Welcome Remarks & Gasification Systems Portfolio Overview

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DOE-NETL's 2020 FE R&D Virtual Project Review Meeting – Gasification
AES/Gasification Program Goals & Benefits

**Enhance Fossil Energy Power Systems**
- Increase availability, efficiency, and reliability
- Maintain environmental standards through early-stage R&D

**Benefits**
- U.S. economic security –
  - Maintains Fuel Diversity
  - Energy Resiliency
- Enables pre-combustion CO$_2$ Capture
  - Negative CO$_2$ Emissions if using BECCS
Supporting Coal FIRST & Small/Modular Power Generation

Aligns with Coal FIRST Initiative

Flexible
Localized fuels like MSW, waste plastic, biomass

Innovative
Improve efficiency + reduce emission (BECCS)
Hydrogen from coal & petroleum waste

Resilient
Coal-based for stable supply

Small
Scale-up to 50 MW; Number-up to achieve 50-350 MW

Modular Approach: alternative to IGCC
Gasification program moving forward

Future work – where are we heading?

July 2020 Request for Information:

- Waste Plastics as Gasifier Feedstock
- $\text{H}_2$ Production / $\text{H}_2$ Economy
- Negative $\text{CO}_2$ w/ Biomass Blending
Budget History

Gasification Program Funding ($M)

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<th>FY 12-FY 20 Cumulative</th>
<th>FY 20 Enacted</th>
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Technology Areas

Modular ASUs for small-scale power systems

Gasifiers for small-scale power systems

Air Separation Technology

Negative Greenhouse Gas Emissions

Coal/biomass use – BECCS connection

Process Intensification for Syngas

Coal-biomass to Liquids

Accommodate limited supply characteristics of biomass & MSW

Access higher value markets
Project Portfolio

Twenty Projects

$49,718,000 budget
Objectives:

- Reduce oxygen production cost
- Process intensification enabling small-scale
- Cost reduction via modular integration

Current focus includes:

- Membranes
- Advanced sorbents
- Oxygen carriers
- Novel cryogenics
Objectives:
• Leverage process intensification to reduce cost
• Modular design integration capability

Current focus includes:
• Modular gasification
• Chemical looping gasification
• Advanced Manufactured ceramic on metal
• Microwave-assisted gasification
Objectives:
• Reduce GHG emission
• BECCS capability

Current focus includes:
• WGS w/ CO$_2$ Capture
• Warm syngas multi-contaminant removal

2 projects valued at $7.8M
$7.8M 16%
Objectives:
- Liquid fuel production
- Coal/Biomass/Other mixtures

Current focus includes:
- Coal waste/MSW conversion
- WGS catalyst for Coal/Biomass gasification
Agenda—Sessions

2020 R&D Virtual Project Review Meeting – Gasification

Wednesday 9/2, 9:45am to 2:00pm
Air Separation Technologies to Assist Modular Gasification
  Moderator—Venkat Venkataraman, NETL
  Co-Moderator—Diane Revay Madden, NETL

Wednesday 9/2, 2:15pm to 5:15pm
Gasification with Mixed Feedstocks & Flexible Operations
  Moderator—Diane Revay Madden, NETL
  Co-Moderator—Steve Markovich, NETL

Thursday, 9/3, 9:30am – Noon
Enabling Technologies for Affordable Small-Scale Gasifiers
  Moderator—Steven Markovich, NETL
  Co-Moderator—Venkat Venkataraman, NETL
Questions?

Thank You!

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Additional information can be found at:
https://www.netl.doe.gov/coal/gasification