



Midland CO₂ Conference: CCUS Tax Strategies, Opportunities, Roadblocks, Hurdles, and Solutions

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Moderator and Panelists



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Mike was the Executive Director of The North American Carbon Capture Storage Association (NACCSA) in Washington, DC from September 2008 until April 2017, and a founding member and officer in the Texas Carbon Capture Association (TXCCSA).



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The CONSENSUS Program, founded in 2008, seeks to educate the public, policy makers, industry, and stakeholders and build a consensus on the wide array of benefits of CCUS and Clean Coal technologies.

- Briefings
- Workshops
- Reports
- Monthly News Clips

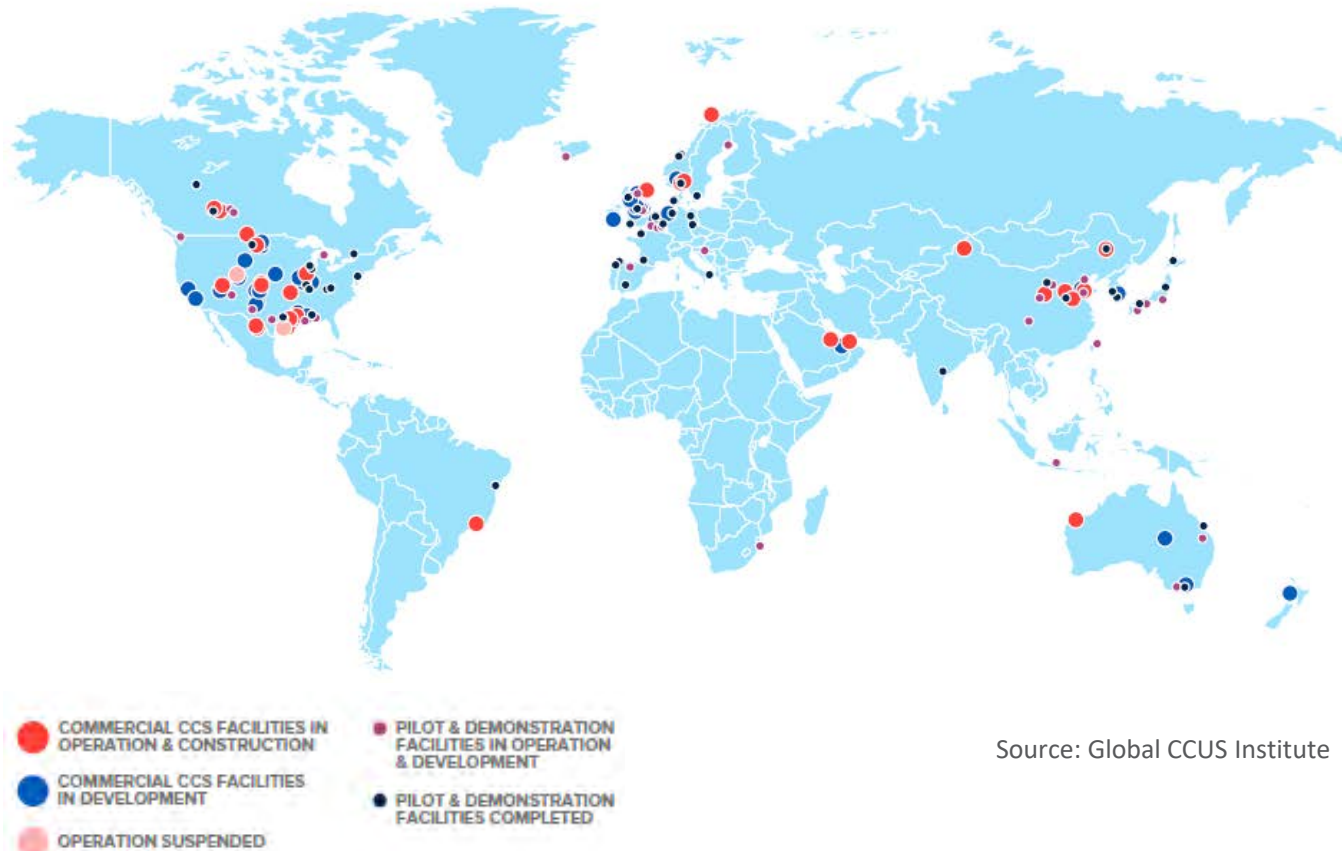
To subscribe to our mailing list, please email Michelle Littlefield at mlittlefield@usea.org

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U.S. is already a global CCUS leader

Global CCUS Facilities – Operational and Under Development



Source: Global CCUS Institute

U.S. Leadership in CCUS

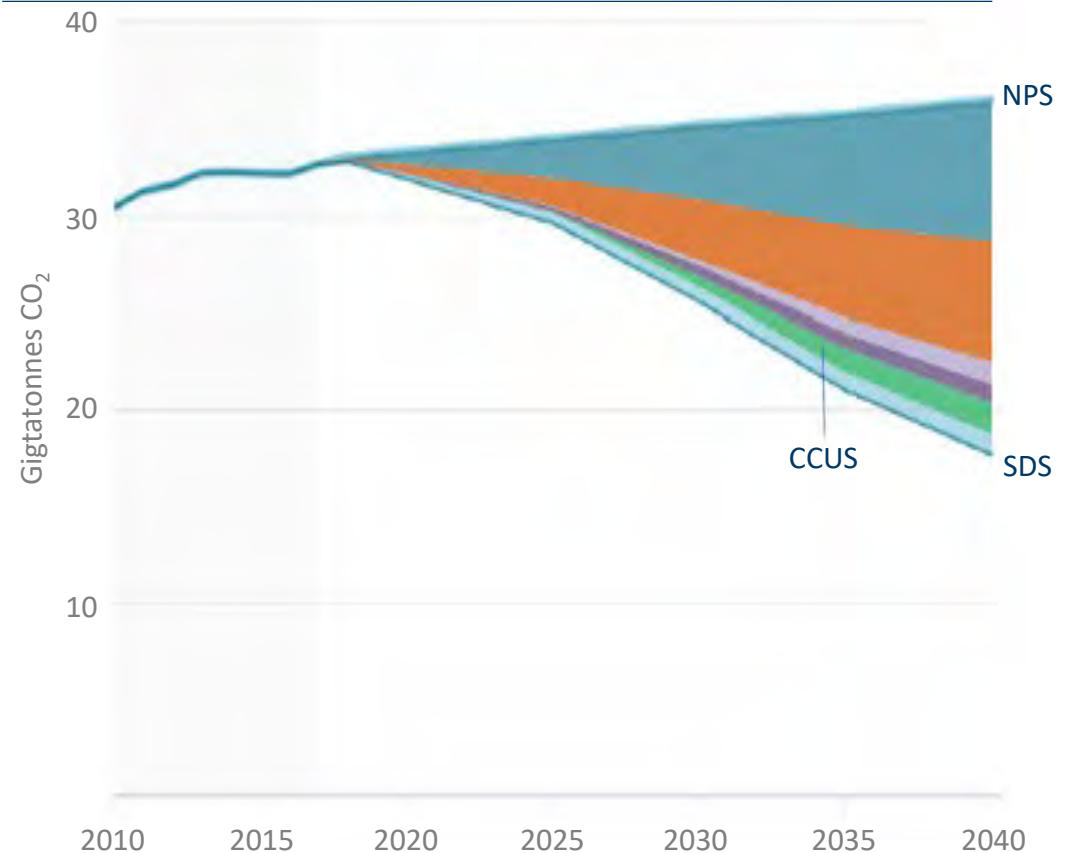
- U.S. hosts 14 of the 28 large-scale CCUS projects operating worldwide
- These projects capture ~26 million metric tonnes (Mt) per year of CO₂ or 67% of global CCUS capacity.

| Project | Type | Capture (MTPA) |
|-------------------------|----------------|----------------|
| Century Plant | Gas Processing | 8.40 |
| Shute Creek | Gas Processing | 7.00 |
| Great Plains Synfuels | Synthetic Gas | 3.00 |
| Petra Nova | Power | 1.40 |
| Air Products SMR | Hydrogen | 1.00 |
| Coffeyville | Fertilizer | 1.00 |
| Illinois Industrial CCS | Ethanol | 1.00 |
| Lost Cabin Gas Plant | Gas Processing | 0.90 |
| Enid Fertilizer | Fertilizer | 0.70 |
| Terrell | Gas Processing | 0.50 |
| Core Energy | Gas Processing | 0.35 |
| PCS Nitrogen | Fertilizer | 0.30 |
| Arkalon | Ethanol | 0.29 |
| Bonanza | Ethanol | 0.10 |
| Total | | 25.94 |

CCUS is critical to achieving 2°C goal

- Meeting 2°C goal **costs 138% more without carbon capture** - *IPCC 5th Assessment*
- **CCUS achieves one-fifth of the reductions by midcentury**; nearly half from industrial facilities – *IEA modeling of 2°C goal*
- “CCUS accounts for **7% of the cumulative global emissions reduction by 2040** and **20% annually by 2050**” – *IEA Sustainable Development Scenario*
- “**Rapid scale-up of CCUS deployment,**” from around 30-40 million tonnes (MT) of CO₂ currently captured each year to “**2,300 Mt per year by 2040.**” – *IEA Sustainable Development Scenario*

SDS vs. NPS – CO₂ and CH₄ Reductions by Measure



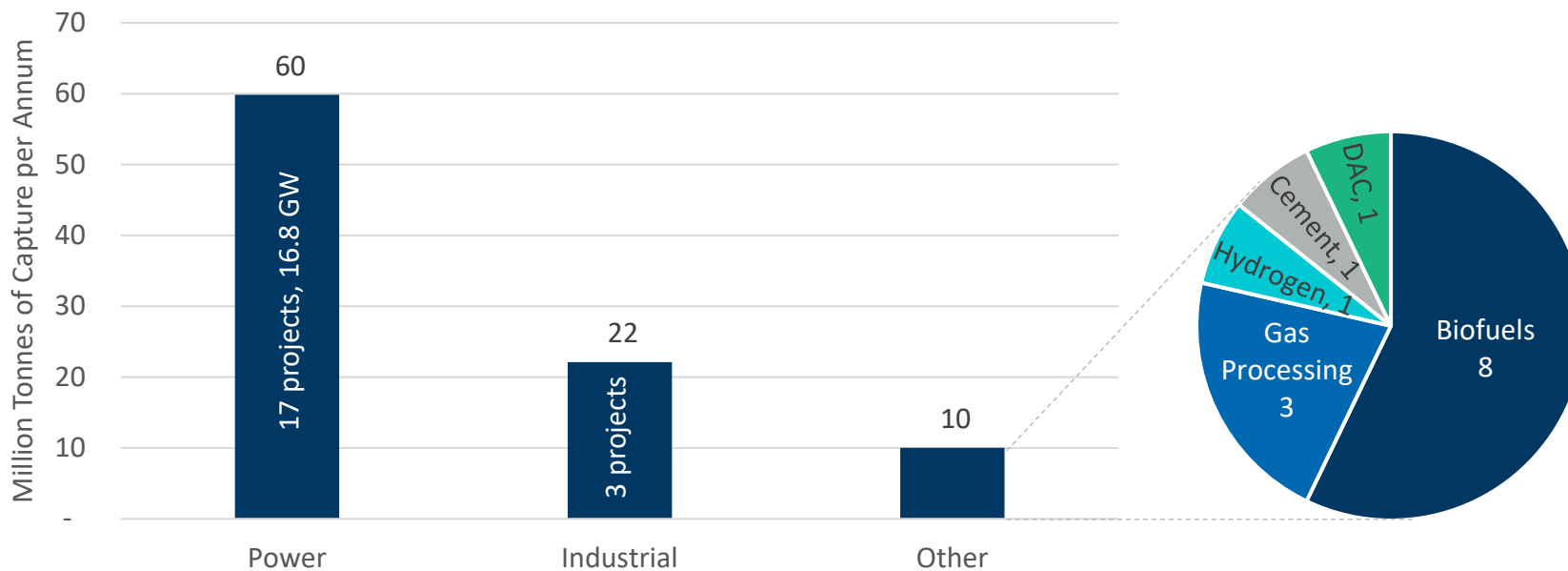
SDS: Sustainable Development Scenario
NPS: New Policies Scenario

Source: IEA, NARUC, WIEB

Robust U.S. CCUS Project Opportunities and Pipeline

- 400+ near- and medium-term capture opportunities using the 45Q Credit in the U.S.¹
- 30+ CCUS projects are under various phases of development²
 - Power plant retrofits and new builds represent almost half of the proposed projects
 - Biofuels represent about 25 percent of the proposed projects.

Proposed U.S. CCUS Projects – Annual Capture and Number of Projects

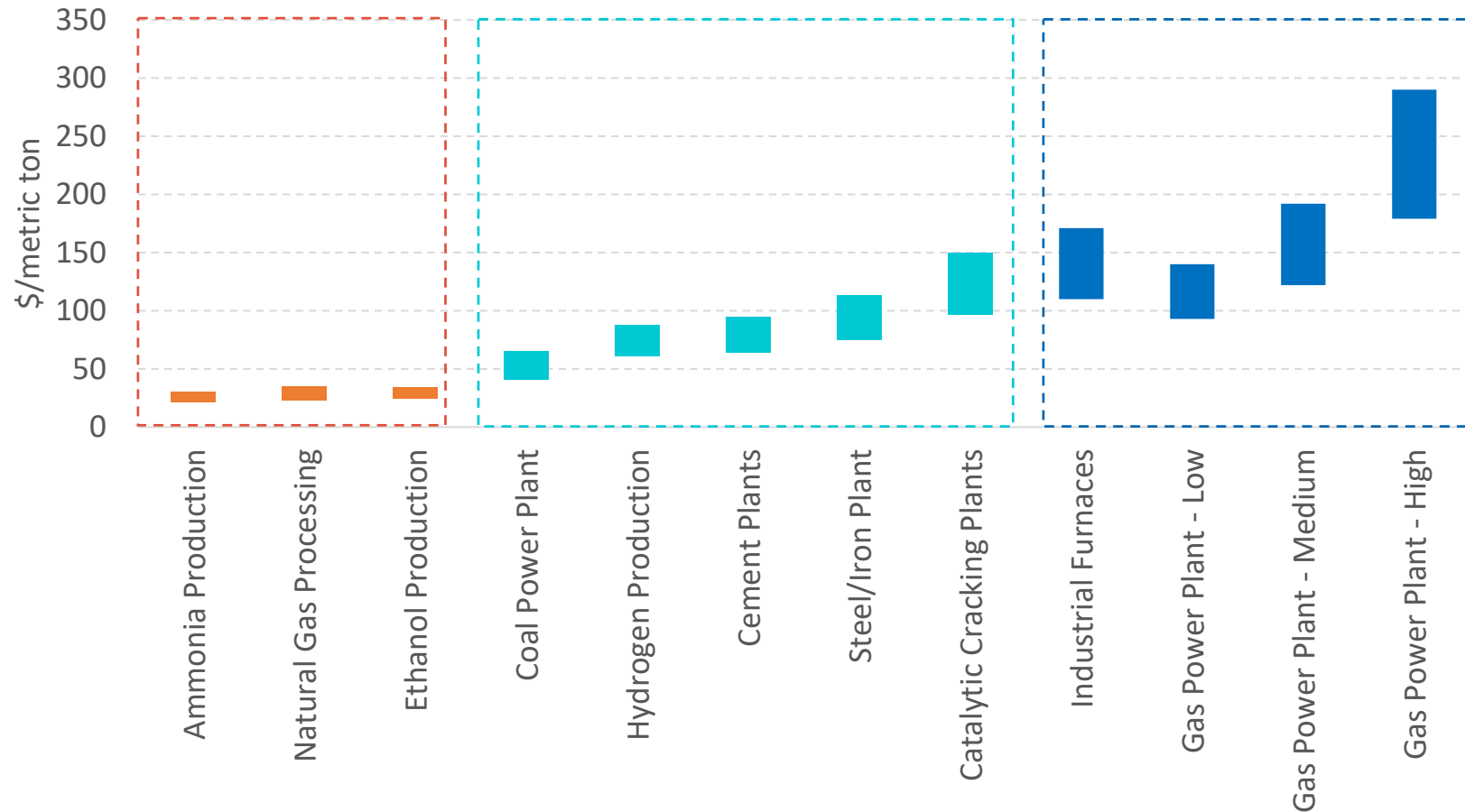


Sources:

1. Abramson, Elizabeth, McFarlane, Dane, and Brown Jeff, "Transport Infrastructure for Carbon Capture and Storage: Whitepaper on Regional Infrastructure for Midcentury Decarbonization," Great Plains Institute, June 2020.

2. Clean Air Task Force's CCUS Project Tracker. <https://www.catf.us/2020/04/the-status-of-carbon-capture-projects-in-the-u-s-and-what-they-need-to-break-ground/>

Estimated Capture-only Costs by Facility Type

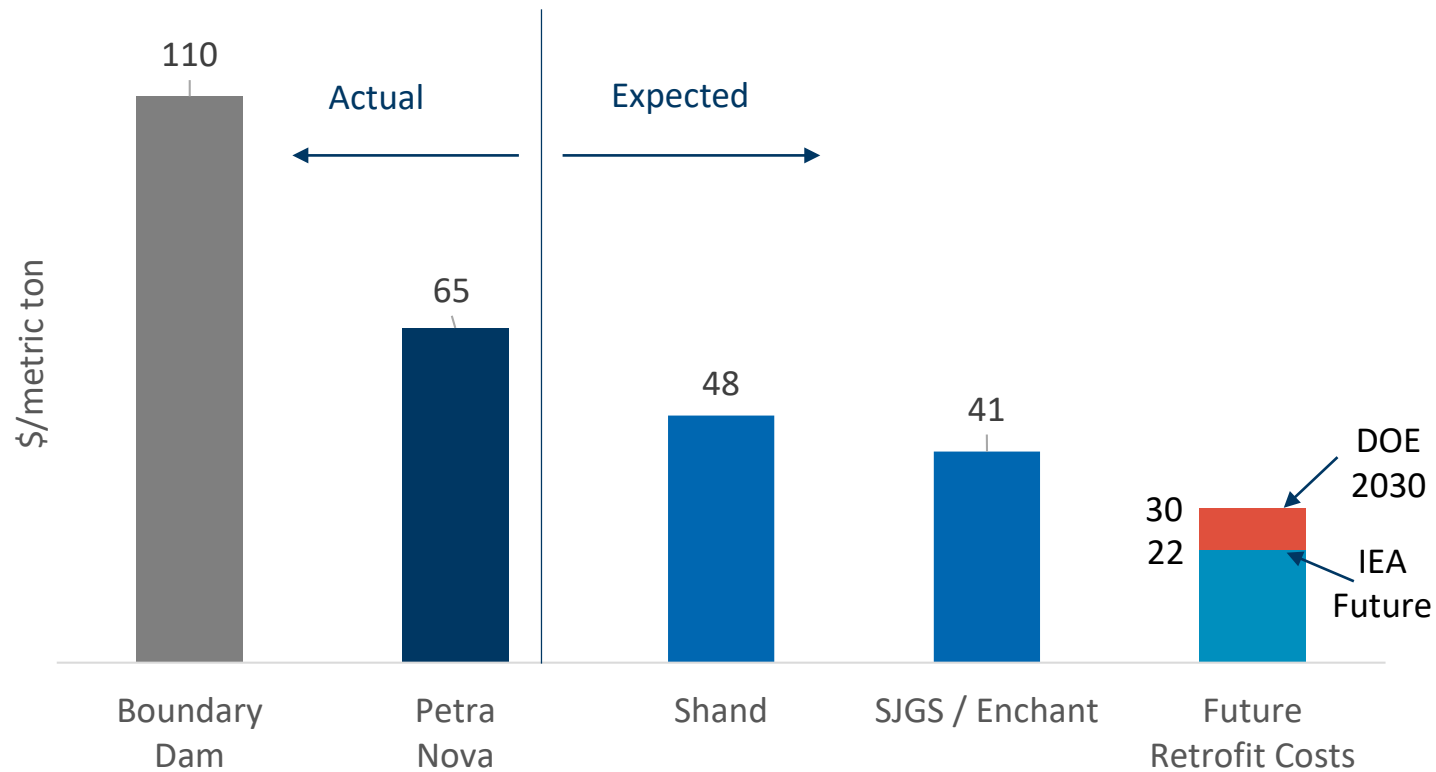


Sources:

National Petroleum Council. A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage. <https://dualchallenge.npc.org/files/NPC%20CCUS%20Chapter%202%20-%20Dec12.pdf>.

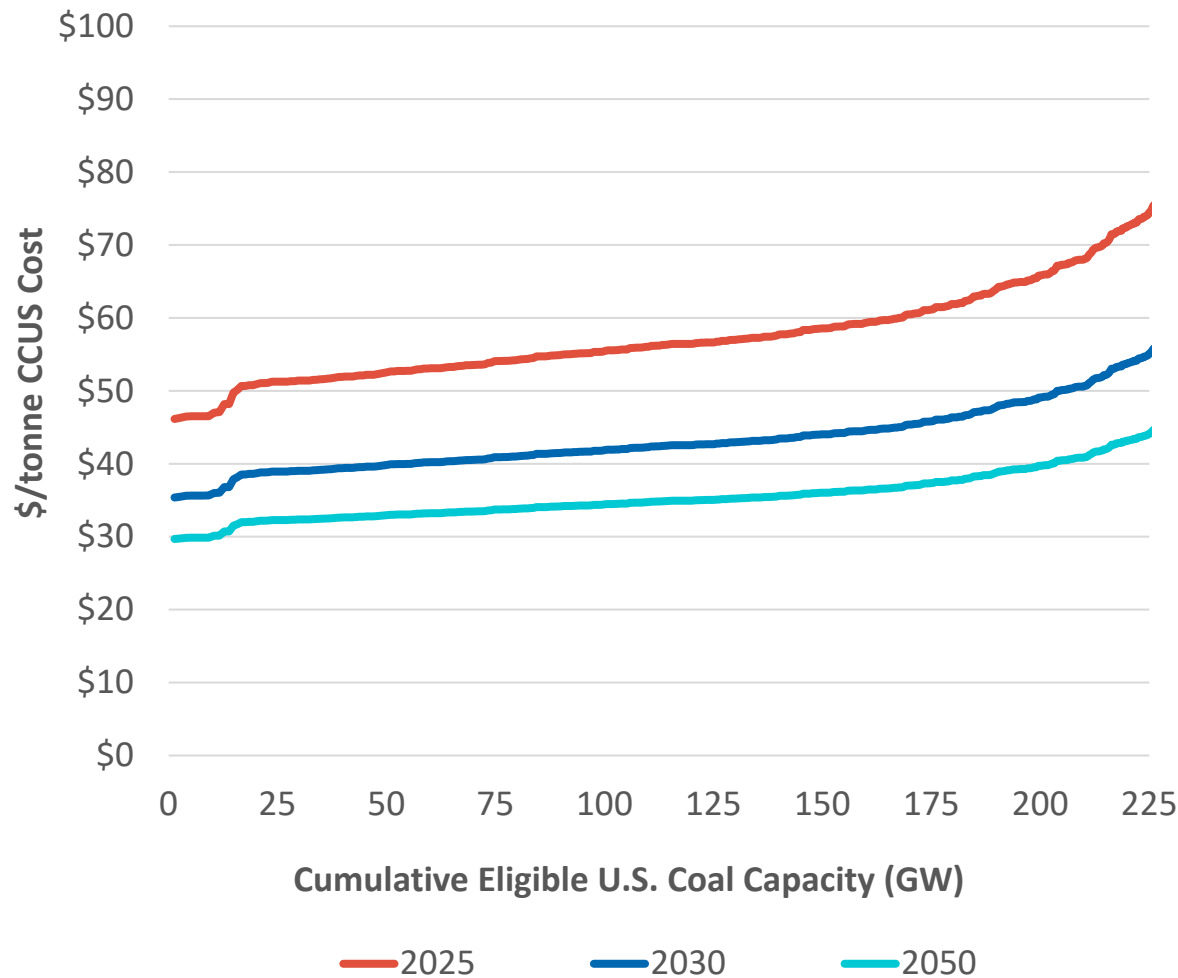
FTI Analysis

Capture-only Costs for Coal-fired Generator Retrofits



Source: FTI Consulting Analysis

U.S. Coal CCUS Costs (Capture, Transport, and Storage)

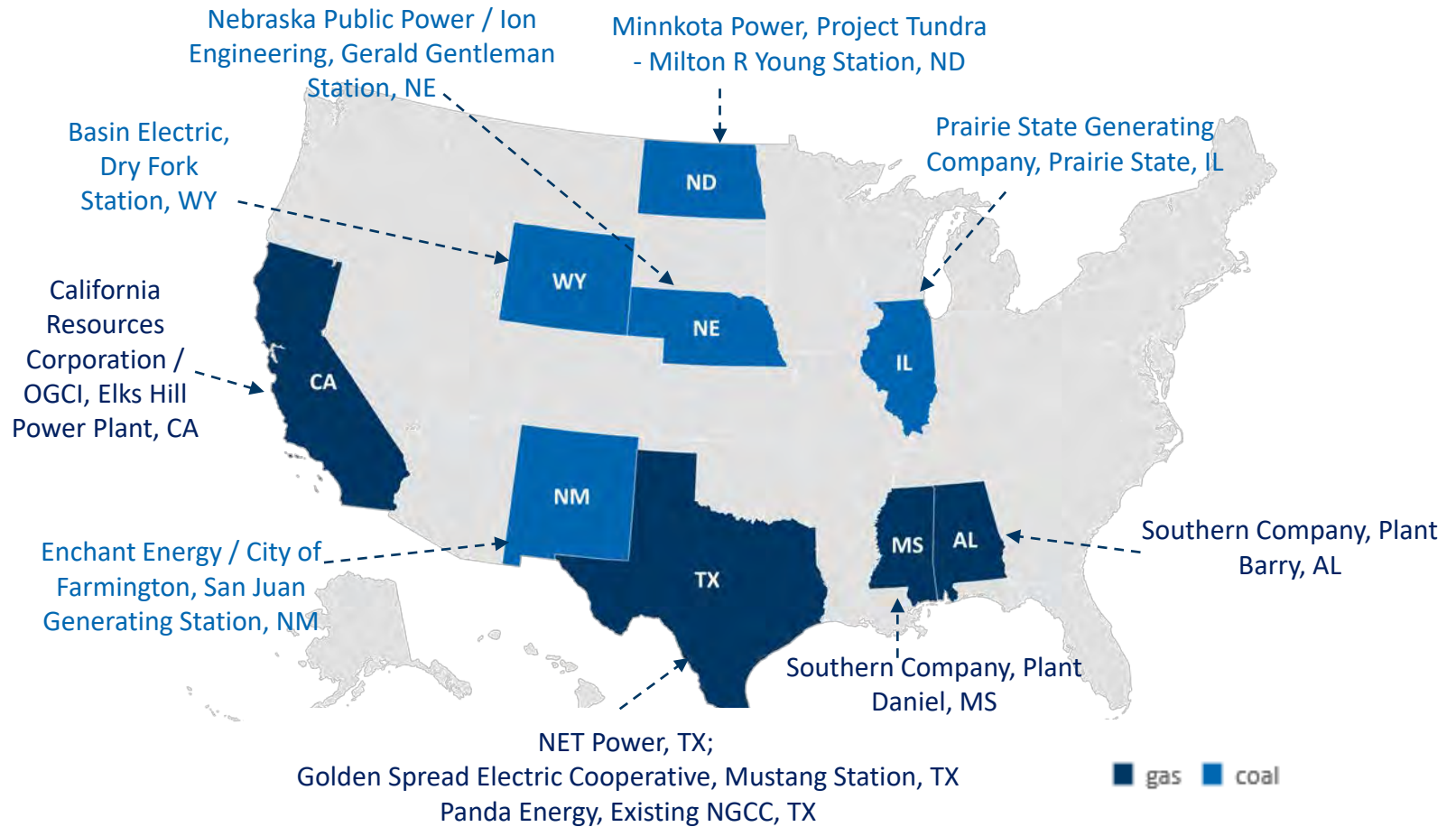


Key Assumptions

- Capture cost of \$45/tonne in 2025 for 530 MW unit decreasing to \$30/tonne in 2030 and \$22/tonne in 2050
- 10% retrofit difficulty factor
- 0.6 scaling factor for unit size economies of scale
- Fixed and variable O&M decline at the same rate as capex
- 85% capacity factor
- 90% capture
- \$14 for transport and storage
- 8% discount rate

Source: FTI Consulting analysis; NETL; NPC

U.S. CCUS Power Projects Under Development



Source: FTI Consulting based on Clean Air Task Force's CCUS Project Tracker.



Section 45Q and Section 43 Credits

Section 45Q Credit for Carbon Sequestration

- Section 45Q provides a federal income tax credit for CCUS to encourage investment in projects that will reduce the emission of greenhouse gases (45Q Credit).
- In February 2018, with the passage of the Bipartisan Budget Act of 2018, the Internal Revenue Code (“IRC”) of 1986 was amended to improve and extend the credit for CO₂ sequestration.
 - The 45Q Credit is available for a 12-year period, beginning when carbon capture equipment is placed in service.
 - The 45Q Credit is awarded per metric ton of qualified carbon oxide.
 - The 45Q Credit increases each year until 2026, when it is equal to \$35 for qualified carbon oxide used in enhanced oil and gas recovery projects or and \$50 if stored in secure geologic storage.
 - After 2026, the credit amount is increased by an inflation adjustment.
 - The credit is also allowed for CO that is used in the chemical conversion of qualified carbon oxide to a material or chemical compound in which such carbon oxide is securely stored.
 - It is also available in for the utilization of CO in any commercial market (to be defined by the IRS).

| Facility Type | 45Q Credit Value in 2026 |
|--|--------------------------|
| Geologic Storage | \$50 per metric ton |
| Enhanced Oil Recovery, Enhanced Gas Recovery, and Utilization | \$35 per metric ton |

Section 45Q Credit for Carbon Sequestration

- Section 45Q allows the owner of the carbon capture equipment to transfer the credit to the party involved in the disposal, injection or utilization of the carbon oxide.
- Construction of the facility that will capture the carbon must begin prior to January 1, 2024.
- Guidance issued by the Internal Revenue Service and the U.S. Treasury Department allow the use of certain investment structures that have successfully been used for solar and wind energy projects.
- The IRS issued guidance in February 2020 relating to the use of a tax partnership structure (known as the partnership flip structure), and what qualifies as the “Beginning of Construction” for purposes of beginning construction prior to January 1, 2024.
- Proposed Regulations were issued in May 2020 and they address many important points, including.
 - The contractual provisions required when the owner of the carbon capture equipment contracts with another party for the disposal, injection, or utilization of the carbon oxide;
 - The definition of carbon capture equipment.
 - The introduction of the so-called “80/20 Rule” allowing existing equipment and facilities to qualify as new carbon capture equipment and facilities;
 - The requirements and methodology for transferring the §45Q Credit to the party that disposes, utilizes, or uses the carbon oxide;
 - The introduction of alternative rules by which Class II wells can comply with the standards for secure geological storage;
 - When and how much of the credit can be recaptured when there is leakage.

Section 43 Enhanced Oil Recovery Credit

- Section 43 provides a credit for costs incurred in connection with qualifying enhanced oil recovery projects that is phased in or out based on the average price of oil for the year compared to an inflation adjusted reference price.
 - The credit is equal to 15% of the taxpayer's qualified enhanced oil recovery costs for the taxable year.
- It does not apply for enhanced gas recovery projects.
- The credit is phased out if the reference price of oil for the prior year exceeds an inflation adjusted benchmark in the current year.
- It is completely phased out when the benchmark exceeds the inflation adjusted amount by \$6 a barrel.
- For 2006 to 2019, the benchmark price resulted in the complete or nearly complete phase out of the credit.

Section 43 Enhanced Oil Recovery Credit – 2021 Outlook

- Outlook for 2021:
 - The inflation adjusted amount for 2021 will be approximately \$50.
 - The reference price per barrel of crude oil will be based on the average price of domestic oil in 2020, which is expected to be less than \$50, possibly as low as \$40.

- The phase-out of the enhanced oil recovery credit only begins when the reference price per barrel of crude oil is greater than the inflation adjusted amount.

- It is reasonable to expect the full amount of the Section 43 Enhanced Oil Recovery Credit to be available in 2021

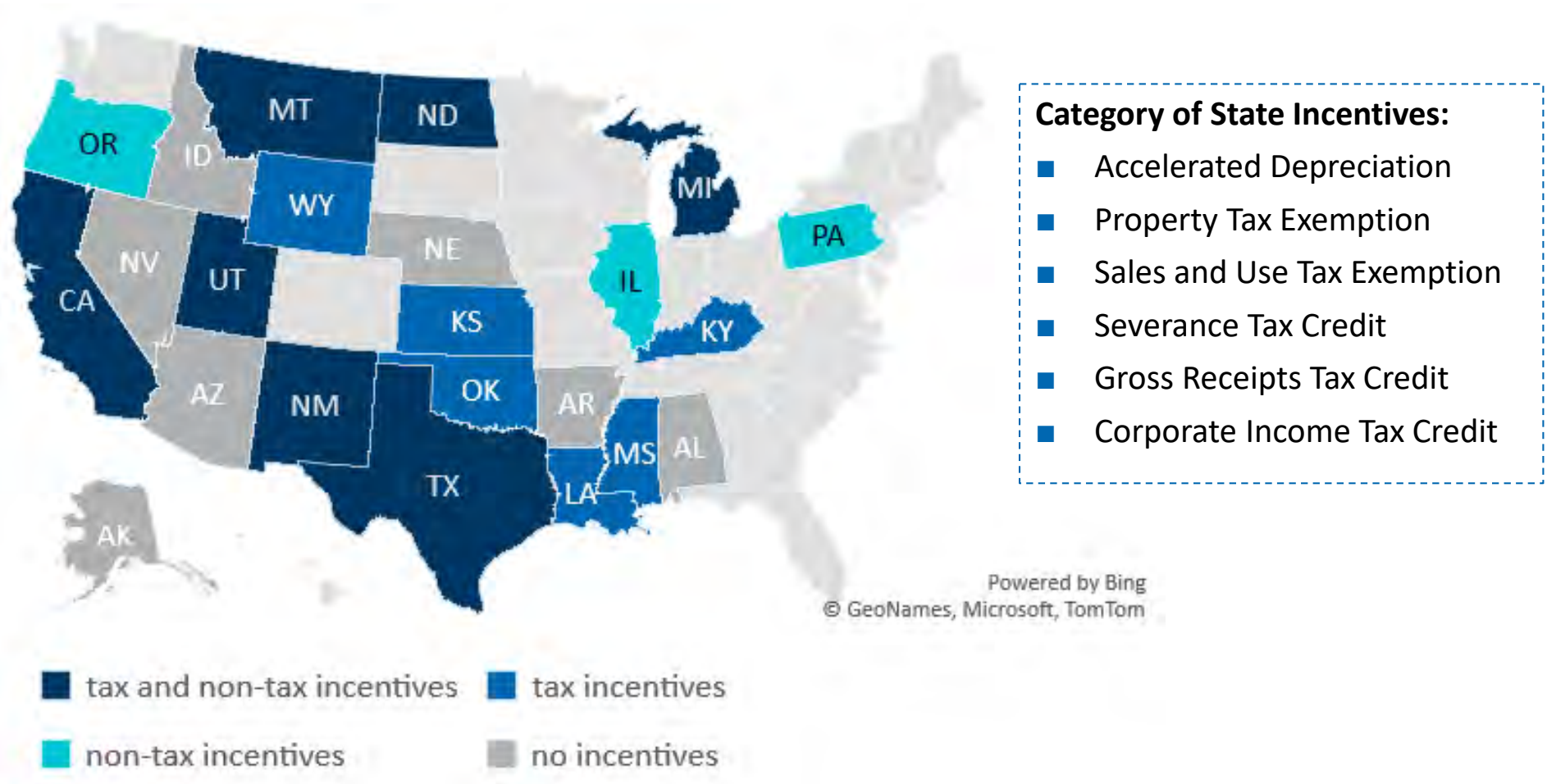
Open Issues

- The definition of “carbon capture equipment”
 - It was expanded in the Proposed Regulations, perhaps inadvertently.
- Whether the party that is obligated to dispose of the captured carbon oxides can subcontract with a third-party to carry out that obligation?
- Can the partnership structure be used for assignment structures?
- The meaning about the term “commercial markets” in which captured carbon oxides can be utilized and qualify for the 45Q Credit
- How is the 500,000 MT annual limitation under the placed-in-service election determined?
- Further legislative changes:
 - Currently construction must begin before January 1, 2024, will that date be extended?
 - Will the 45Q Credit become a refundable credit?
 - Will the restrictions on the use of the credit against the base erosion anti-abuse tax (BEAT) be revised?
 - How will that affect the market for tax equity investors?



State Tax Incentives

States Active in CCUS Incentives



Source: FTI Consulting and Orrick Research

State Tax Incentives – Categories of Incentives

| | California | Illinois | Kansas | Kentucky | Louisiana | Michigan | Mississippi | Montana | New Mexico | North Dakota | Oklahoma | Oregon | Pennsylvania | Texas | Wyoming |
|--|------------|----------|--------|----------|-----------|----------|-------------|---------|------------|--------------|----------|--------|--------------|-------|---------|
| Accelerated Depreciation | | | | ✓ | | | | | | | | | | | |
| Property Tax Exemption/Reduction | | | | ✓ | | | | | ✓ | | ✓ | | | | |
| Sales and Use Tax Exemption | | | | | ✓ | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ |
| Severance Tax Credit | | | | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ |
| Gross Receipts Tax Credit | | | | | | | | | | | ✓ | | | ✓ | |
| Corporate Income Tax Credit/Reduction | | | | | ✓ | | | | | | | | | | |
| <i>Other Tax Incentives</i> | ✓ | | | ✓ | ✓ | | | ✓ | | ✓ | | ✓ | | ✓ | |

State Tax Incentives – Categories of Incentives

| California | EOR Credit |
|--------------|---|
| Illinois | N/A |
| Kansas | Accelerated Depreciation Property Tax Exemption Carbon Farming Tax Credit |
| Kentucky | Sales and Use Tax Exemption Severance Tax Credit Credit on Corporate Income Taxes Credit on Personal Income Taxes |
| Louisiana | Sales and Use Tax Exemption Severance Tax Reduction |
| Michigan | Severance Tax Reduction |
| Mississippi | Ad Valorem Tax Exemption Severance Tax Reduction Gross Income Tax Reduction |
| Montana | Reduced Property Tax |
| New Mexico | Alternative Energy Product Manufacturers Tax Credit Act |
| North Dakota | Sales and Use Tax Exemption Property Taxes Exemption Gross Receipts Tax Reduction |
| Oklahoma | Gross Production Tax Exemption |
| Oregon | N/A |
| Pennsylvania | N/A |
| Texas | Franchise Tax Credit Severance Tax Reductions Sales and Use Tax Exemption Gross Receipts Tax Exemption and Other Tax Incentives |
| Wyoming | Sales Tax Exemption Severance Tax Credit |

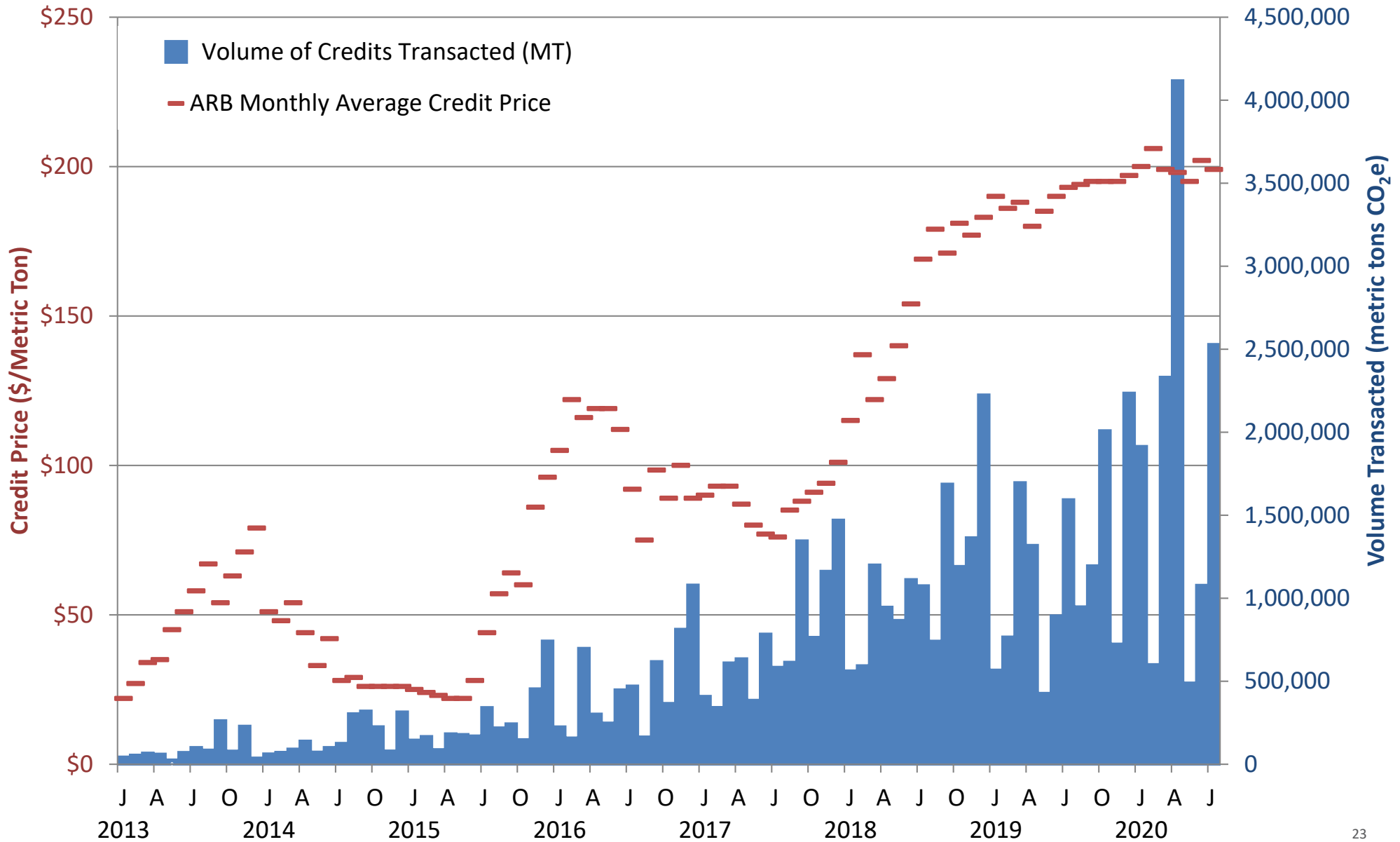


California's Low Carbon Fuel Standards

California's Low Carbon Fuel Standards ("LCFS")

- The LCFS program in California is a regulatory program designed to encourage the use of cleaner, less carbon-intensive vehicle fuels.
- The California Air Resource Board's ("CARB") articulated goal for the LCFS program is to reduce the carbon intensity of vehicle fuels used in the state by 20 percent by 2030, compared to a 2010 baseline.
- The LCFS program has recently been amended to recognize carbon capture and sequestration as a method of reducing the carbon intensity of fuels.
- Under the LCFS program, each supplier of vehicle fuels in California is required to achieve a "benchmark" standard of "carbon intensity" of the fuels it supplies in the state.
- CARB notes four avenues for generating LCFS credits using CCUS projects:
 - 1) use of CCUS when calculating a low-carbon fuel pathway (e.g., ethanol or biodiesel) for a carbon intensity;
 - 2) refinery investment program (e.g., steam methane reforming);
 - 3) innovative crude (e.g., cogeneration at oilfield); or
 - 4) direct air capture

California's LCFS Program Market Data



LCFS – Carbon Sequestration Pathway

- Red Trail Energy (RTE) recently requested approval of two design-based starch ethanol pathways which take into account sequestration of CO₂.
 - RTE operates an ethanol production facility with annual production of approx. 60 million gallons per year.
 - The ethanol fermentation process produces high purity CO₂.
 - RTE already has two certified starch ethanol pathways under the LCFS
- RTE recently performed a detailed assessment of engineering designs for capturing, transporting and storing CO₂, and integrating CCS with ethanol production.
- The planned facility for CCS sits atop the Broom Creek Formation, North Dakota, which is the proposed CO₂ storage site.
- Operating Conditions
 - “Approval of CIs for this design-based pathway does not permit generation of credits under the LCFS. When the CCS project is operational, the applicant shall submit a pathway application to include operational data for both the starch ethanol plant and the CCS operations for review by CARB staff per section 95488.7. Appropriate operational conditions will be included prior to certification.”

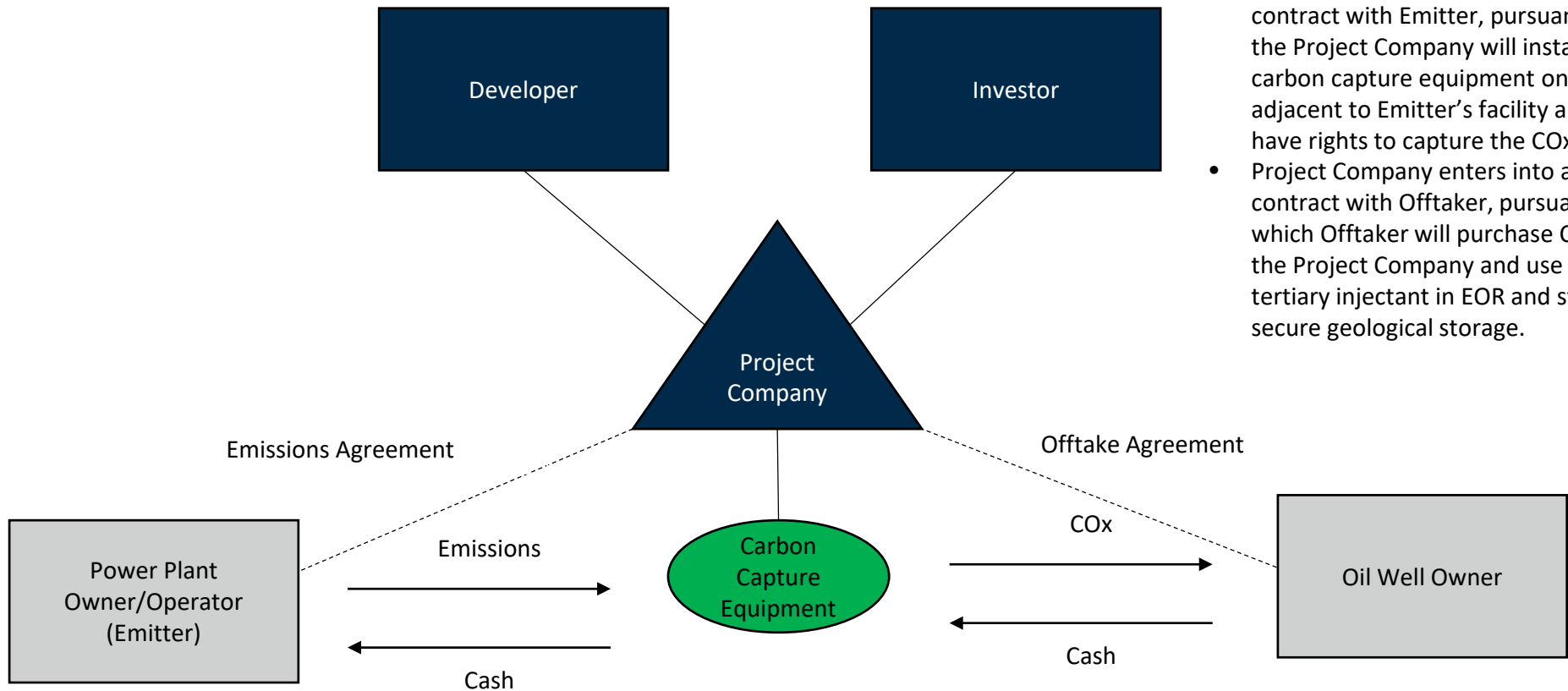


Potential Partnership Structure

Partnership Flip Structure – IRS Revenue Procedure 2020-12

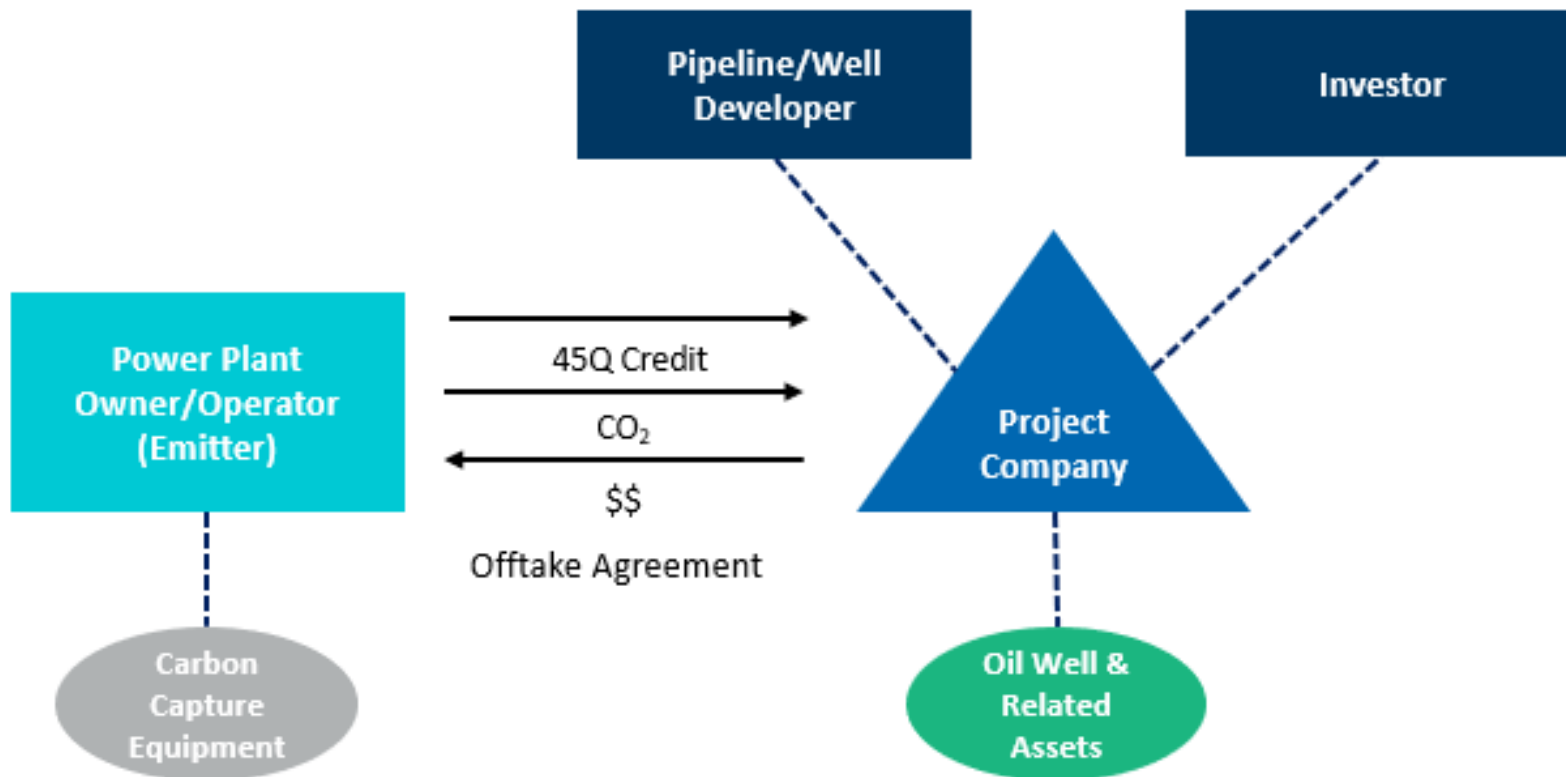
- Revenue Procedure was released in February 2020 and provides guidance on the application of a “partnership flip” structure to the Section 45Q Credit
 - This structure is used in other tax credit financings
- 4 requirements from the Revenue Procedure
 1. The Sponsor/Developer must have a minimum of one percent in each material item of partnership income, gain, loss, deduction and 45Q credit (“Partnership Items”).
 2. The Investor:
 - Must have a minimum interest of five percent of the Investor’s largest share of Partnership Items.
 - For example, if the Investor is allocated 99% of income, gain, loss, deduction and credits, the minimum is 4.95% = 99% x 5%
 - Up to 50% of the Investor’s total investment (fixed investments plus reasonably anticipated contingent investments) can be contingent in amount and certainty of payment (*i.e.*, PAYGOs)
 - Must constitute a “bona fide equity investment,” meaning the value of the Investor’s interest in the partnership must be contingent on the net income, gain and loss from the Project, and is not substantially fixed in amount.
 3. Put/Call Options: Only the Investor may have a put option (subject to some restrictions), but neither Investor nor Developer may have a call option on the other’s interest in the partnership.
 4. Allocations of the 45Q Credit.
 - If the partnership has income, credits are allocated in same proportion as the income.
 - If the partnership does not generate income, credits are allocated in same proportion as the losses.
 - For example, partnership captures and sequesters CO₂. Nobody is paying for the CO₂ (no income) and will only have operating expenses. Allocate 45Q Credit in same proportion as losses.
- Typically, Investor is allocated 99% of income/tax credits and deductions (depreciation) and cash until they reach a target IRR.
 - Following the “flip date” when this target IRR is achieved, the allocations “flip” and the Investor is allocated 5% of income/loss and 5% of cash and the Developer receives 95% of income/loss and 95% of cash.

Potential Investment Structure: Partnership Flip



- Project Company enters into a long-term contract with Emitter, pursuant to which the Project Company will install the carbon capture equipment on or adjacent to Emitter's facility and will have rights to capture the CO_x emissions
- Project Company enters into a long-term contract with Offtaker, pursuant to which Offtaker will purchase CO_x from the Project Company and use it as a tertiary injectant in EOR and store it in secure geological storage.

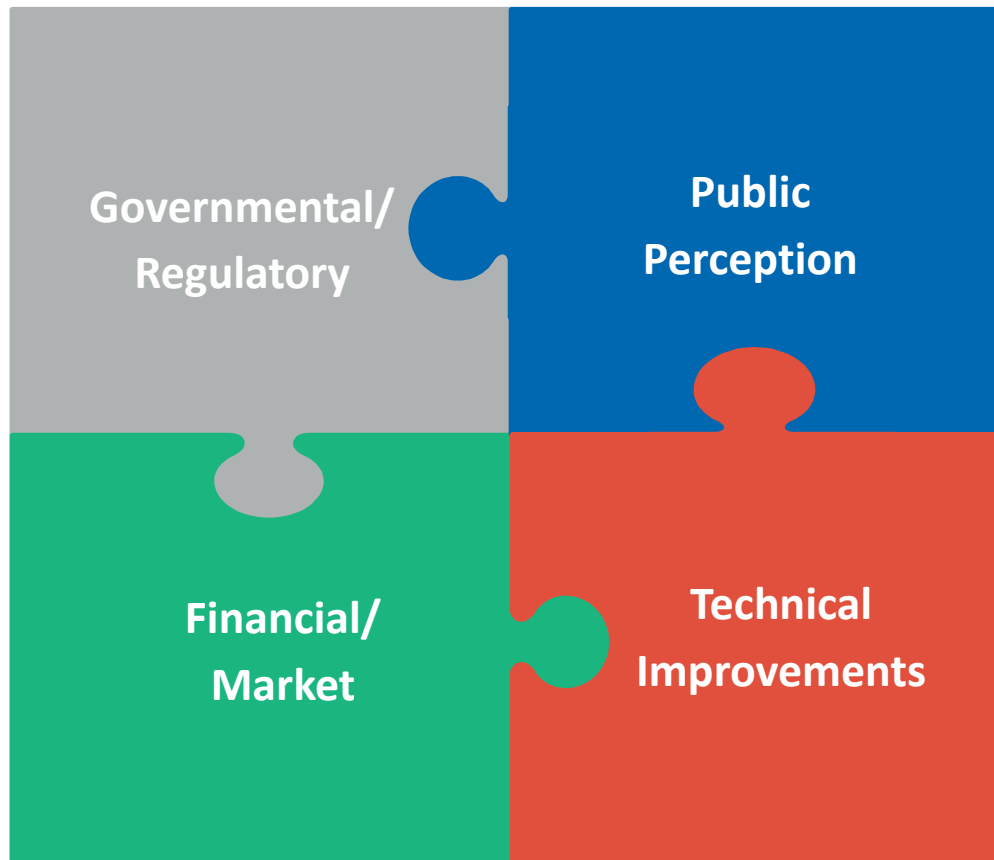
Potential Investment Structure: Partnership Flip – Assignment of 45Q Credit to Project Company





Roadblocks, Hurdles, and Solutions

Interconnected Nature of Major Roadblocks, Hurdles, and Solutions



Source: FTI Consulting and Orrick Research

Governmental/Regulatory Roadblocks, Hurdles, and Solutions

State Roadblocks & Hurdles

- **Many existing state programs encourage renewables but not other low or zero-carbon approaches**
- There is not a consistent set of regulations across states for permitting CCUS projects
- Approved pathways for the many variation of biofuels with CCUS do not exist

State Solutions

- **Renewable Portfolio Standards (RPS) could be modified to include CCUS, effectively becoming a Clean Energy Standard**
- Developing a consistent set of regulations across states for permitting CCUS projects
- Using input from industry, proactively create and possible aggregate pathways for carbon reduction programs

Federal Roadblocks & Hurdles

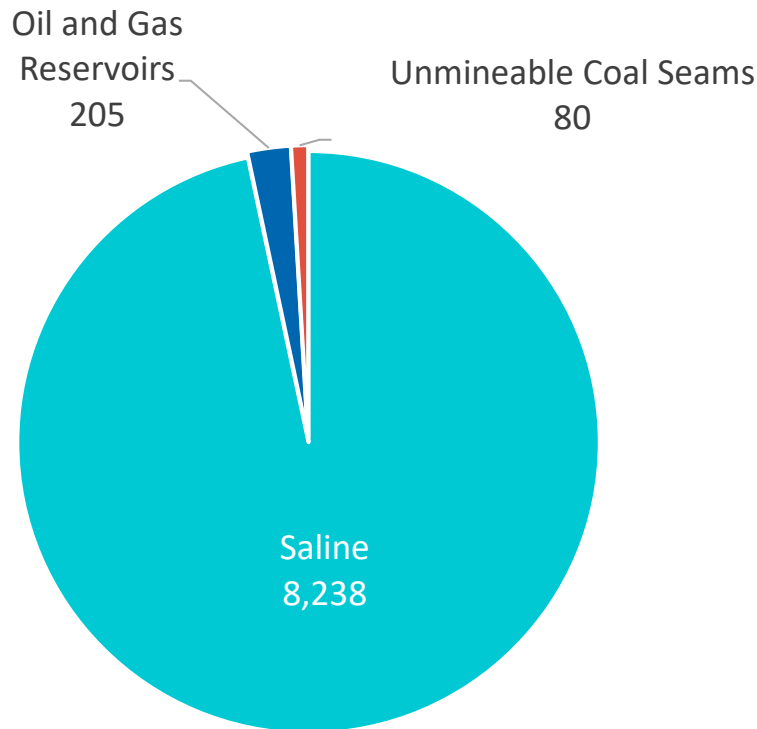
- Regulatory certainty from the IRS as the Section 45Q program is still being shaped by IRS guidance
- **Default requirement for monitoring storage is 50 years, or at the discretion of the EPA administrator – there is no insurance solution**
- CO₂ pipeline build-out

Federal Solutions

- While existing IRS Guidance provides a safe harbor for tax equity investors in partnerships that capture CO_x, it does not address the situation where the tax credit is assigned to a party that disposes of, utilizes in permitted applications, or uses the CO_x in EOR.
- While some guidance on measuring lifecycle greenhouse gas emissions is provided, reporting procedures and standards for the IRS, DOE, and EPA review of lifecycle reports have not.
- **Government assumption of liability for early mover project to incentivize and de-risk market creation**
- **Transfer of liability risk and oversight to the government when secure geologic storage is demonstrated, likely with operators paying a fee into a stewardship or trust fund**
- Making legislative and regulatory changes that accelerate the buildout of CO₂ pipelines, such as expediting CO₂ pipeline permitting and development.

Class II and Class VI Wells for Long-term Storage

CO₂ Storage Potential by Reservoir Type (Gt)¹



- The latest EPA data shows that there are more than 180,000 Class II wells in operation while there are only two Class VI wells in operation.
- The two Class VI wells are located at the Archer Daniels Midland (“ADM”) Decatur ethanol facility in Illinois.

Indicative Timelines and Costs

| | Class II | Class VI |
|--|------------|----------------------|
| Permitting Timeline | 1 year | 3 years ² |
| Permitting Costs | <\$100,000 | >\$500,000 |
| Annual Monitoring Costs³ | \$4,000 | \$320,000 |

Source:

1. NETL data. <https://www.netl.doe.gov/coal/carbon-storage/strategic-program-support/natcarb-atlas>.

2. Based on ADM Timeline. “ADM CCS Projects: Experience and Lessons Learned,” McDonald, Scott, CSLF Technical Workshop, June 17, 2015.

3. EPA. <https://www.epa.gov/sites/production/files/2015-07/documents/subpart-rr-uu-factsheet.pdf>.

Public Perception Roadblocks, Hurdles, and Solutions

Roadblocks & Hurdles



Socio-Political Acceptance



Market Acceptance



Community Acceptance

Solutions

- **Systematic analysis of the broader political agenda** regarding CCUS and how it might influence the investment in and the further R&D of technologies and products. This **research should model different investment and development pathways** in different policy and legislative scenarios.
- A broader and more detailed **analysis of media coverage of CCUS** in order to **assess emerging perceptions** of CO₂ utilization technologies (among the media and reported stakeholders) and **how these are influencing the public agenda** on CO₂ utilization.

- **Research into intra-firm perception, attitudes, acceptance, and diffusion** of CO₂ utilization technologies and products. In particular, **the role that “change agents” have in influencing intra-firm decision-making** is a relevant area for research.
- **Detailed identification of market-stakeholders and analysis of their perceptions of CO₂-derived products** (including end-consumers) as they become commercially available.

- **Determination of which of the many “place” and “process” factors identified as influencing local project acceptance** are most important in shaping people’s attitudes (and behavioral responses) to CO₂ utilization facility development?
- **To what extent is the relative indifference shown towards hypothetical CCUS facilities** by communities actually hosting or not hosting facilities and/or facing actual development?

Technical Roadblocks, Hurdles, and Solutions

Roadblocks & Hurdles

- Enabling more “learning-by-doing”
- Fostering new technology development and demonstration

Solutions

- Developing a robust federal direct air capture research, development, demonstration, and deployment (“RDD&D”) program
- Expanding support for a federal carbon utilization RDD&D program
- Federal RDD&D investments in carbon capture, utilization, storage and removal
- DOE cost-share for Front-End Engineering Design (FEED) studies

Financial / Market Roadblocks, Hurdles, and Solutions

Roadblocks & Hurdles

- Decreasing regulatory uncertainty along with lowering and narrowing the range of CCUS costs

- Investors in renewable energy deals must use the Hypothetical Liquidation Book Value (“HLBV”) method to present the results of their investment on their financial statements.

Solutions

- Clarifying the CCUS pipeline permitting review process and
- Extension of the 45Q Credit as proposed in the USE IT Act
- Expediting CO₂ pipeline permitting
- Providing loan guarantees
- Cost-sharing of FEED studies

- The Financial Accounting Standards Board should be urged to consider wider application of the Proportional Amortization Method so that carbon-capture credit investments qualify for this method of financial statement presentation.

Financial Accounting Treatment

- Investors in renewable energy deals that use the partnership flip structure must use the Hypothetical Liquidation Book Value (“HLBV”) method to present the results of their investment on their financial statements.
- Under this approach, the expected amount each partner would receive is calculated at the end of the year as if the partnership was liquidated.
- The method determines how better or worse off the partners are at the end of the period than they were at the beginning of the period in a tax equity structure following the hypothetical liquidation of a project at book value.
- Concerns with the HLBV methods are twofold:
 - the results are not linear from year to year, and
 - the results are reported in pre-tax earnings.
- Investors view this as distortive because the tax benefit is included in the effective tax rate calculation.