

# Welcome Remarks & Gasification Systems Portfolio Overview



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DOE-NETL's 2020 FE R&D Virtual Project Review Meeting – Gasification



**GASIFICATION  
SYSTEMS**

## 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<sub>2</sub> Capture
  - Negative CO<sub>2</sub> Emissions if using BECCS

## 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

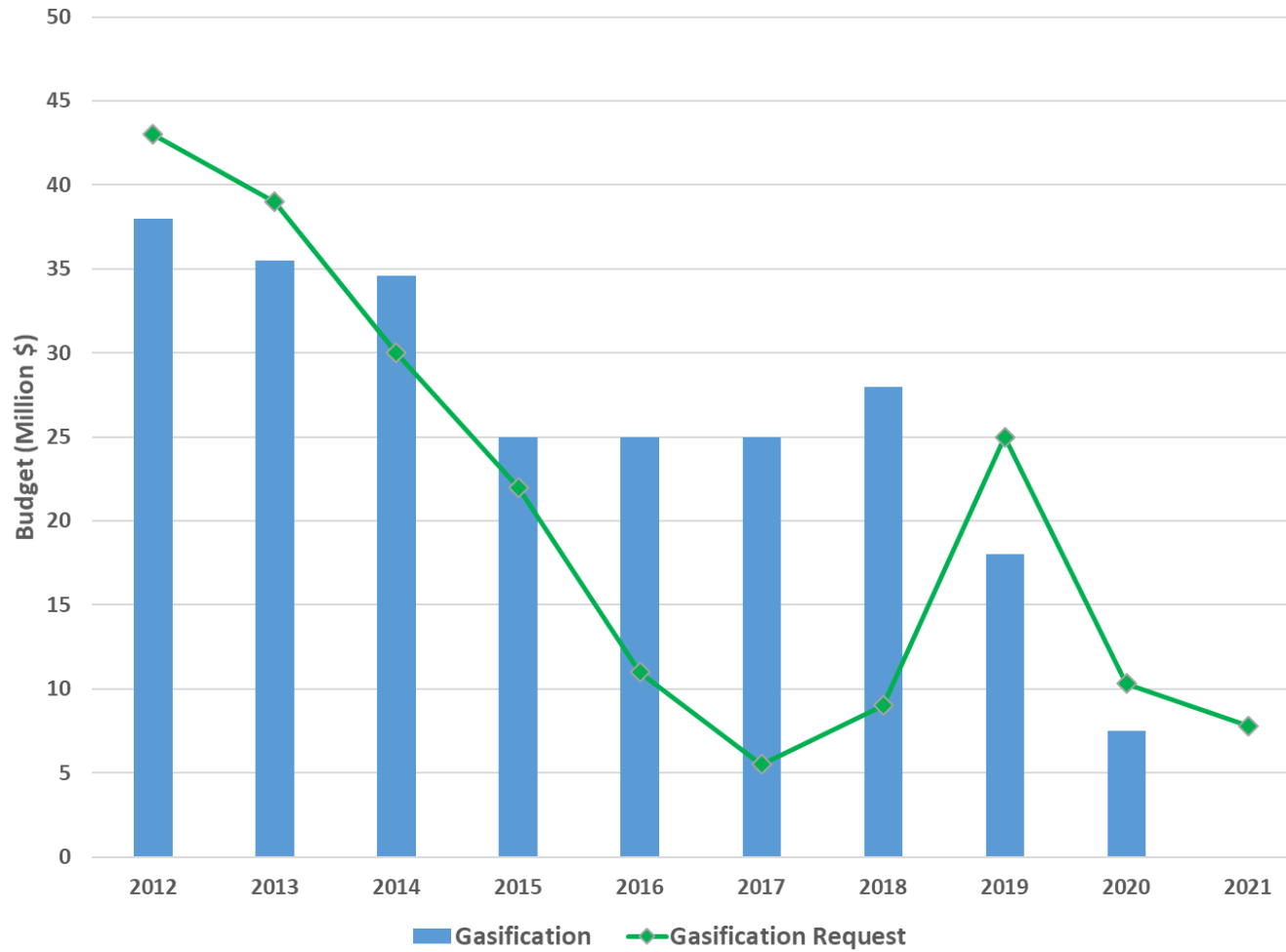
## Future work – where are we heading?

July 2020 Request for Information:

- Waste Plastics as Gasifier Feedstock
- H<sub>2</sub> Production / H<sub>2</sub> Economy
- Negative CO<sub>2</sub> w/ Biomass Blending



# Budget History



## Gasification Program Funding (\$M)

FY 12-FY 20 Cumulative

FY 20 Enacted

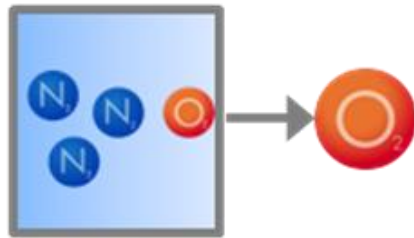
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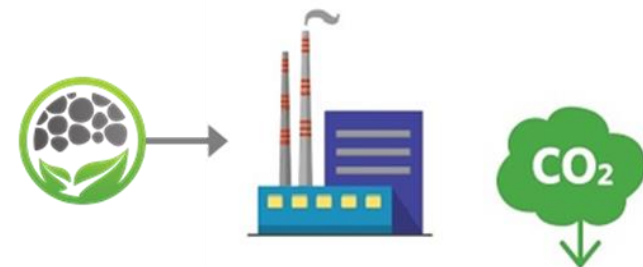
# Technology Areas

## Modular ASUs for small-scale power systems

Air Separation Technology



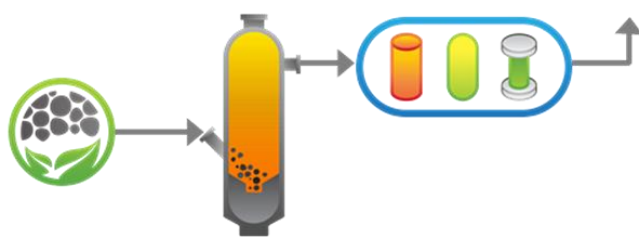
Negative Greenhouse Gas Emissions



Coal/biomass use – BECCS connection

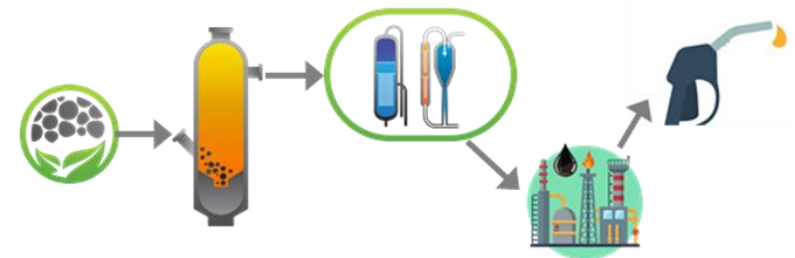
## Gasifiers for small-scale power systems

Process Intensification for Syngas



Accommodate limited supply characteristics of biomass & MSW

Coal-biomass to Liquids



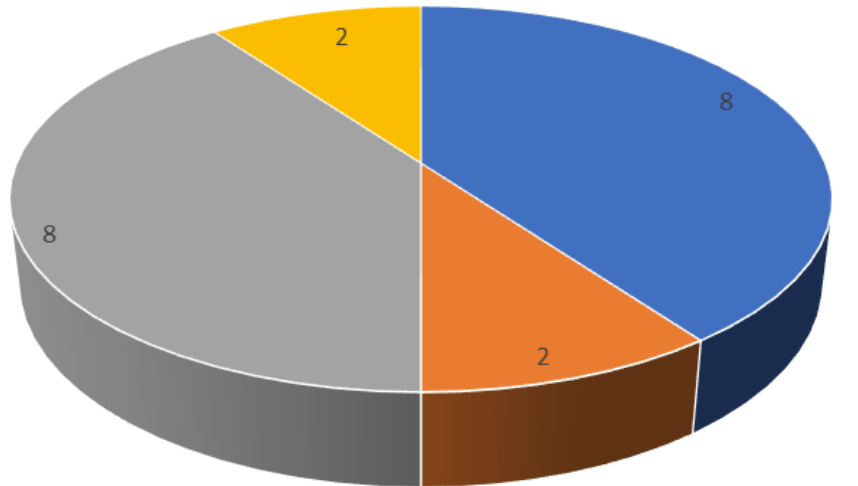
Access higher value markets

# Project Portfolio

## Twenty Projects

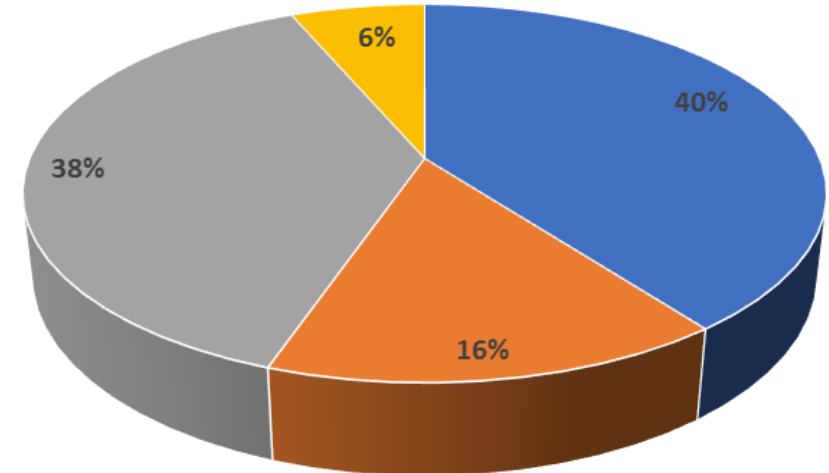
\$49,718,000 budget

Gasification Systems Active/Recent Projects  
(Projects by Key Technology)



■ Air Separation  
■ Process Intensification for Syngas  
■ Negative GHG Emissions  
■ CBTl

Gasification Systems Active/Recent Projects  
(Funding by Key Technology)

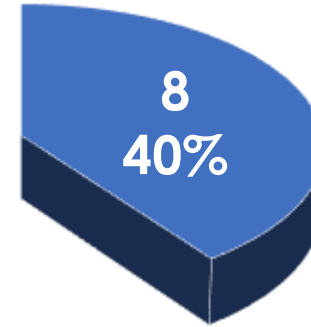


■ Air Separation  
■ Process Intensification for Syngas  
■ Negative GHG Emissions  
■ CBTl

# Air Separation/Oxygen Production

## Objectives:

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



8 projects/tasks  
valued at \$19.7M



## Current focus includes:

- Membranes
- Advanced sorbents
- Oxygen carriers
- Novel cryogenics



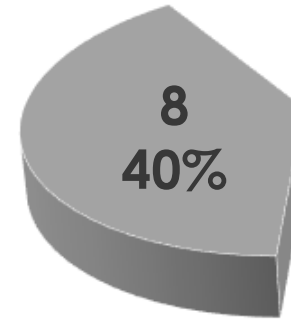


# Process Intensification for Syngas

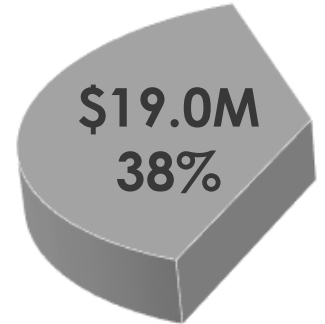


## Objectives:

- Leverage process intensification to reduce cost
- Modular design integration capability



8 projects/tasks  
valued at \$19.0M



## Current focus includes:

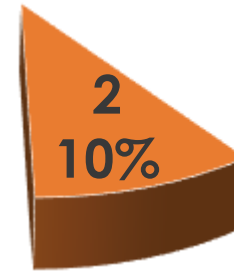
- Modular gasification
- Chemical looping gasification
- Advanced Manufactured ceramic on metal
- Microwave-assisted gasification



# Negative Greenhouse Gas Emissions

## Objectives:

- Reduce GHG emission
- BECCS capability



2 projects valued at  
\$7.8M



## Current focus includes:

- WGS w/ CO<sub>2</sub> Capture
- Warm syngas multi-contaminant removal



# Coal-Biomass to Liquids

## 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

# Project Summaries / Portfolio Booklet

<https://netl.doe.gov/sites/default/files/2020-08/Gasification-Projects-Portfolio-2020.pdf>





# Questions?

## Thank You!

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**Gasification**

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Additional information can be found at:

<https://www.netl.doe.gov/coal/gasification>



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**ENERGY**