Safety and De-risking Geologic CO_2 Storage and US Incentives

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Official UNFCCC Side Event

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Baku Azerbaijan
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25 years of practical experience
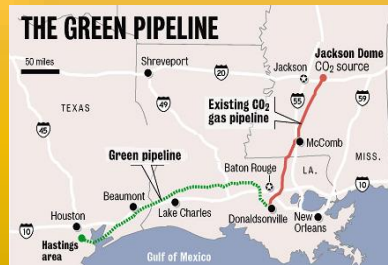Researching and developing CO_2 storage and monitoring in deep geological formations

500 T

Frio Brine Storage Pilot 2004

Injector CFU 31F1

Obs CFU 31 F2

Obs CFU 31 F3

SECARB Demonstration Project in Mississippi

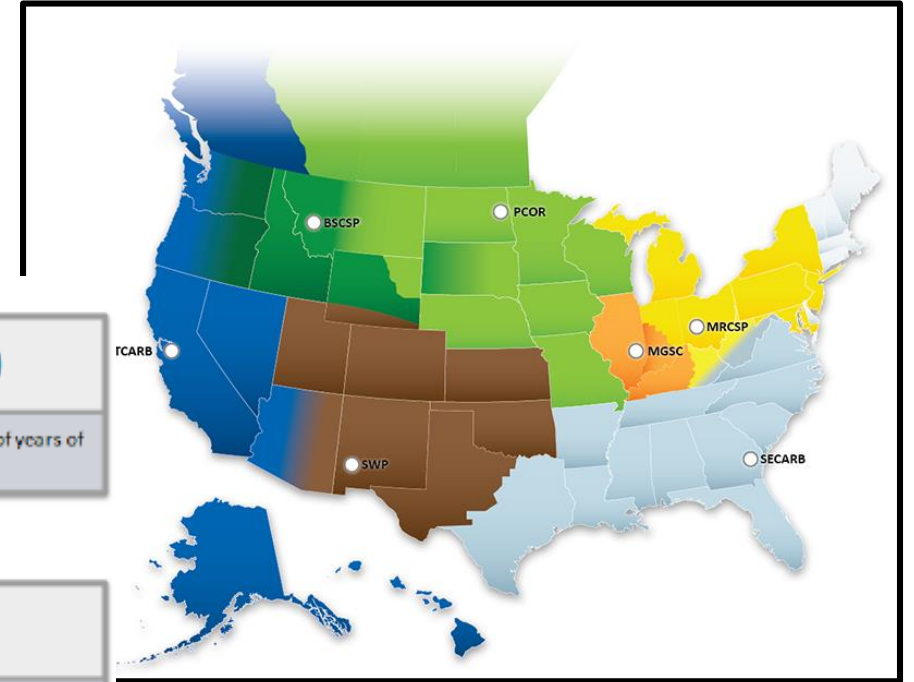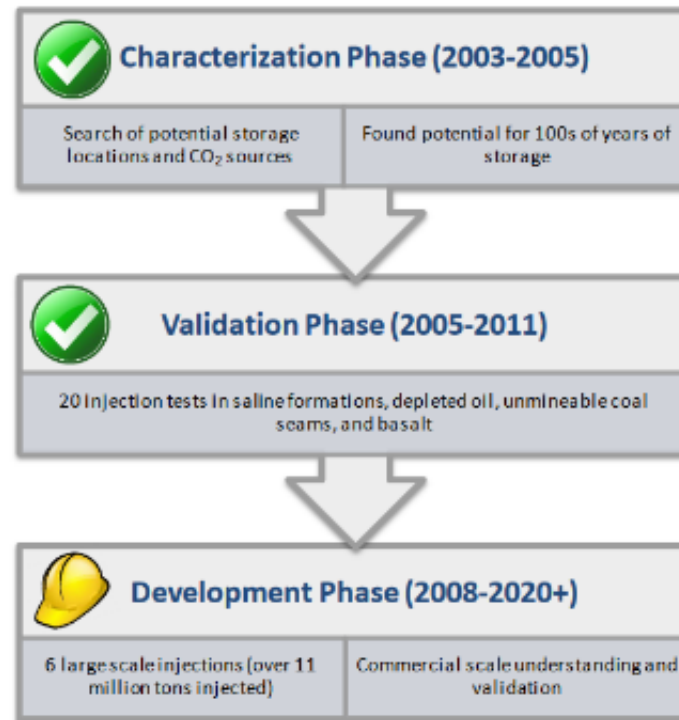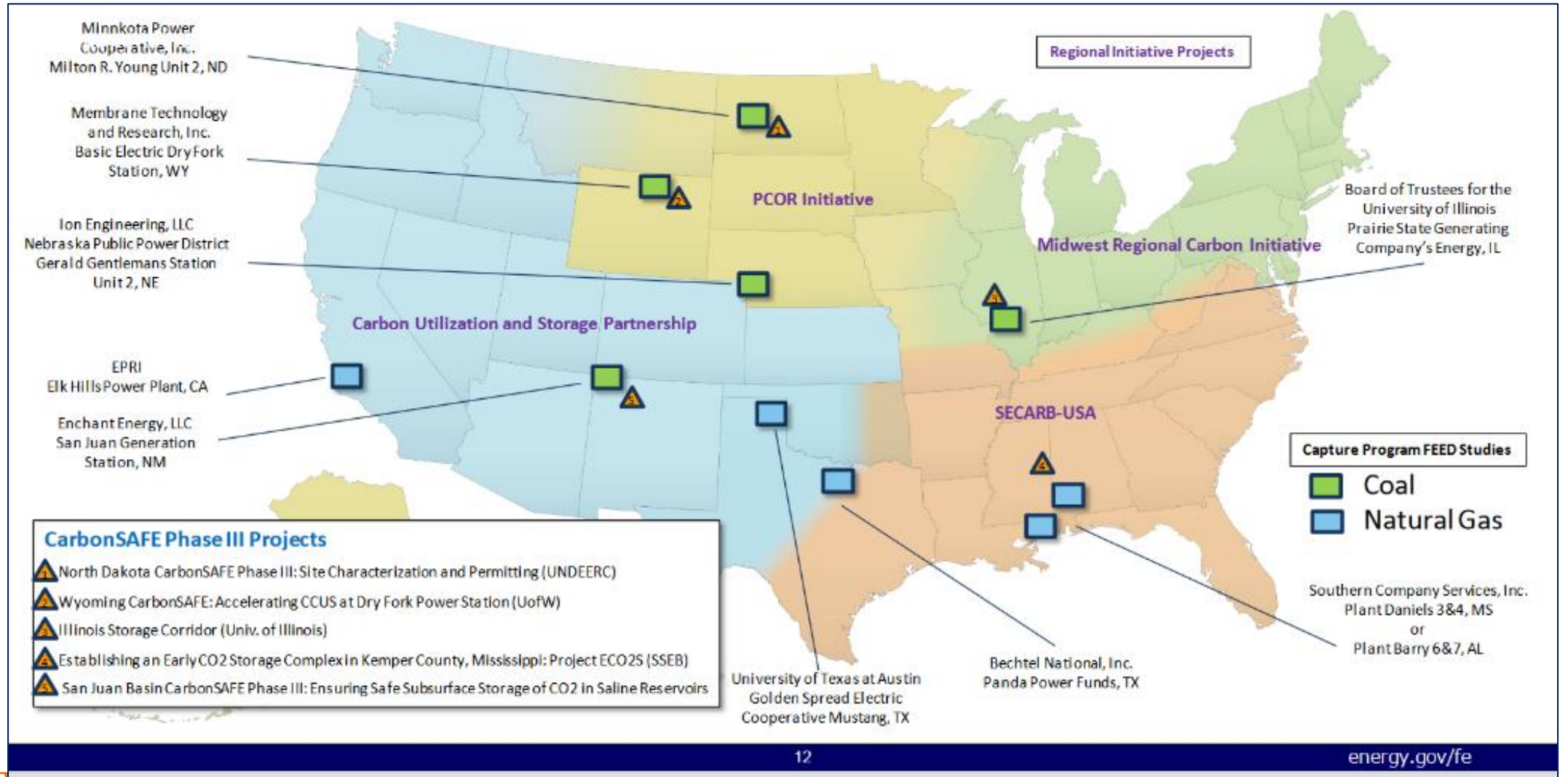Hastings Project

THE GREEN PIPELINE

NRG Petranova Project

1.6 MMT/year

U.S. DOE Regional Carbon Sequestration Partnership Program

- Since 2003, testing replicated in 7 regions in the U.S. and Canada

- Proved up regionally important storage resources

- Develop sound monitoring and environmental practices.

- >15 million tons injected

Characterization Phase (2003-2005)

| Search of potential storage locations and CO$_2$ sources | Found potential for 100s of years of storage |

Validation Phase (2005-2011)

20 injection tests in saline formations, depleted oil, unmineable coal seams, and basalt

Development Phase (2008-2020+)

| 6 large scale injections (over 11 million tons injected) | Commercial scale understanding and validation |

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CarbonSAFE 50-MT Sites

How Does It Work?

Capture

Underground Source

> 800 m

Confining system li

brine

CO$_2$

Hovorka, 2021

Pore-scale trapping

Sand grain

CO$_2$

Brine
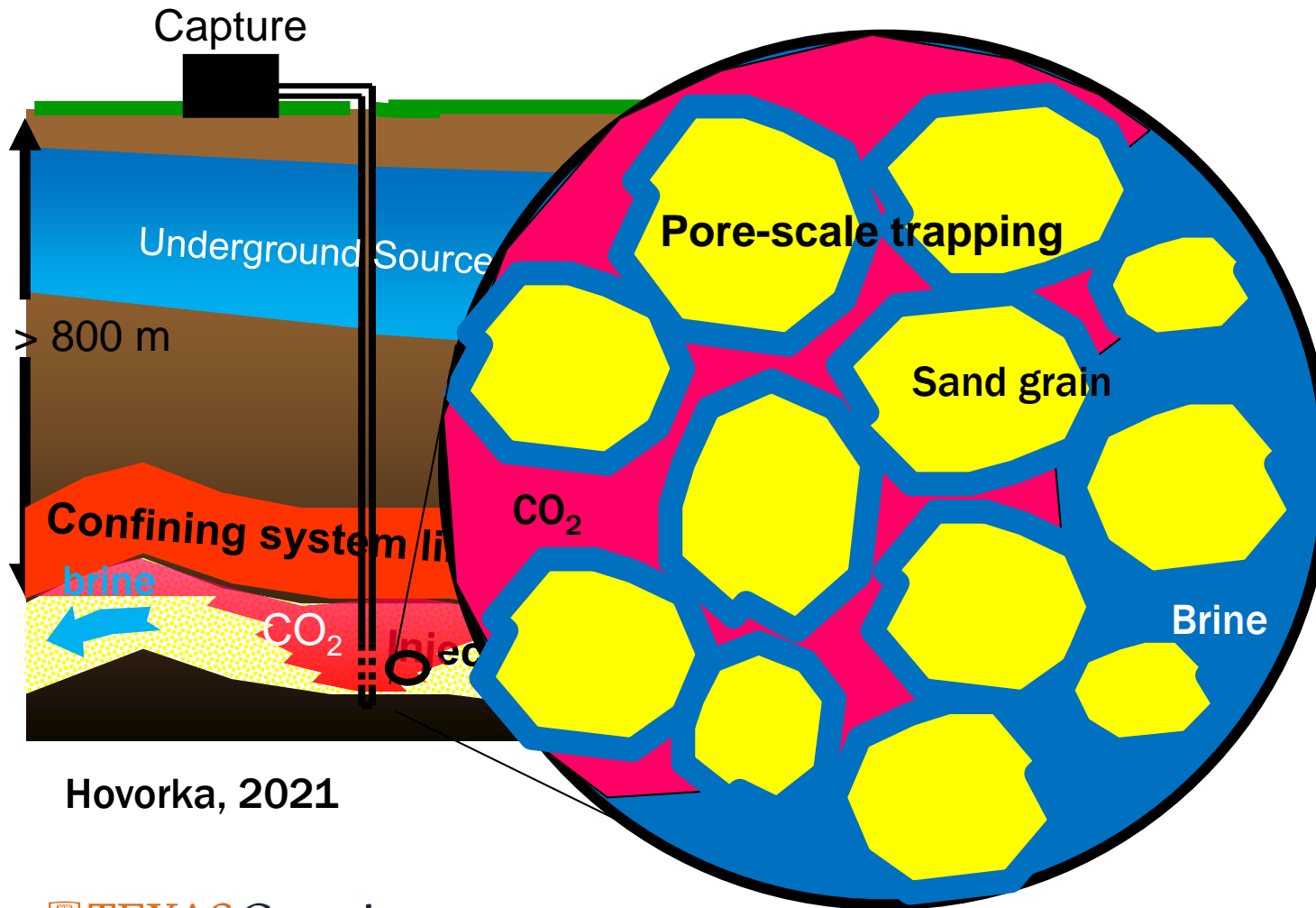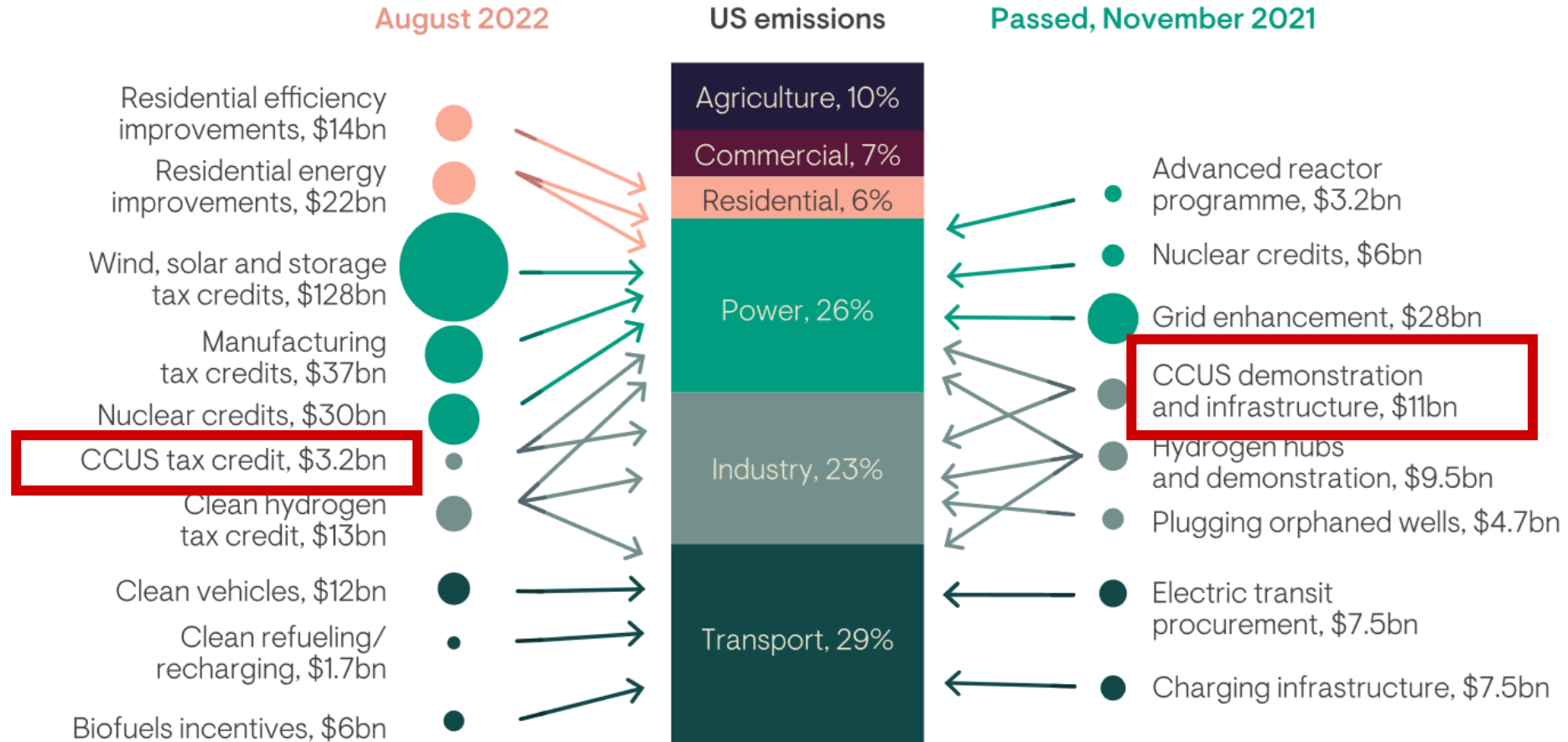
- CO$_2$ is injected via wells into pore space at depths > 800 m

- CO$_2$ is trapped by many methods
  - Structural trapping
  - Residual trapping
  - Dissolution and mineralization
- CO$_2$ is stored in pore space over 1000's of years
- Storage becomes more secure with time.

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USA Funding

Inflation Reduction Act
$260bn for energy transition

August 2022

US emissions

Bipartisan Infrastructure Law
$80bn for energy transition

Passed, November 2021

Residential efficiency improvements, $14bn
Residential energy improvements, $22bn
Wind, solar and storage tax credits, $128bn
Manufacturing tax credits, $37bn
Nuclear credits, $30bn
CCUS tax credit, $3.2bn
Clean hydrogen tax credit, $13bn
Clean vehicles, $12bn
Clean refueling/recharging, $1.7bn
Biofuels incentives, $6bn

Agriculture, 10%
Commercial, 7%
Residential, 6%
Power, 26%
Industry, 23%
Transport, 29%

Advanced reactor programme, $3.2bn
Nuclear credits, $6bn
Grid enhancement, $28bn
CCUS demonstration and infrastructure, $11bn
Hydrogen hubs and demonstration, $9.5bn
Plugging orphaned wells, $4.7bn
Electric transit procurement, $7.5bn
Charging infrastructure, $7.5bn

Source: EIA, EPA, Joint Committee on Taxation, BloombergNEF. Note, chart only captures tax credits and incentives, not grant programmes or loan. Bn is billion. CCUS is carbon capture, utilisation and storage. Chart has been redrawn by Ninety One.

An Invitation to Countries

- Opportunities are available at all levels for "getting on the path" to CCS.

- Explore your country's potential for geological storage of CO_2

- Become involved in the Carbon Management Challenge

- Utilize UNFCCC funding mechanisms to build your capacity in CCS – e.g. CTCN and GCF

- Engage in capacity building and technology transfer

- Explore memberships with experienced organizations

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