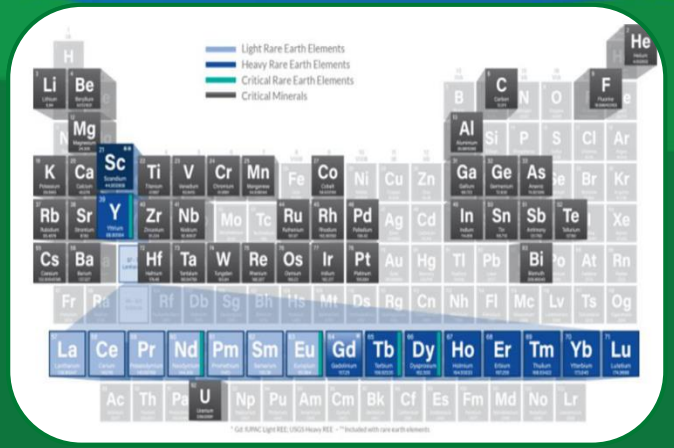
U.S. DEPARTMENT OF ENERGY
Fossil Energy and Carbon Management

Importance of Responsible Carbon Management to Decarbonization

Dr. Emily Grubert

DEPUTY ASSISTANT SECRETARY
OFFICE OF CARBON MANAGEMENT



Fossil Energy and Carbon Management (FECM)

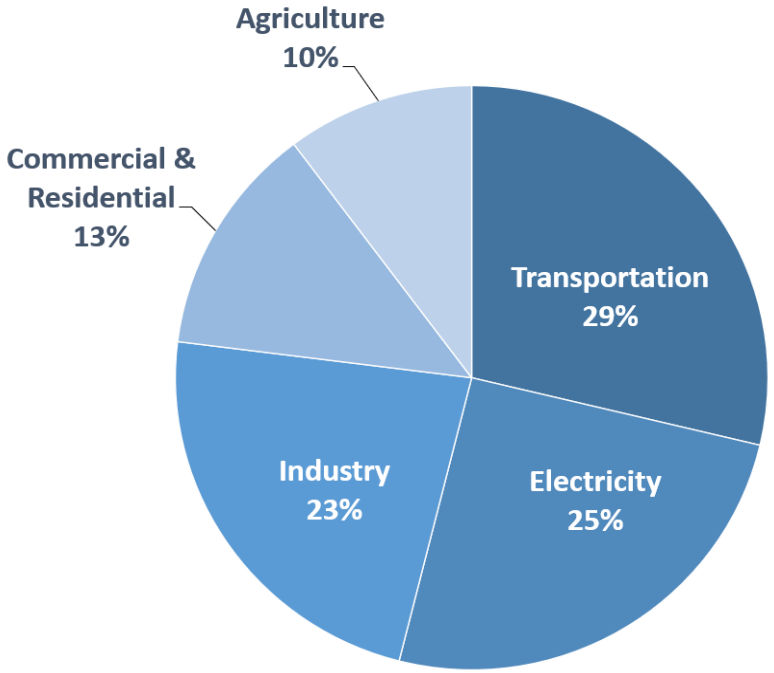
Office of Fossil Energy and Carbon Management

DOE-FE is now DOE-FECM

New name for our office reflects our **new vision**

- President Biden's goals:
  - 50% emissions reduction by 2030
  - CO_2 emissions-free power sector by 2035
  - Net zero emissions economy by no later than 2050

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2019



U.S. Environmental Protection Agency (2021). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019

FECM Mission: Deep Decarbonization and Environmental Justice

Minimize environmental and climate impacts of fossil fuels from extraction to use

Priority Technology Areas

1. Point source carbon capture
2. Carbon dioxide (CO_2) removal
3. CO_2 conversion into products
4. Reliable CO_2 storage
5. Hydrogen production

Office of Carbon Management
(FECM-20)

6. Critical mineral production from industrial and mining waste
7. Methane mitigation

Office of Resource Sustainability
(FECM-30)

Enacting Justice and Supporting Legacy Communities

- Good-paying jobs
- Job growth acceleration
- Healthy economic transitions
- Improve community conditions

Address hardest-to-decarbonize applications in the electricity and industrial sectors

CCUS and CDR Facilitate Deep Decarbonization

Reduce the cost of capture/increase rates

- Power Sector
- Industry
- Carbon Dioxide Removal
- Design Studies and Demonstrations

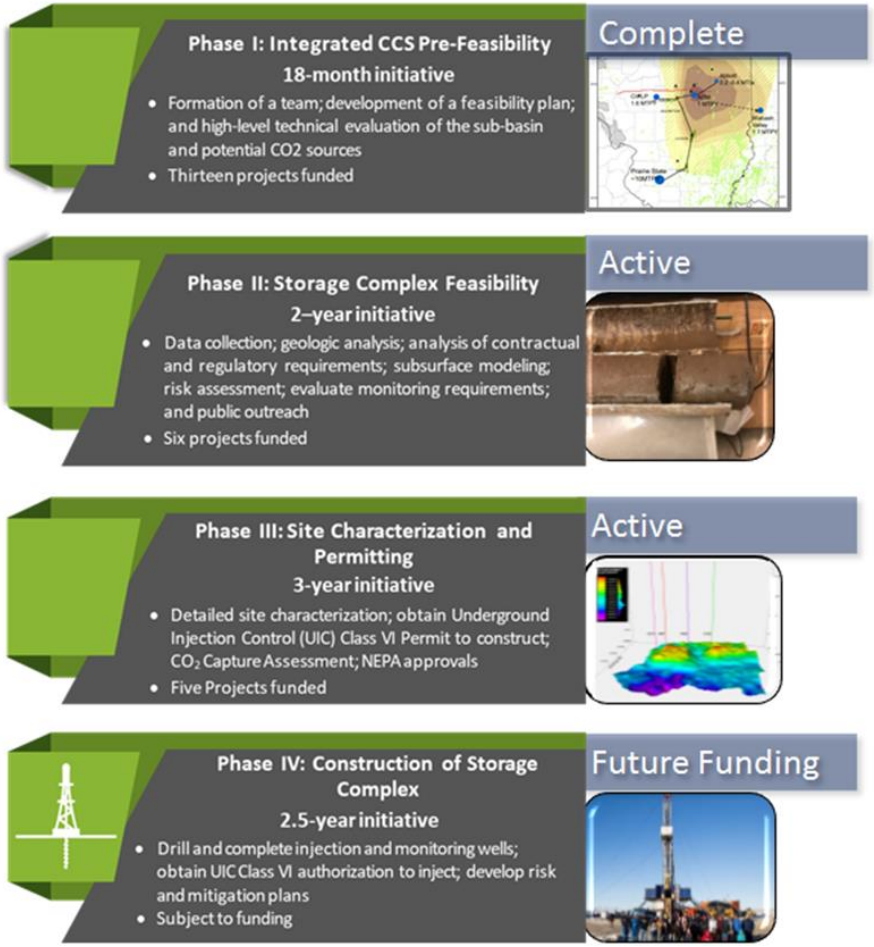
Develop low-carbon supply chains through conversion

- Aggregates
- Fuels and Chemicals
- Solid Carbon Products

Optimize geologic storage operations

- CarbonSAFE Infrastructure, Partnerships
- Geomechanics (pressure and state of stress)
- Conversion of fossil assets
- Enabling real-time decision making through AI

CarbonSAFE - Infrastructure



Emissions control, and legacy waste remediation, are crucial

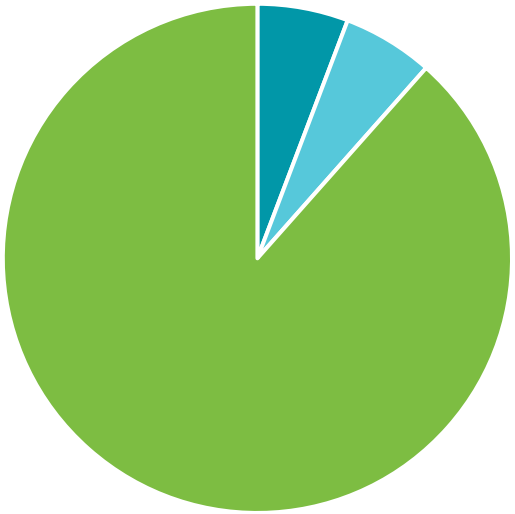
- Environmental justice is about both correcting legacy harms and preventing new ones
- Traditional fenceline pollution like air emissions, water pollution, and solid waste disproportionately affect host communities
- Even with successful deep decarbonization, legacy waste management is challenging and important
- New activities like hydrogen combustion can be supported by emissions mitigation activities

Carbon Negative Shot: Key Performance Elements

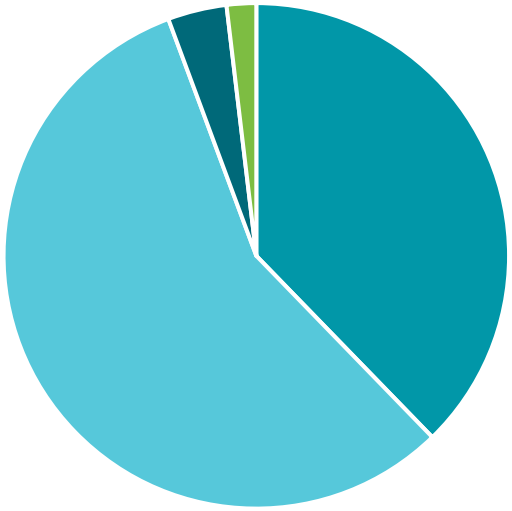
Carbon Negative Shot's key performance elements will guide a responsible industry that is responsive to the climate crisis, such that multiple true, durable removal pathways can be deployed at their most affordable cost at the scale required to address the climate crisis.

1. Less than **$100/net metric ton CO_2e** for both capture and storage
2. Robust accounting of full life cycle emissions
3. High-quality, durable storage with costs demonstrated for MRV **for at least 100 years**
4. Enables necessary **gigaton-scale** removal

Soil Carbon Sequestration



Direct Air Capture and Storage



Blue are costs associated with ambient air capture

Green are costs associated with ensuring durable storage

Ensure the first ton of removal is true, durable removal

Ensure the last ton of removal is as affordable as it can be

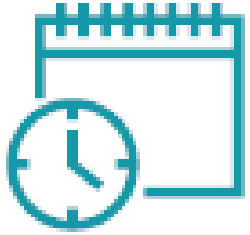
Hydrogen Shot

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Hydrogen

Hydrogen Shot seeks to reduce the cost of clean hydrogen by 80% to $1 per 1 kilogram in 1 decade (“1 1 1”)

1 Dollar

1 Kilogram



1 Decade

Energy Efficiency & Renewable Energy | Fossil Energy and Carbon Management | Science | Nuclear Energy | ARPA-E

Coal & Power Plant Communities & Economic Revitalization

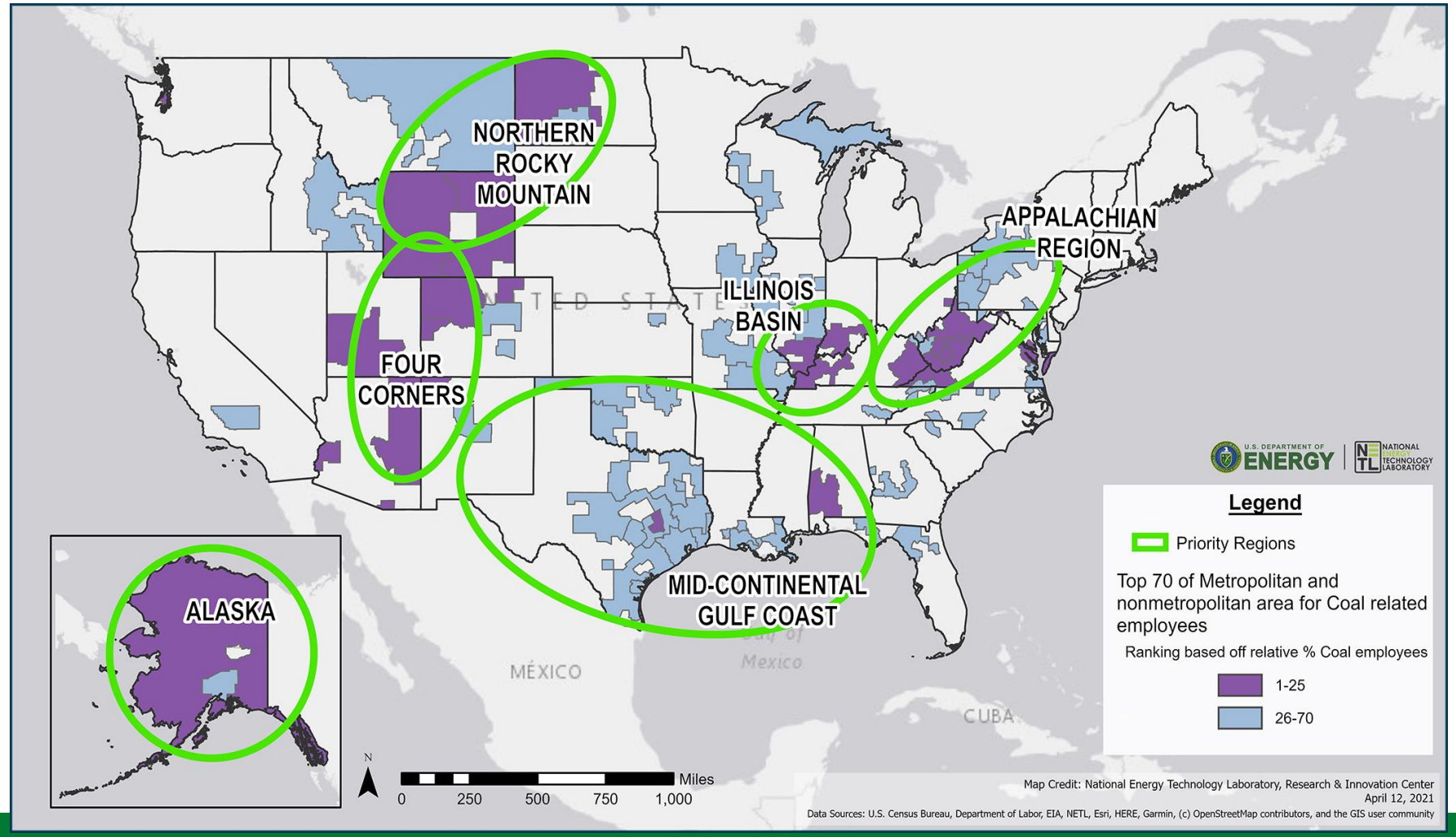
- The Interagency Working Group (IWG) was established by Executive Order 14008, Sec. 218, on Jan. 27, 2021

- The IWG released an Initial Report with recommendations to catalyze robust economic activity and support workers in America's energy sector

Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities, Released April 23, 2021

Initial Report to the President

- Identified **25** priority Energy Communities
- Coal communities identified as immediately challenged



Getting More Funds, to More Places, More Quickly

Upgrade Infrastructure

Clean Up Environmental Damage

Promote Entrepreneurship

Support Workforce Development

Funding Opps in the Clearinghouse: $5.5+ Billion Invested to Date

$204B+

Value of Open/Planned Opportunities

127

Open/Planned Opportunities

12

Agencies Represented

52

Opportunities w/ no cost share

energycommunities.gov/funding

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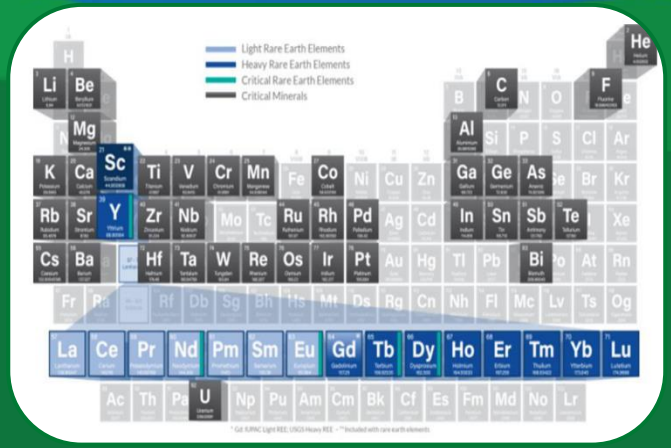
Questions?