

BESAC subcommittee on International Competitiveness

Cynthia Friend (Harvard), Subcommittee Chair

Matthew Tirrell (Chicago), Subcommittee Vice Chair

Working title:

“Strategies for Global Leadership in Basic Energy Science Research”

- Report due date: July 31, 2021
- Interim reports will be made at intervening BESAC meetings
- Committee consisting of mixture of BESAC members and other members of scientific community



Brief summary of Charge to the committee

1. to identify key areas of its mission-relevant research and facility capabilities in which U.S. leadership is most threatened,
2. to advise on modifications to existing trade-offs (balance of resources) or new ways to leverage scarce resources,
3. to identify incentives that will retain and attract scientific talent.

Report (and team) Organization

- **Areas Team** (Friend and Shen, co-leads)

The U.S. position in key areas of mission-relevant research and facility capabilities, identifying areas where US leadership is most threatened or critical.

- **Strategies Team** (Tirrell and Isaacs, co-leads)

Potential strategies for retaining and establishing U.S. leadership in key research areas

- Modifications to existing trade-offs (balance of resource allocation)
- New ways to leverage scarce resources
- Identification of incentives that will retain and attract scientific talent.

- **Cross cutting topics** (TBD)

Each team will identify two members who will be responsible for identifying cross-cutting themes. These members will meet monthly with the Team Leads.

Preliminary Participants and Team Organization

Areas Group 1	
Bates, Frank	University of Minnesota
*Friend, Cynthia (Chair)	Harvard University
Kastner, Marc (BESAC Chair)	Retired MIT
Meng, Y Shirley	UCSD
Musumeci, Pietro	UCLA
Olvera de la Cruz, Monica	Northwestern University
Santore, Maria	University of Massachusetts - Amherst
*Shen, ZX	Stanford University
Stach, Eric	University of Pennsylvania
Strategies Group 2	
Cheetham, Anthony	UC Santa Barbara
DeBeer, Serena	Max Planck Inst. Chem. Energy Conversion
Gao, Yan	GE
*Isaacs, Eric	Carnegie Institute
Kawai, Maki	Institute for Molecular Science
Mlynek, Juergen	Humboldt University Berlin
Ourmazd, Abbas	University of Wisconsin – Milwaukee
Takeuchi, Esther	Stony Brook
*Tirrell, Matt (Vice Chair)	University of Chicago
Helms, Brett	LBNL * Group co-lead

BES Participants	
Horton, Linda	Basic Energy Sciences
Russell, Thomas	Basic Energy Sciences
Logistics and Technical Support	
Click, Tammy	ORISE
DeFrancesco, Leah	Harvard University
Hammond, Al (Writer)	Allen Hammond & Assoc.
Miller, Jeff	Harvard University
Runkles, Katie	Basic Energy Sciences

Note: Invitations to join the committee are pending; designed to add strength in critical areas

Roles and Responsibilities

Team Co-leads:

- *calling meetings, team organization and writing
- Areas team (1)—Friend and Shen;
- Strategies team (2)—Tirrell and Isaacs

Technical and editing support:

- Dr. Jeff Miller will assist with data collection and organization, technical editing, and graphics preparation.
- Dr. Al Hammond will assist with final editing and add relevant "stories" to illustrate points

DOE/BES representation (required at all meetings):

- Dr. Linda Horton
- Dr. Tom Russell

Administrative support:

- Ms. Katie Runkles will provide general administrative support
- Ms. Leah DeFrancesco will schedule meetings
- Ms. Tammy Click (ORISE) will arrange zoom links and moderate meetings

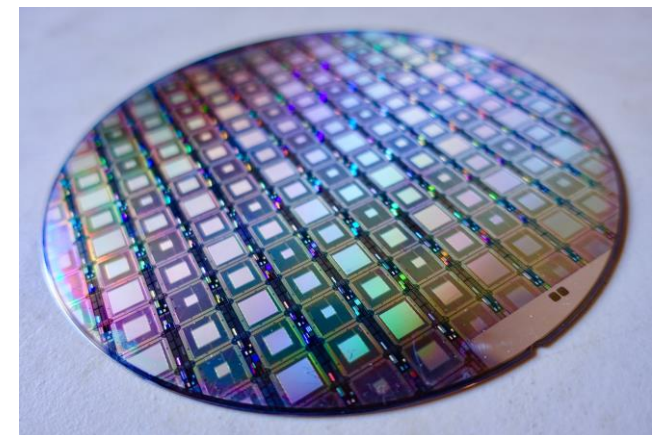
Team members:

- collecting and analyzing data
- drafting report sections

Areas team

- What areas are key and why?
 - Identify a few areas that include grand challenge and energy use science; e.g. energy storage, Quantum Information Science (QIS), data science, solar fuels, polymer upcycling, microelectronics
 - Articulate reasons for selecting those areas
 - Limit discussion to BES-related research
- Criteria:
 - International competitiveness
 - Environmental, economic, or security impacts
- Identification of major international contenders
- Future prospects for maintaining or establishing leadership

Areas Group 1
Bates, Frank
Friend, Cynthia (Co Lead)
Kastner, Marc (BESAC Chair)
Meng, Y Shirley
Musumeci, Pietro
Olvera de la Cruz, Monica
Santore, Maria
Shen, ZX (Co-Lead)
Stach, Eric



Areas Team: Identification of key areas of mission-relevant research and facility capabilities:

In which areas is US leading and in which is leadership is most threatened?

Considerations:

- International competitiveness
- Environmental, economic, or security impacts
- Grand challenge research
- Identify aspirational goals important for the future
- Identify origin of gaps between aspiration and actual investment

Evaluation Process:

- Build matrix of Area vs. US competitiveness
- Metrics to be defined, e.g. # publication & citations
- Workforce development and job creation

Data sources:

Major reports (DOE-BES, NSF, National Academies, scholarly societies,...)
Publication and citation data

Strategies team will address the following:

- Funding models
 - Current and alternative
 - Strengths and weaknesses
- Key Facilities
- Potential new types of cooperation
- STEM initiatives
- Strategies for recruiting and retaining talent
 - Foreign and domestic

Strategies Group 2

Cheetham, Anthony

Serena de Beer

Gao, Yan

Isaacs, Eric (Co-Lead)

Kawai, Maki

Mlynek, Juergen

Ourmazd, Abbas

Takeuchi, Esther

Tirrell, Matt (Co-Lead)

Helms, Brett

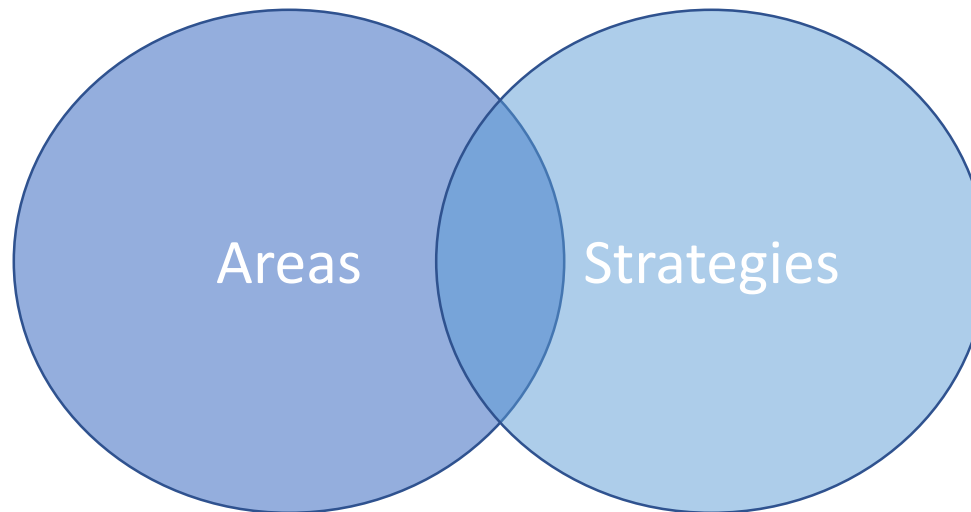
Ideas for the “Strategies” subgroup to consider

“Potential strategies for retaining and establishing U.S. leadership in these areas, including modifications to existing trade-offs or new ways to leverage scarce resources and identification of incentives that will retain and attract scientific talent.”

- PI-level strategies
- National lab-level strategies
- Facilities strategies
- Agency-level strategies
- Interconnections and leveraging (inter-agency, industry, other)
- Some models to consider (at all levels)
 - MRSECs
 - Max Planck Society, Helmholtz Institutes, and Fraunhofer Institutes (Germany)
 - Riken Institutes (Japan)
 - Made in China 2025
 - The Faraday Institution (UK)
 - DESY
- What has worked well? And what has not?
 - Nanoscale Science Research Centers
 - Energy Innovation Hubs
 - Energy Frontier Research Centers

Cross-cutting topics

- Two members of each team will be designated to identify cross-cutting topics (To be named after first team meetings in Aug. 2020)
- Cross-cutting topics will be discussed in monthly meetings:
 - Including team designates and team co-leads
 - With full subcommittee



Data

The subcommittee is committed reporting objective results and recommendations based on data.

Data collection will be a bedrock of the subcommittee's work, including

- Identify key, relevant reports already available.
- Identify other critical data, methodology for collecting it.
- Find data to answer the **questions** (appendix)



Process and Next steps

Monthly sub-group meetings (Aug. 20-Apr. 21)

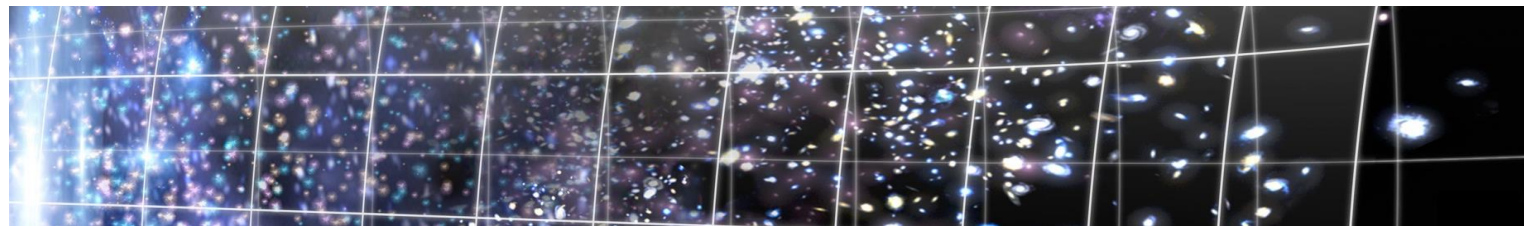
1. Define roles and responsibilities
2. Identify data sources and gather data
3. Integrate data, ideas and recommendations
4. Write draft sections of report

Monthly meetings of leads

Monthly meetings of full committee (Sept. 20-June 21)

1. Interim reports of teams; discussion
2. Consider any needs for modification of process
3. Write reports

Proposed Timeline



By the end of the meeting in this month	Complete these tasks
August 2020	Identify key topics for study; begin data collection
November 2020	Gathering, analyzing, synthesizing data, redirecting inquiries as appropriate
December 2020	Agree on report outline
January 2021	Integrate data, ideas, recommendations. Write section outlines
Feb. 2021	Preliminary drafts of sections; preparation of interim report to BESAC
March 2021	Report to BESAC; modify report based on BESAC input
April 2021	Draft sections complete
May 2021	Draft report complete; handoff to Al Hammond
June 2021	Review Al Hammond's edits, provide feedback
July 2021	Report to BESAC for consideration of final report approval; submit report



