

High Performance Materials



Briggs White Technology Manager

Program Overview Annual Project Review Meeting August 25, 2020







Diverse Portfolio of Programs













Superalloy Markets Significant Growth Projected

NATIONAL ENERGY TECHNOLOGY LABORATORY

\$7 Billion market in 2023

Strong regional footprint

Support employment and economy

Advanced manufacturing

Workforce critical









Electricity Generation

Fossil fuels in future as renewables double



Electricity generation

billion kilowatthours





EIA AEO2020 Reference case – www.eia.gov/aeo



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1. <u>https://www.ccsdualsnap.com/pressure-switches-in-combined-cycle-power-plant-switches/</u>

https://www.climatetechwiki.org/technology/sup_crit_coal

PROGRAM OVERVIEW

Mission

Program Mission & Implementation

- Produce high performance materials suitable for extreme environments found in fossil power generation to support existing and new plants.
- Encourage change and stimulate innovation in the high performance materials value chain to spur US competitiveness.

Meeting challenging end-user objectives:

- Flexible Operations
- Increased Efficiency
- Reduced Costs
- Intelligent Asset Management

Fossil Power Plant Challenges

Addressing existing and future challenges in efficiency, flexibility, and reliability.

Market Segments

Strategic Research Thrusts

Recent spending addresses pressing challenges while aligning with broader technology trends

MARKET SEGMENTS

Existing Fleet

Next Generation Plant

Objectives	Maintain cost competitiveness of existing assets	Commercialize a novel coal plant design with efficiency >44%
Barriers	Aging infrastructure; Unpredictable outages; Costly repair	Temperature and cycle alloy capability; High-costs of suitable alloys; Lack of domestic supply chain

Solutions Component and Materials Life Prediction; Advanced Manufacturing and Repair Processes High temperature/high performing alloys; Computational tools for alloy & process

Investment in materials has broad opportunities to deliver impacts

Annual High Performance Materials Budget (\$M)

Active portfolio allocation:

\$32.6M (21 projects) to improve short- and long-term profitability

\$53.7M (25 projects) to assess equipment health and extend useful life

Recent solicitations continue to develop solutions for existing and future fleets

DE-FOA-0002002

Enhancing the domestic supply chain for AUSC materials Phase I: \$6M, Phase II: \$20M Cyclic durability

Reducing costs

DE-FOA-0002192 Addressing existing fleet material failure and repair \$10M total funding Coatings Joining

Annual Fall Solicitation

Click here to download

USEA-hosted Workshop

July 23

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DATE & TIME

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LOCATION

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July 23, 2020 - 9:00 am to 12:00

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STEVE WINBERG

DANIEL SIMMONS

MARY-ROSE DE

U.S. Department of Energy

USDOE Office of Fossil Energy R&D Enabling a Sustainable Hydrogen Economy

Available presentations from the webinar can be found on the right side of this page in the section marked "Presentations." Plea see the links below for DDE-FE's Hydrogen Request for information as well as a link to its Hydrogen Strategy Document.

FE Hydrogen Strategy Document - July 2020

For inquiries about the presentation on Global Perspectives on Hydrogen Policy. Technology & Markets by Mary-Rose de Valladares. please kindly contact her at Maryrose devalladares@email.com or 202.409.4240.

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Click here to download presentations

Hydrogen RFI

Responses Due August 24

- 1. Natural Gas Hydrogen Production, Transport, and Storage;
- 2. Hydrogen Production from Gasification of Wastes
- 3. Hydrogen Turbines
- 4. Hydrogen Storage
- 5. Hybrid Energy Systems with the second sec

Click <u>here</u> for RFI

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Office of Fossal Energ

DE-FOA-00023

Workforce: Webinar, RFI and ARC Partnership

Materials 101 Webinar

NETL Regional Workforce Initiative April 7

To watch webinar, please click <u>here</u>.

Workforce Development RFI

Responses Due August 31

- 1. Immediate Needs
- 2. Near-term Workforce Needs
- 3. Long-Term Adv. Materials Workforce Strategy

Click <u>here</u> for RFI

NETL & ARC Interagency Agreement

Appalachian Materials Workforce August 14

Today's Objectives

- 1. Update you on FE's High Performance Materials program
- 2. Share useful information on existing fleet
- 3. Highlight projects
- 4. Hear and learn from you

Key Takeaways

- Supply chain benefits from this FE program
- Current and future challenges
- Coal and gas applications
- Driving down costs
- Reliability for flexibility
- Workforce
- Hydrogen

Calls to Action

- 1) Check out <u>website</u>
- 2) Let us know if you're interested
- Advise and partner on projects
 Advisory Board for XMAT, partner on Lab work
- 4) Guide program RFIs & workshops
- 5) HPC4Materials Solicitation
- 6) FOAs on FedConnect

Program Contacts

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