

Fleetwood

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Fleetwood Industry Day

March 12, 2026





Industry Day Objectives

- To **introduce the science and technology community** (industry, academia, and government) to the Fleetwood program vision and metrics
- To explain the **logistics of DARPA contract awards** as well as the objectives of the Fleetwood program
- To **facilitate interaction between investigators** that may have capabilities of interest and relevance to Fleetwood program metrics
- To **encourage and promote teaming arrangements** among organizations that have the necessary expertise, facilities and capabilities to meet research objectives established by the Fleetwood program



The Fleetwood Team

- Dr. William Mounfield, Program Manager
- Ms. Virginia Arzadum, Financial and Administrative Support
- Dr. Aimee M. Bryan, Technical Support
- Dr. Allie Zito, Technical Support
- Dr. Kenny Turner, Technical Support
- Mr. Elvis Montes, Program Security Support

Contracting Support

- Mr. Jonathan Space, Contracting Officer (KO), DARPA

All correspondence to: Fleetwood@darpa.mil



Fleetwood Technical Overview

William Mounfield

Credit: DARPA | Alissa Eckert



Future Warfighting Sustainment Concepts Will Depend on Advanced Conversion Technologies

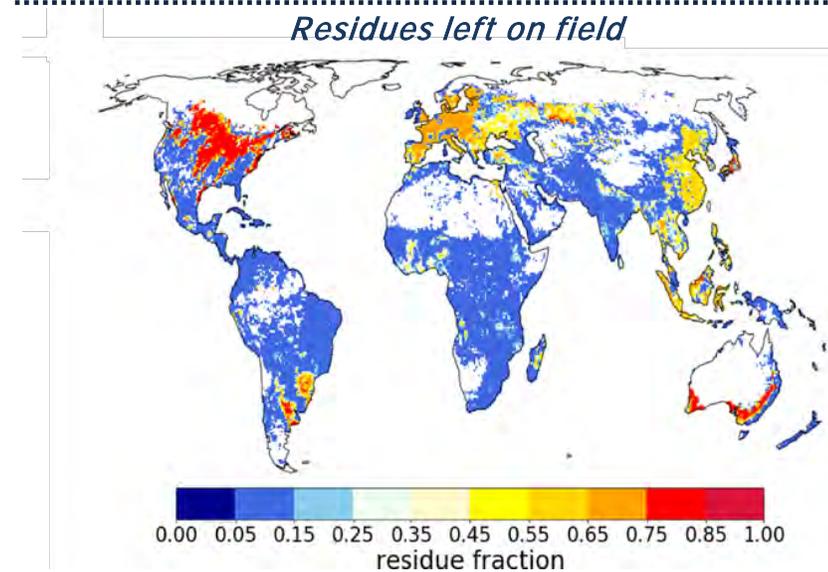
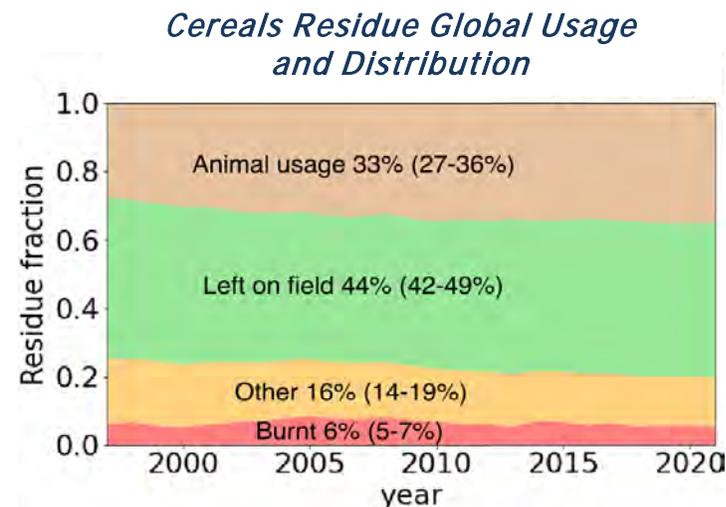
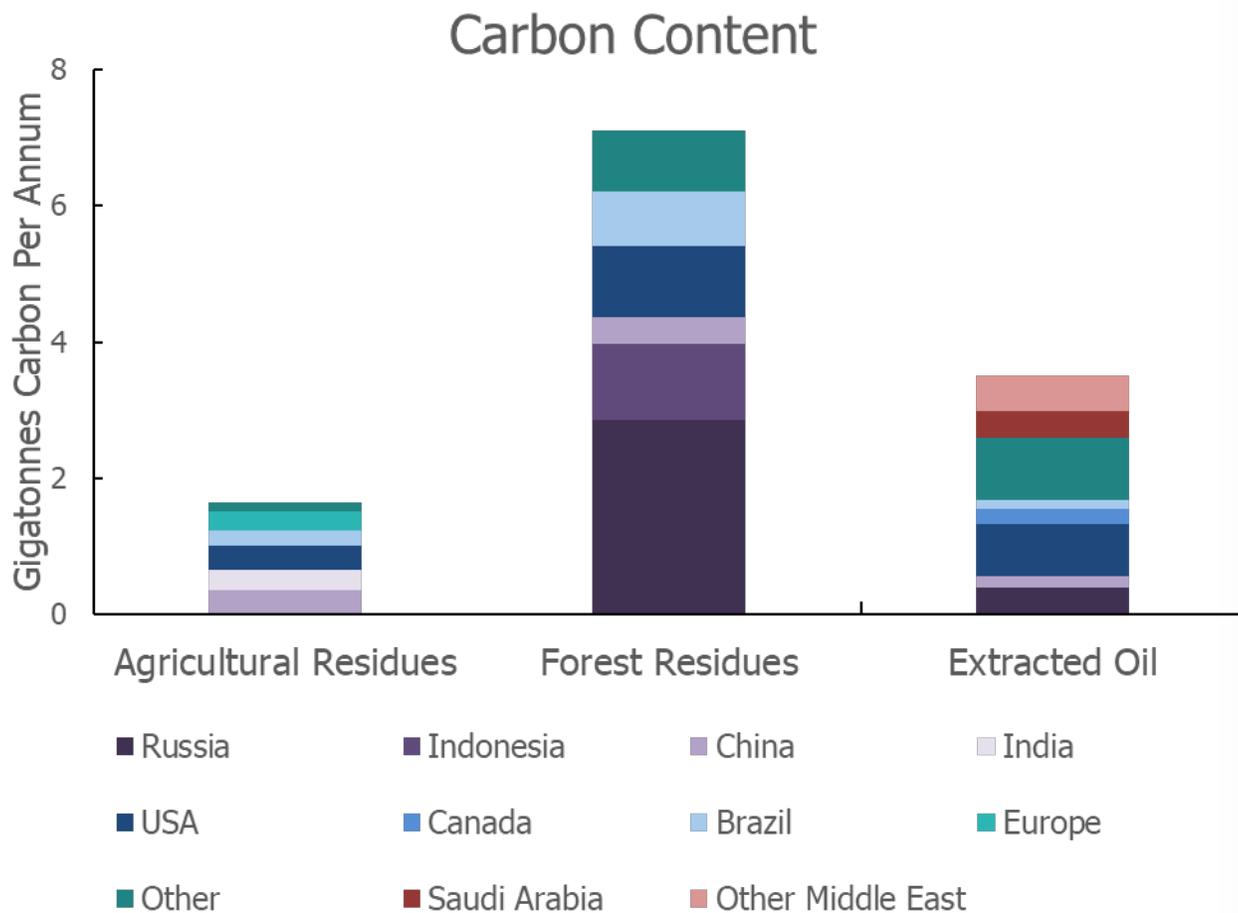


Credit: DARPA | Alissa Eckert

Fleetwood will enable conversion of biomass resources to produce carbon containing chemicals for resilient global chemical manufacturing



Lignocellulosic Biomass - Globally Available at Scale



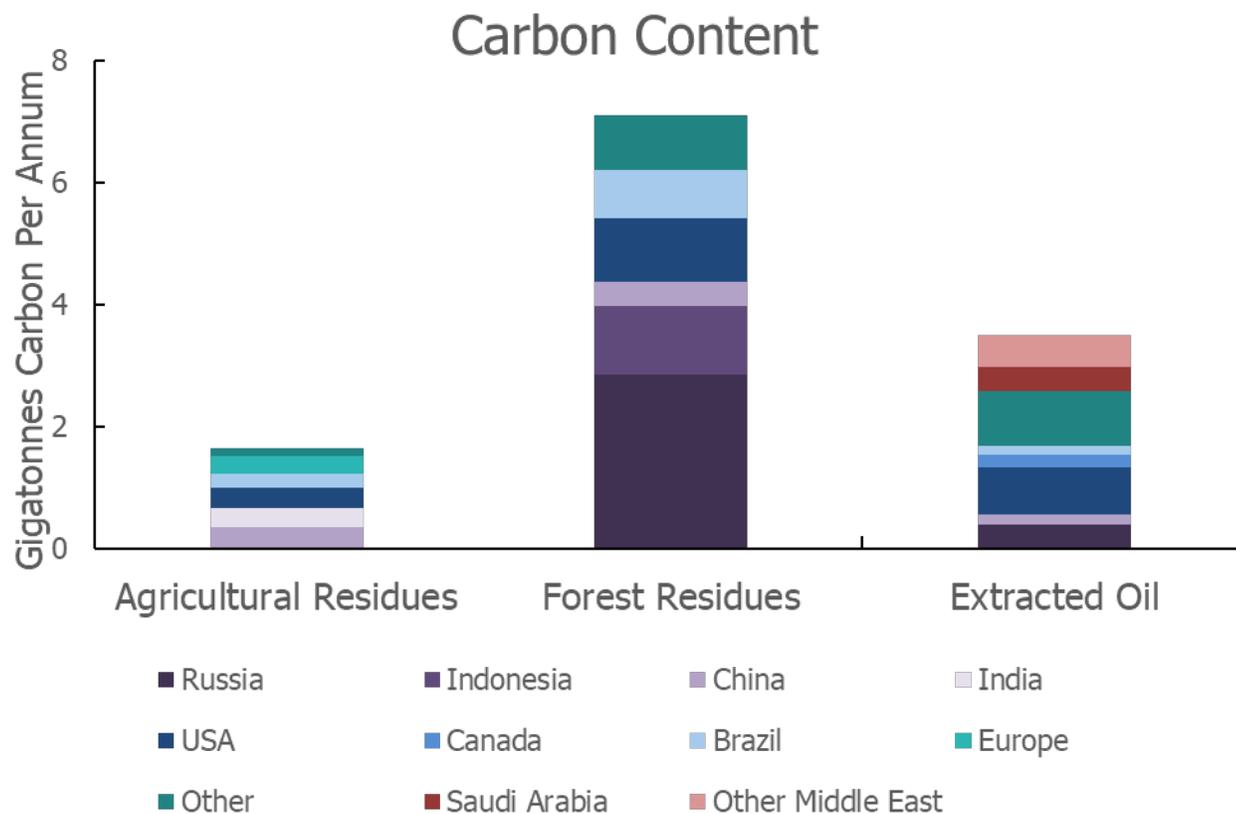
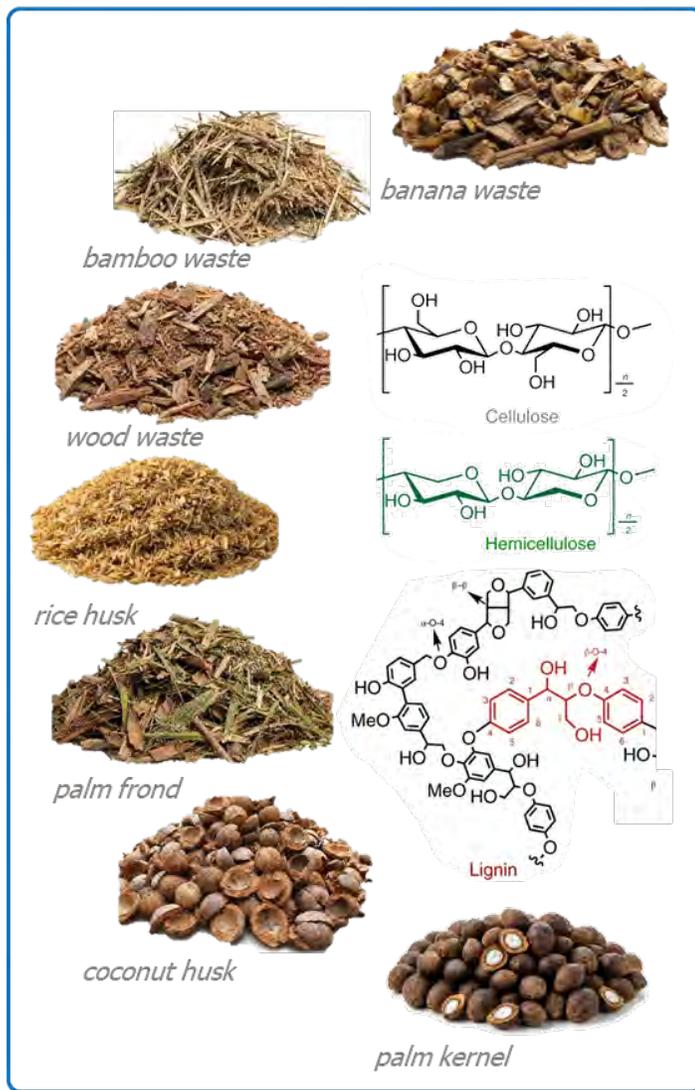
Adapted from *Climate and Atmospheric Science 2019*

Adapted from *Scientific Data 2023*

A large global spatial distribution and regional differences challenge whole biomass utilization



FA1: Unlocking Lignocellulosic Biomass as a Global Carbon Resource

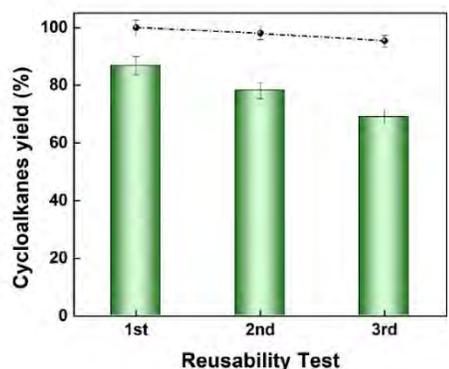
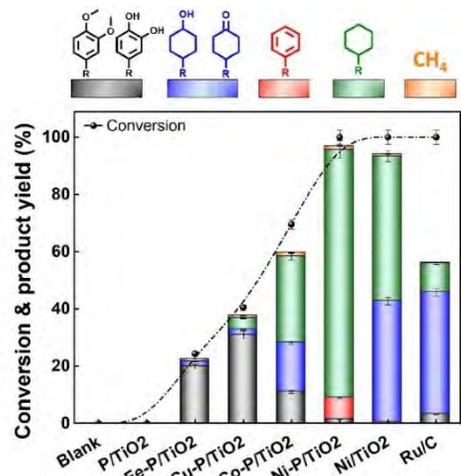


Adapted from *Climate and Atmospheric Science 2019*

SoA struggles with efficient processing of lignin-containing feedstocks (majority of biomass residues)

Higher Activity

Optimized HDO of lignin oil

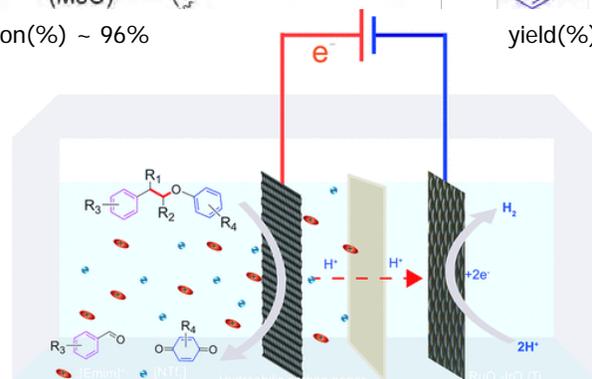
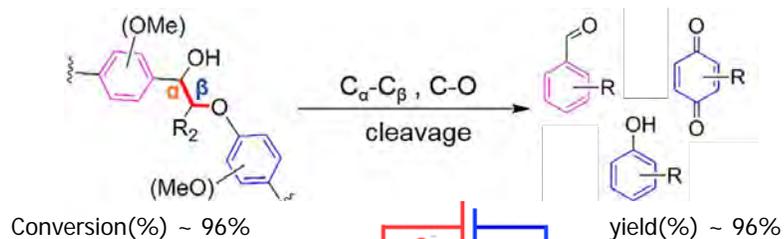


Reusability Test

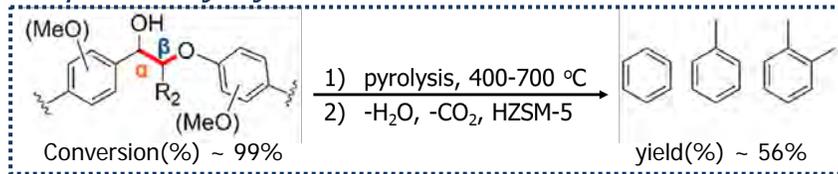
Adapted from *En. Con. Man*, 2022

Higher Selectivity

Novel electrocatalysis. Selectively breaks C-C and C-O bonds, resulting in higher yield



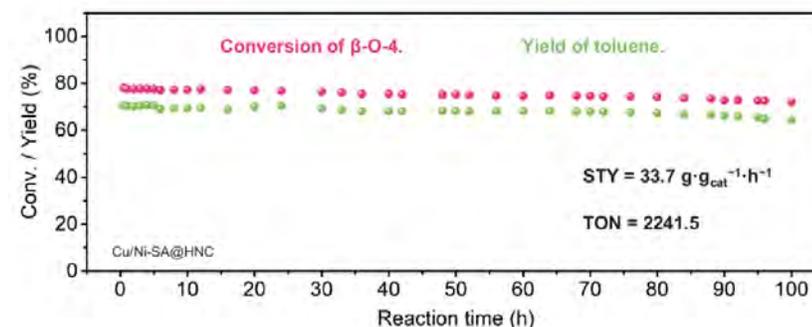
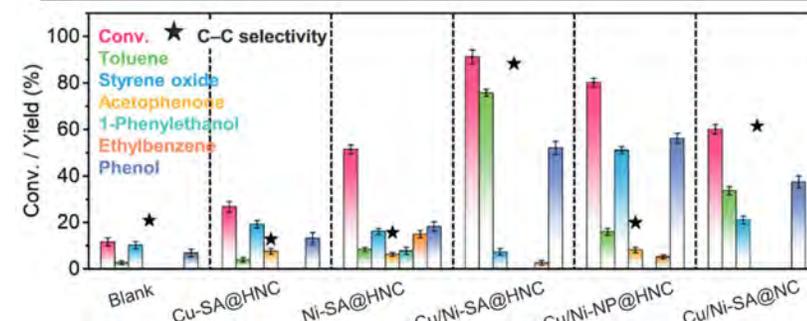
Compared to Pyrolysis



Adapted from *ChemBioEng*, 2024

Improved Stability

Single-atom catalyst optimization yields selective and stable C-C bond activation

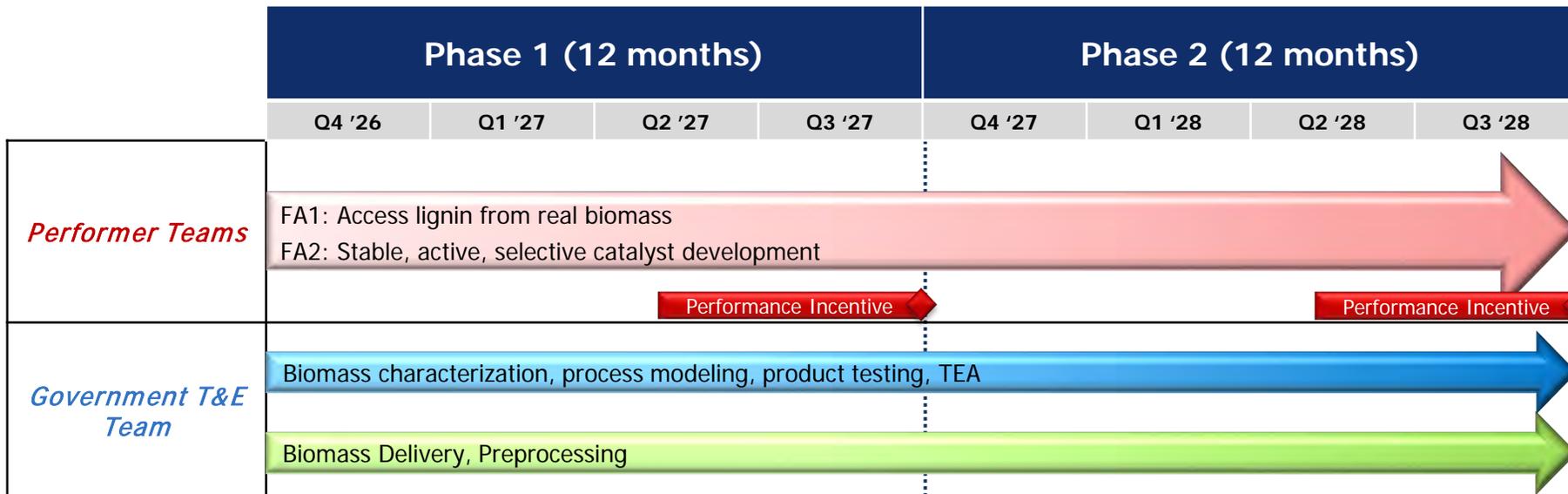


Adapted from *NatComm*, 2025

Biomass-focused catalyst development offers routes to higher activity, higher selectivity, and improved stability over existing biomass conversion catalysts



Fleetwood Program Schedule



TEA: techno-economic analysis

Out of scope: C1-C2 products, Pyrolysis, Gasification



Program Metrics: Modular Biochemical Manufacturing

Metrics			
Category	Rationale	Phase 1	Phase 2
Delignification	Evaluate and optimize flexibility of biomass processing with varied feedstocks – lignin yield on a mass basis	≥50%	≥90%
Monomer Yield	Demonstrate efficient separation and conversion of lignin to monomers – aromatic monomer yield on a mass basis	≥50%	100%
Process Rate	Efficient conversion needed to improve yield and inform sizing – STY	Maximize Space Time Yield	
Catalyst Development	Demonstrate stability, activity, and selectivity of developed catalysts	Catalysts maintain performance across biomass feedstocks (stable, active, selective)	
Performance Incentive			
Category	Rationale	Phase 1	Phase 2
Performance Incentive	Maximize overall value of products as represented by MSP, accounting for CAPEX, OPEX, maintenance, etc. – verified by Government T&E Team	Evaluated based on Minimum Selling Price (MSP)	

CAPEX: Capital Expenditure; OPEX: Operating Expense; STY: $\text{kg}_{\text{product}}/\text{day}/\text{L}_{\text{reactor}}$

NOTE: If there is any discrepancy between what is presented today and Program Solicitation(PS), the official published PS takes precedence.



Biomass Examples:

- Rice residues
- Banana residues
- Coconut residues
- Coffee residues
- Nut shells/hulls
- Palm fronds
- Corn stover
- Sugar cane bagasse
- Soybean residue
- Macadamia nut shells/hulls
- Sargassum seaweed
- Switchgrass
- Elephant grass
- Forest residues
- Oil palm residues
- Wheat residues
- Barley residues

Proposers should propose an approach suitable to multiple types of biomass.
However, the PM has the discretion to replace chosen biomass feedstocks(s)

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FA2: Stable, Active, Selective Catalyst Development

- Proposing Teams are encouraged to propose multi-component systems that integrate multiple types of catalysts
 - Catalytic approaches are not limited to a single type
 - Cell-free biocatalysis is within scope
- Molecules of interest included, but not limited to: pharmaceuticals, defense-relevant materials, lubricants, and other specialty and high-value chemicals
- Out of Scope: pyrolysis, gasification, hydrothermal liquefaction, C1-C2 products

NOTE: If there is any discrepancy between what is presented today and Program Solicitation(PS), the official published PS takes precedence.

Peer Adversary in Conflict

Frontline report: 50% of Moscow's fuel supply at risk after Ukrainian drone strike on its largest oil refinery

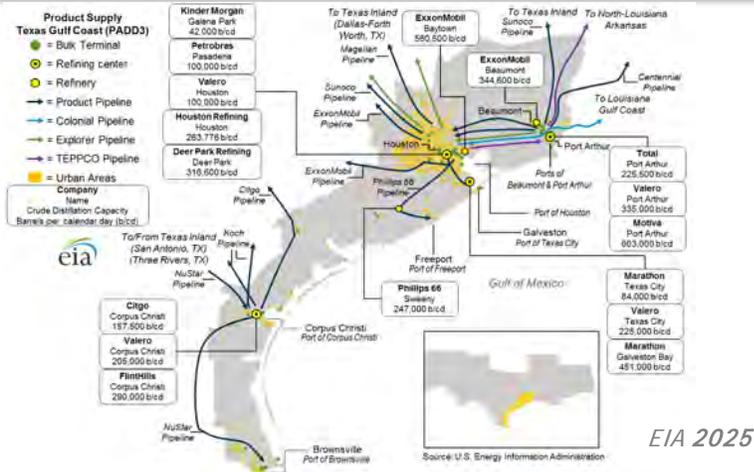
EuroMaidan Press 2025

UKRAINE'S 'DARING' OPERATION 'SPIDERWEB'

WIONews 2025

Caspian Policy Center 2025

Vulnerable Infrastructure and Supply Chains



Improved Domestic Resiliency



Adapted from Bioresour. Bioprocess., 2025, and Renew. Sus. Eng. Reviews, 2025

Recent events and conflicts highlight risks to domestic infrastructure