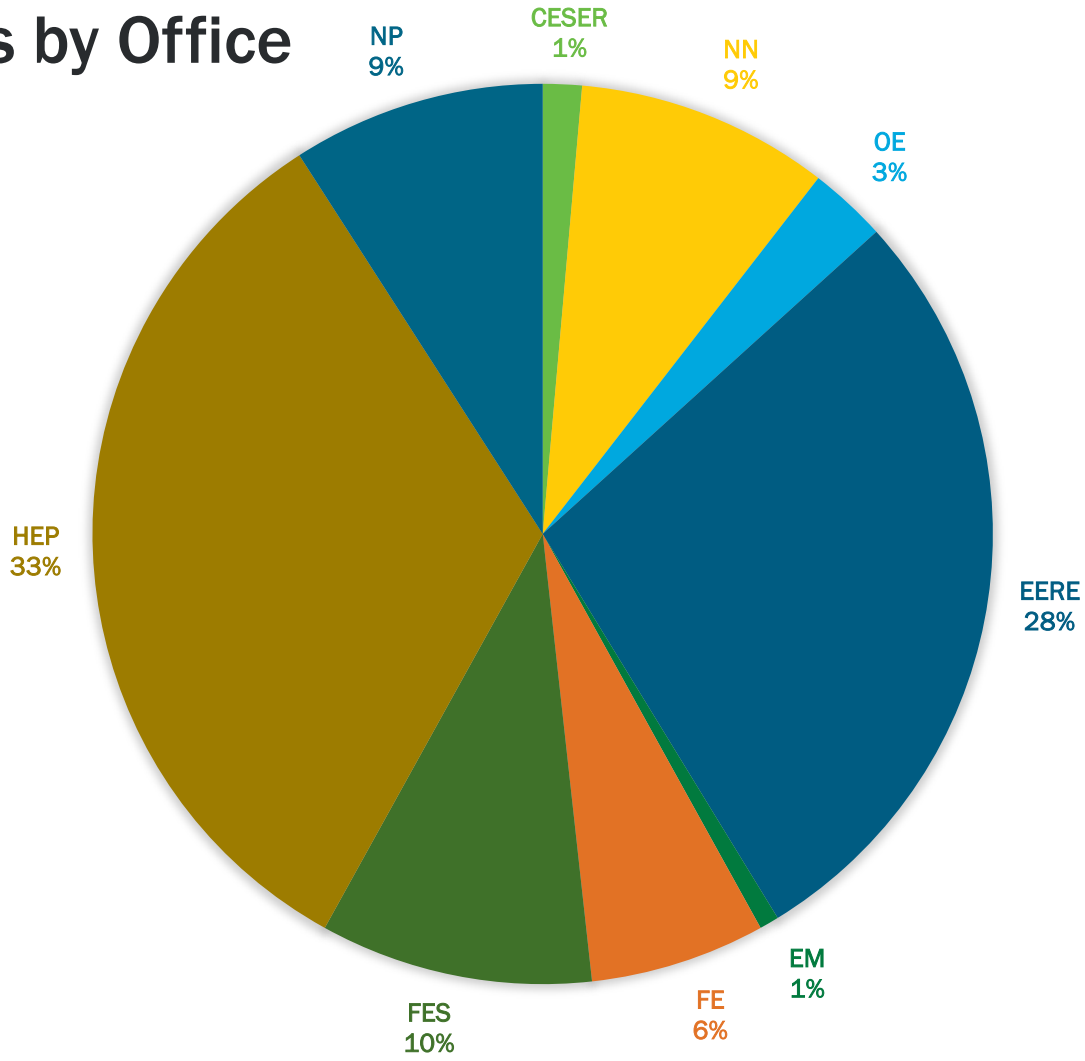
Fusion Energy Sciences : (3 topics, 14 subtopics)

High Energy Physics : (7 topics, 47 subtopics)

Nuclear Energy : (2 topics, 13 subtopics)

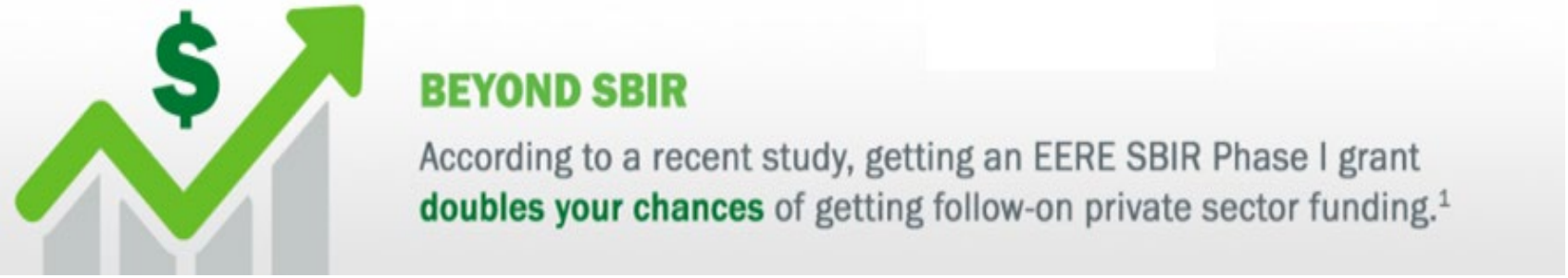
FY 2019 Release 2, 9 Offices

Subtopics by Office



Phase I Award itself is Huge

- You're already winners with double the chance of getting VC finding!
- After just a Phase I award small firms have a 20% chance of receiving such funding (vs. 10% chance without it)



[1] https://www.energy.gov/sites/prod/files/2019/03/f60/sbir-eere-fe-analysis-howell-report-2019.pdf

Your Future…on average

- Up to one third don't apply for a Phase II
- One third to half of Phase II applicants receive 1st Phase II.
- Smaller (10 > 20%) go on to 2nd Phase II.
- No third Phase II yet at DOE.
- Most EE and FE awardees do not apply again.

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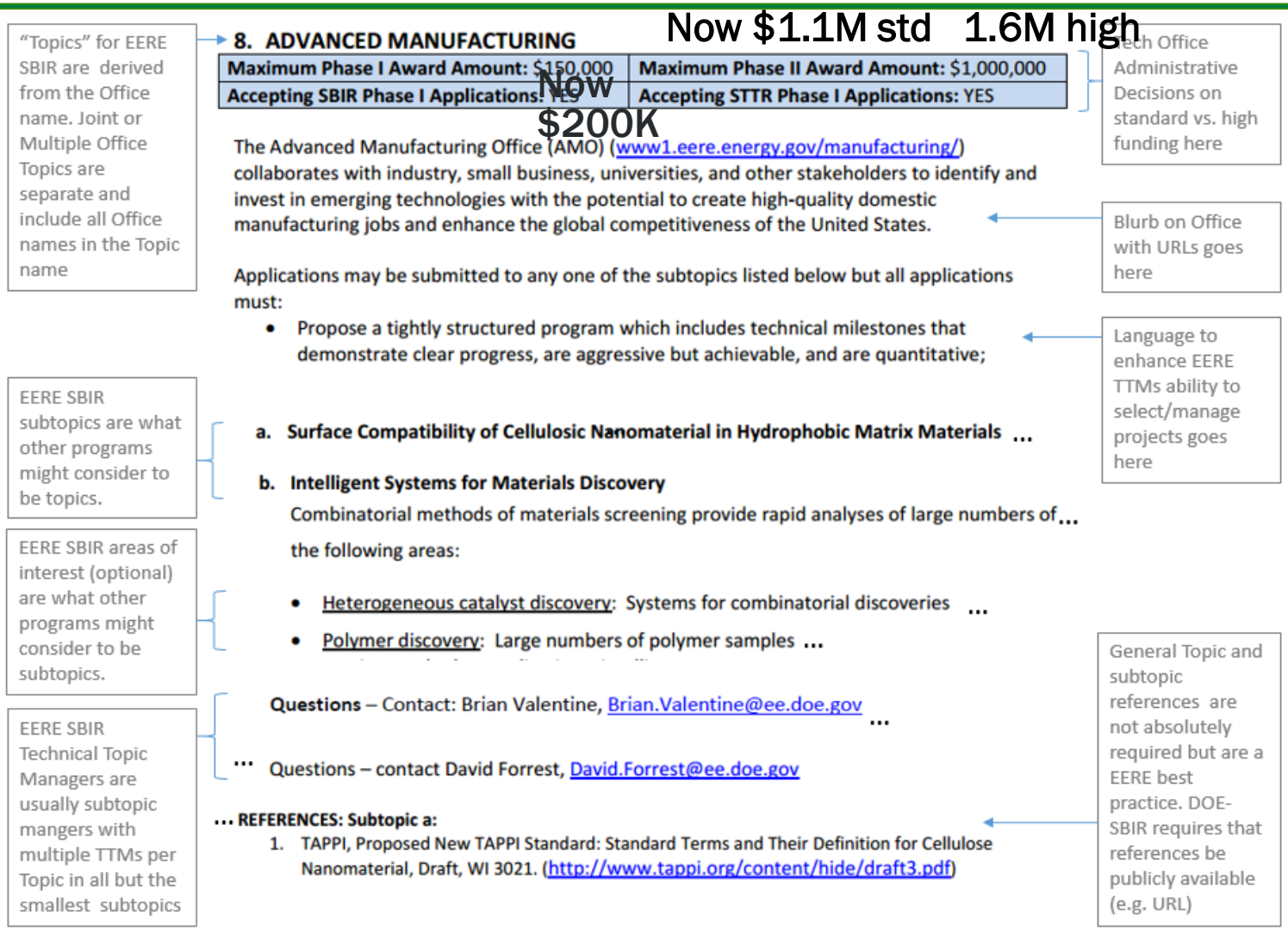
Components of Actual EERE Topic



Closeup of Latest AMO Topic

Applications may be submitted to any one of the subtopics listed below but all applications must:

- Propose a tightly structured program which includes **manufacturing-relevant technical milestones** that demonstrate clear progress, are aggressive but achievable, and are quantitative;
- Provide evidence that the proposer has relevant manufacturing R&D experience and capability.
- Provide evidence that the proposed technology can be scaled to appropriate manufacturing scale (e.g. widely available, cost-effective inputs, processes providing increased control, speed and throughput)
- Include projections for price and/or performance improvements that are tied to a recent baseline (i.e. Manufacturing Energy Bandwidth Studies and Advanced Manufacturing Technology Assessments (2015) [1] and/or state-of-the-art products or practices);
- Explicitly and thoroughly differentiate the proposed innovation with respect to existing commercially available products or solutions;
- Include a preliminary cost analysis; and
- Justify all performance claims with physics-based theoretical predictions and/or relevant experimental data.

[1] https://www.energy.gov/eere/amo/energy-analysis-data-and-reports

Much depends on Office Strategic Decisions

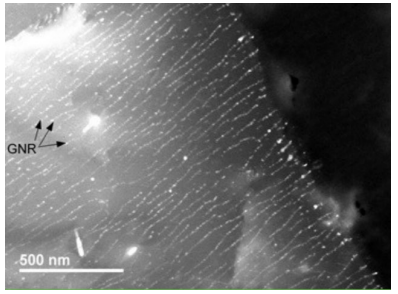
- **Reinforcing versus Gap Filling?**
  - Reinforcing—pro: Easiest to get management approval, Higher likelihood of integration of awardees into overall program.
  - Gap Filling –pro: Diversifies and derisks office portfolio—can be use to anticipate future priorities, greater potential for breakthrough technologies.

- **Hot vs Obscure Topic**
  - Hot topic – pro: lots of high quality applications; con: other R&D performers huge compared to small business
  - Obscure topic – pro: can be disruptive, potential very large energy savings; con: innovation ecosystem may be too small

AMO Examples of Phase I -> II

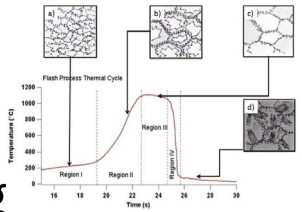
SBIR *complements* AMO portfolio:
(reinforcing)

- FY 2018-2019 High performance conductors/Covetics subtopic builds on earlier AOP work at NETL, Argonne, and UMD: https://www.energy.gov/sites/prod/files/2019/10/f67/Fabrication%20of%20Nanocarbon%20Metal%20Composites.pdf

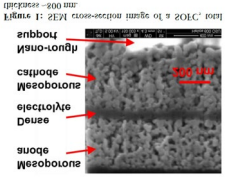


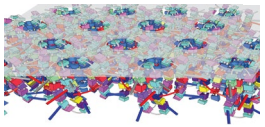
SBIR *expands* AMO portfolio:
(gap filling)

- FY 2013+ material (flash bainite) processing
- FY 2015-2016 high selectivity membranes
- FY 2017-2019 Atomically Precise manufacturing



<-First Phase III





BLOG: https://www.energy.gov/eere/articles/metals-molecules-small-business-innovation-boosts-technology

Grantee Advice I

- Frequency /Nature of contact with TTM?
  - Yes, reach out –especially with news about your project/good or bad.
  - Ensure your questions not answered in Topic or FOA.
  - Assume first contact will be for scheduling.
  - Ask TTM about future contacts.
- Expected Phase I progress:
  - Meet stated goals or explain (e.g. concept not proven)
  - "Failure Example" concept doesn't work and you don't find an alternative within topic.
  - If doing R&D, you should never fail to learn

Grantee Advice II

Goals of SBIR/STTR statutes include integrating small businesses into the federal R&D enterprise and commercializing more technologies, so it's ok to

- Request TTM enable technical contacts on related DOE projects (at the Labs etc.).
- Expect assistance with commercialization (Mainly from Program not TTM).

NOT ok to

- Request assistance with PII application strategy.

Phase II Applicant Advice

- **Carefully read Phase II FOA**
  - Initial Phase II, IIA, IIB and IIC have different requirements and eligibility
- **RE READ the Topic**
  - Especially about what is expected in Phase II.
- **RE READ your Phase I application**
  - Did you meet stated goals? Ok if not –especially if met other goals, but explain. Make it easy for PM, reviewers to track progress.
- **Set Aside more time —MORE is expected (e.g. commercialization plan)**
- **Get Help**
  - State, Phase 0 (First time applicants only) assistance.

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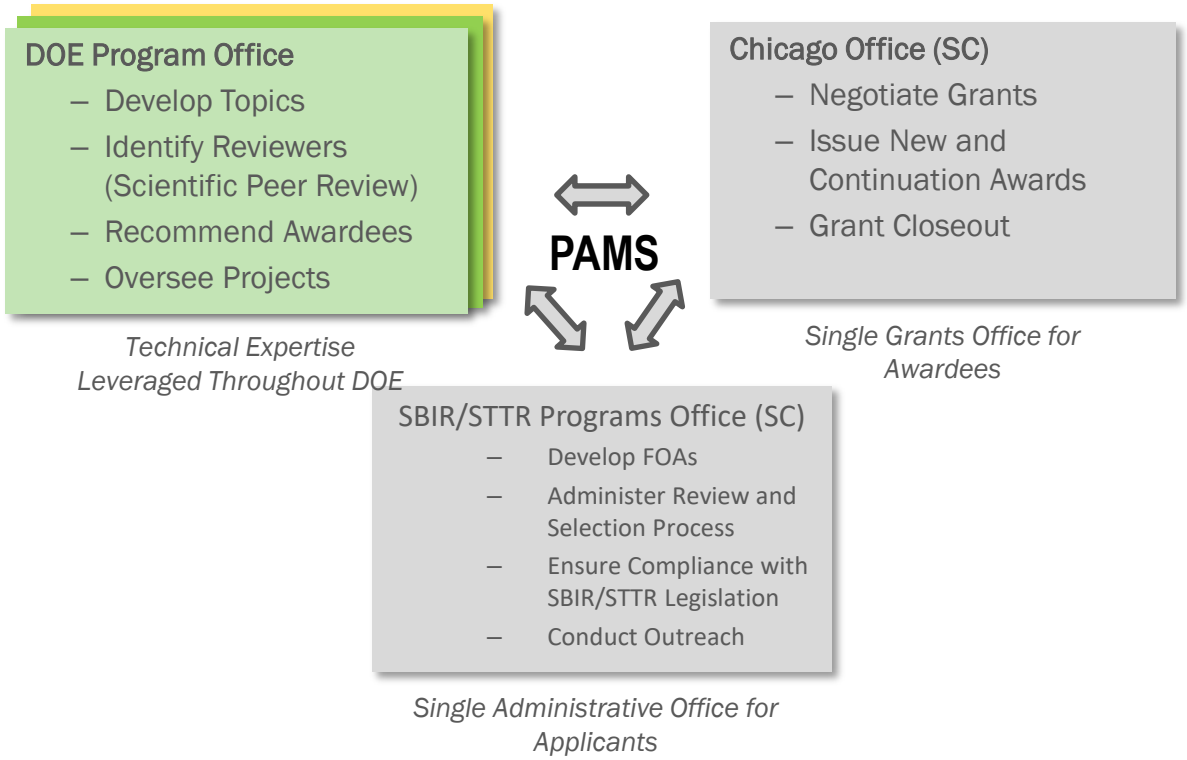
Thank You

For additional information:

energy.gov/eere/amo/advanced-manufacturing-office

The END—EXTRA AFTER THIS

DOE-wide Management of SBIR/STTR



Office* Portfolio Manager (O-PM) Responsibilities

*EERE only

- Responsible for leading the effort on and gaining Office Director's approval of topics, budgets, and award selections
- Primary points of contact between their Offices and the EERE-Portfolio Manager (EERE-PM) convey information assembled from TTMs to EERE-PM
- Ensure alignment of Office goals and topics, and are responsible for ranking Office award selections
- Recruit TTMs
- Always copied on communications from EERE-PM to TTMs
- Responsible for determining the level of awareness needed at the office level for interactions with sector DAS or EE-1 and TTMs on topic reviews
- Best practice is for O-PM to have TTM experience; often also serves as a TTM

Why Small Business Loves EERE SBIR:

Reason #1
Undiluted Capital

Reason #2
Validation, Guidance, and Follow-On Funding

Reason #3
Flexibility and Security

Reason #4
Commercialization Support

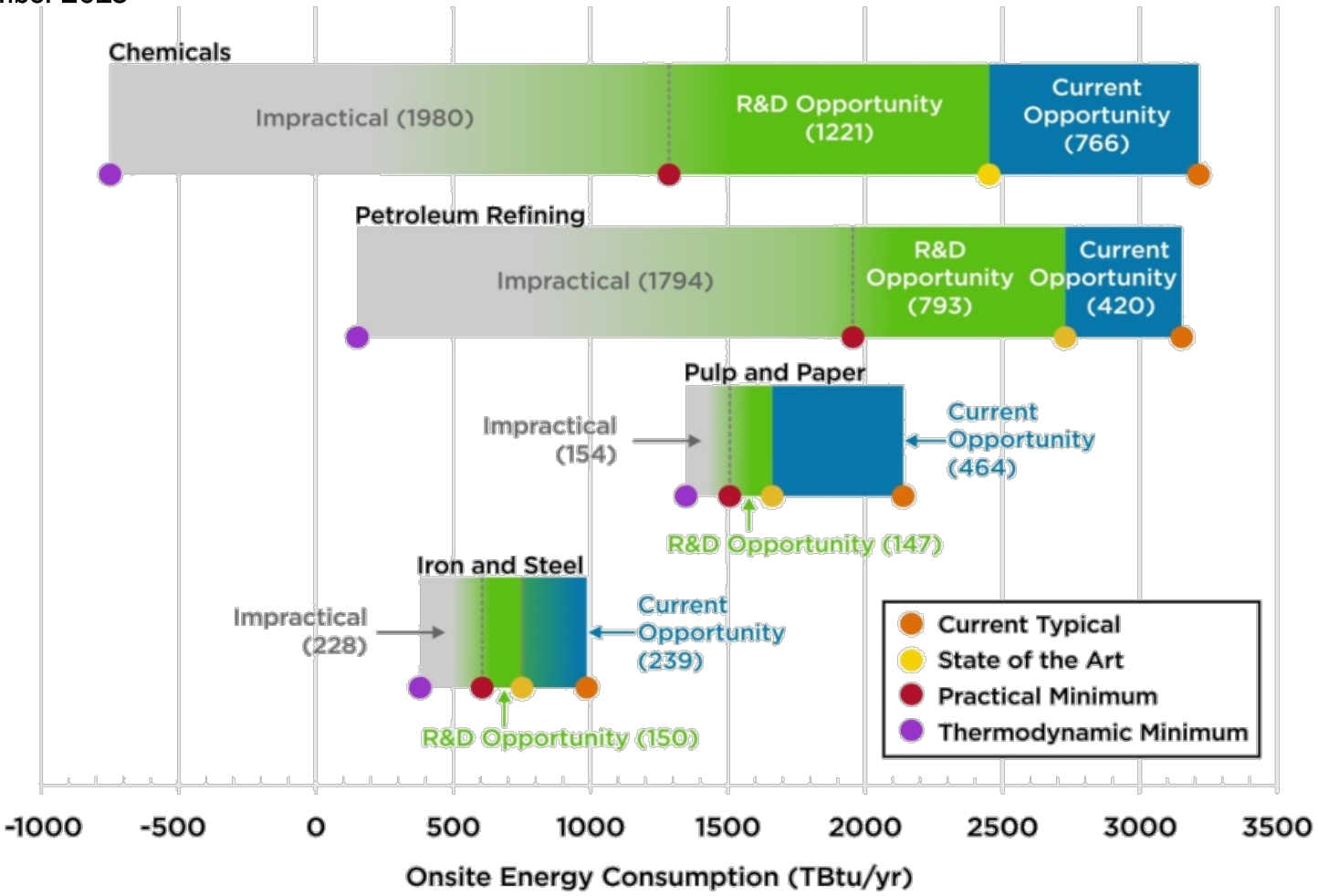
Reason #5
Cleantech Innovation Connections

What Makes a Good Subtopic

- Is R&D (no studies, although can address non-technology barriers with technology)
- Aligned with DOE/EERE/AMO
- Brings more small businesses into AMO research network
- Small businesses (different types) can contribute significantly (different ways: initial idea or development)
- Innovativeness
  - Dramatic energy /cost improvement possible
  - Innovation ecosystem exists (reviewers, DOE user facilities can contribute)
- Commercialization potential (market, potential applications, market need addressed)
- Goldilocks point—just right in broad/narrow spectrum (10-15% award rate)
- Too broad: logistically difficult, discourages small business
- Too narrow: too few high quality proposals, ecosystem too small (unconflicted reviewers hard to find)
- Topic developer has bandwidth to fully manage topic/project's 3-year lifecycle.

Manufacturing Bandwidth Studies

AMO: September 2015



Current opportunities represent energy savings that could be achieved by deploying the most energy-efficient commercial technologies available worldwide. R&D opportunities represent potential savings that could be attained through successful deployment of applied R&D technologies under development worldwide. More info can be found at : https://www.energy.gov/eere/amo/energy-analysis-data-and-reports

Recently Closed Multi-Topic Funding Opportunity

FOA Released: May 7th, 2019
Federal Funding: $89M
Cost share: 20%
Concept Papers Due: 6/20
Full Applications Due: 8/29
Led by the Advanced Manufacturing Office (AMO)

Supports in innovative, early-stage advanced manufacturing applied R&D projects that focus on specific high-impact manufacturing technology, materials, and process challenges. The topics are aimed at foundational energy-related advanced manufacturing technologies that impact areas relevant to manufacturing processes and broadly applicable platform technologies

- Topic 1. Advanced Materials
  - Advanced Energy Conversion and Storage Materials
  - Innovative Manufacturing Processes for Battery Energy Storage
  - Materials and Manufacturing for Nanocrystalline Metal Alloys
  - Harsh Service Conditions
- Topic 2. Low Thermal Budget Processes
  - Advanced Drying Technologies
  - Thermal Process Intensification
- Topic 3. Connected & Flexible Manufacturing and Energy Systems
  - Medium-Voltage Power Conditioning Systems to Enable Grid-Dispatchable and Resilient Manufacturing Facilities
  - High Efficiency Combined Heat and Power
  - Validation of CHP and District Energy Systems

- Link: https://eere-exchange.energy.gov/Default.aspx#Foaldeaf73ef3-8146-47bd-9f99-a5d7af08a6b6