Carbon Capture Utilization and Storage in the FY 2021 Omnibus

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Issues

- EFFECT Act
- Section 45Q
- USE IT Act
- CCUS Policy Issues Going Forward

EFFECT Act

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Amends DOE's fossil fuel and CCUS RD&D programs to modernize the authority, broaden the program purposes, increase attention on CCUS for natural gas, focus spending on large-scale pilots, and align the program with U.S. carbon reduction commitments.

EPACT 2005

Sec. 961 – Fossil Energy

Sec. 962 – Coal and Related Technologies Program

Sec. 963 – Carbon Capture and Sequestration RD&D Program

Omnibus 2020

Sec. 961 – Fossil Energy

Sec. 962 – Carbon Capture Technology Program

Sec. 963 – Carbon Storage Validation and Testing

Section 961 – Fossil Energy

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EPACT 2005

- Increase energy conversion efficiency
- Decrease cost of fossil production, generation, delivery
- Promote energy supply diversity
- Decrease foreign dependence
- Improve U.S. energy security
- Decrease environmental impact
- Increase exports of fossil equipment, technology and services

Omnibus 2020 – added purposes

- Decrease CO_2 and heavy metals emissions
- Increase exports of emission control equipment
- Decrease emission control costs
- Significantly lower GHG emissions for production, generation, delivery, utilization
- Develop GHG net reduction technologies, products, methods
- Improve conversion, use, and storage of carbon oxides
- Reduce water use, improve reuse
- PRIORITY – "Activities and strategies that have the potential to significantly reduce emissions . . . relevant to the applicable objective and international commitments of the United States."

Section 962

Coal → Carbon Capture

EPACT 2005 Coal and Related Technologies Program Eliminated

EPACT '05 Program - Technology RD&D and commercialization program to "facilitate production and generation of coal-based power" through –

- Existing plant innovations (including mercury removal)
- Gasification systems
- Advanced combustion turbines
- CCS R&D
- Coal-derived chemicals and transportation fuels
- Liquid fuels derived from low rank coal slurry
- Solid fuels and feedstocks
- Advanced separation technologies
- Fuel cells for coal-derived syngas

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New Section 962 – Carbon Capture

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Carbon Capture Technology Program Objectives

- Increase generation performance – ensuring reliable low-cost power, reducing emissions, support load-following, accelerating transformational technologies
- Decrease CO_2 emissions, including net-negative technologies and capture from nat gas hydrogen production
- Accelerating industrial facility emission reductions

Carbon Capture Technology Program Elements

- R&D program, Large-scale pilots, Demonstration projects, FEED program
- Focused on transformational technologies (resulting in a step change) – oxycombustion, chemical looping, supercritical carbon dioxide cycle

Commercial-scale Demonstration Projects

- Six cooperative agreements by September 30, 2025
- Competitive, merit-based review; no specific cost share
- Two each for natural gas, coal, and industrial facilities
- Encourages partnering with DOE labs and universities
- Financial contributions from government and private sector
- Geographic and technology diversity

New Section 962 Carbon Capture (continued)

Large-scale Pilot Projects

- Transformational technologies
- 50% minimum cost share required

Carbon Capture Test Centers

- Grants of up to 5 years to one or more test centers providing distinct testing capabilities
- Prioritizes test centers already in existence

Effect on Regulation

- No effect on Section 402(i) of EPACT '05, which precludes a project funded by these programs from setting a standard under CAA 111 or other sections

Section 963 – Carbon Storage

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Carbon Storage Program

- Mapping tools to assess capacity of storage formations
- Monitoring tools to predict containment and do accounting
- Researching e/s/h impacts and mitigation actions
- Evaluating subsurface interactions and seismicity
- Assessing safety
- Determining CO_2 fate
- Assessing economic viability

Large-scale Sequestration Demo Program

- Funding for demonstration projects to validate cost and feasibility
- >50 million tons over 10 years

RD&D program for carbon utilization

AND

RD&D program for carbon utilization

That’s right – there are two overlapping RD&D programs for carbon utilization.

USE IT Act

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Two objectives

- **Accelerating permitting**
  - Adds “carbon capture” to covered projects for FAST Act permitting streamlining
  - Covered project - $200 million project size, subject to NEPA, not subject to other permitting streamlining
  - FAST Act – FPISC, lead agency to coordinate permitting across agencies, performance schedule, regular reporting
- **Promoting direct air capture**
  - Authorizes (but does not require) an EPA technology prize program within 1 year
  - >10,000 tpy capture
  - Applies to technology to be commercial “in the foreseeable future”
  - At least 1 coastal State and 1 rural State project
  - Authorizes a 9-member Direct Air Capture Technology Advisory Board
  - Report to Congress within 1 year on the risks and benefits of saline storage

Section 45Q

Two-year extension of "begin construction" deadline, to January 1, 2026

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CCUS Policy Issues Going Forward

- **CCUS Incentives**
  - Extension of 45Q “begin construction” date
  - Expansion of 45Q
    - Lengthening the credit period
    - Eliminate minimum threshold requirements
    - Direct pay
- **Keeping the “U” in CCUS**
- **If a push toward non-producing storage, these issues become more important:**
  - Class VI reform
    - Risk-based endangerment standard, risk-based monitoring, financial responsibility, post-injection site care period, area of review
  - Class VI primacy
  - Federal eminent domain
    - Pipelines, Pore space

Oil Field Utilization versus Dedicated CCS

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BASE CASE

- **Single gasification project producing 200 MMcf/d of CO_2**
- **30 year life**
- **Total CO_2 Utilization : 2.2 Tcf of CO_2**

CO_2 ENHANCED OIL RECOVERY OPERATIONS

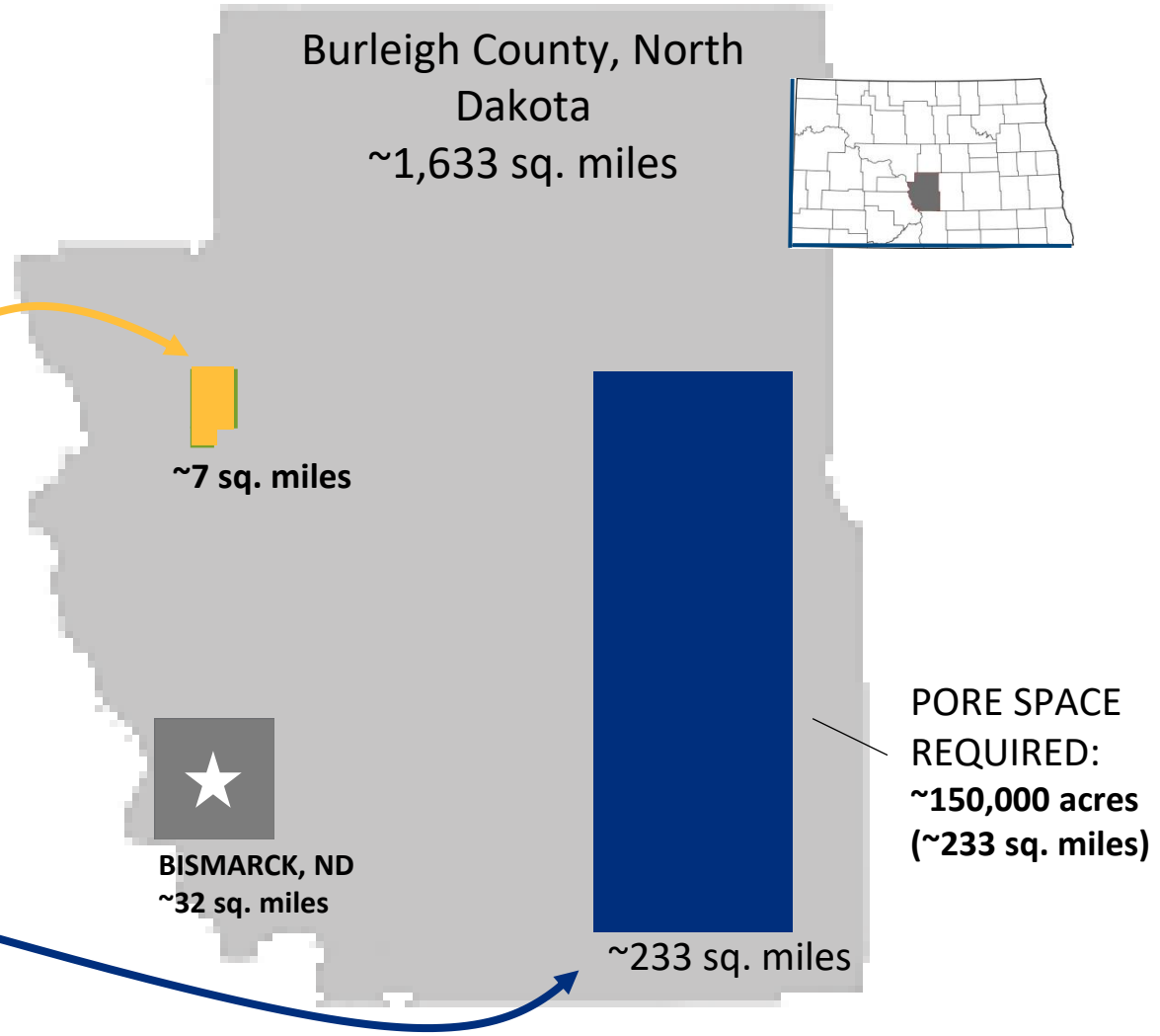
Oil Field Example (approximate values)

- 5,500'
- Reservoir Pressure: 2,500 psi
- Areal Extent: 4,600 acres
- Max CO_2 Utilization: 1.0 Tcf

DEDICATED CARBON CAPTURE & STORAGE

Saline Reservoir (approximate values)

- CO_2 to be stored: 2.2 Tcf
- 6,500'
- Reservoir Pressure: 3,000 psi
- Thickness: 125'
- Porosity: 20%
- Percent of pore space utilized: 4% (versus avg. 40% for EOR)



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