

# National Petroleum Council

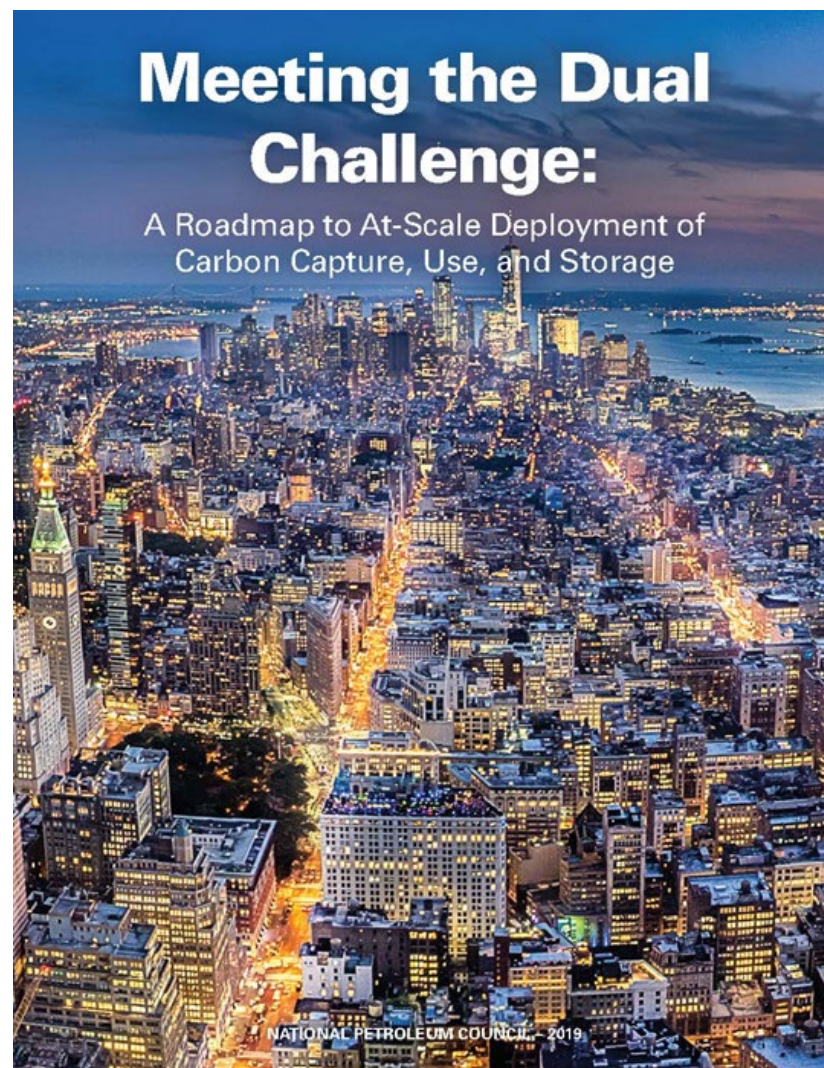
## ***Meeting the Dual Challenge: A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage***

***<https://dualchallenge.npc.org>***

USEA Consensus Program Briefing Webinar  
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**Nigel Jenvey**

Global Head of Carbon Management, GaffneyCline  
Alternate Chair, Coordinating Sub-Committee, NPC CCUS Study



# Summary

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**In September 2017, the U.S. Secretary of Energy requested the NPC conduct a study to define the potential pathways for integrating CCUS at scale into the energy and industrial marketplace.**

**The NPC CCUS study found CCUS deployment at scale will mean:**

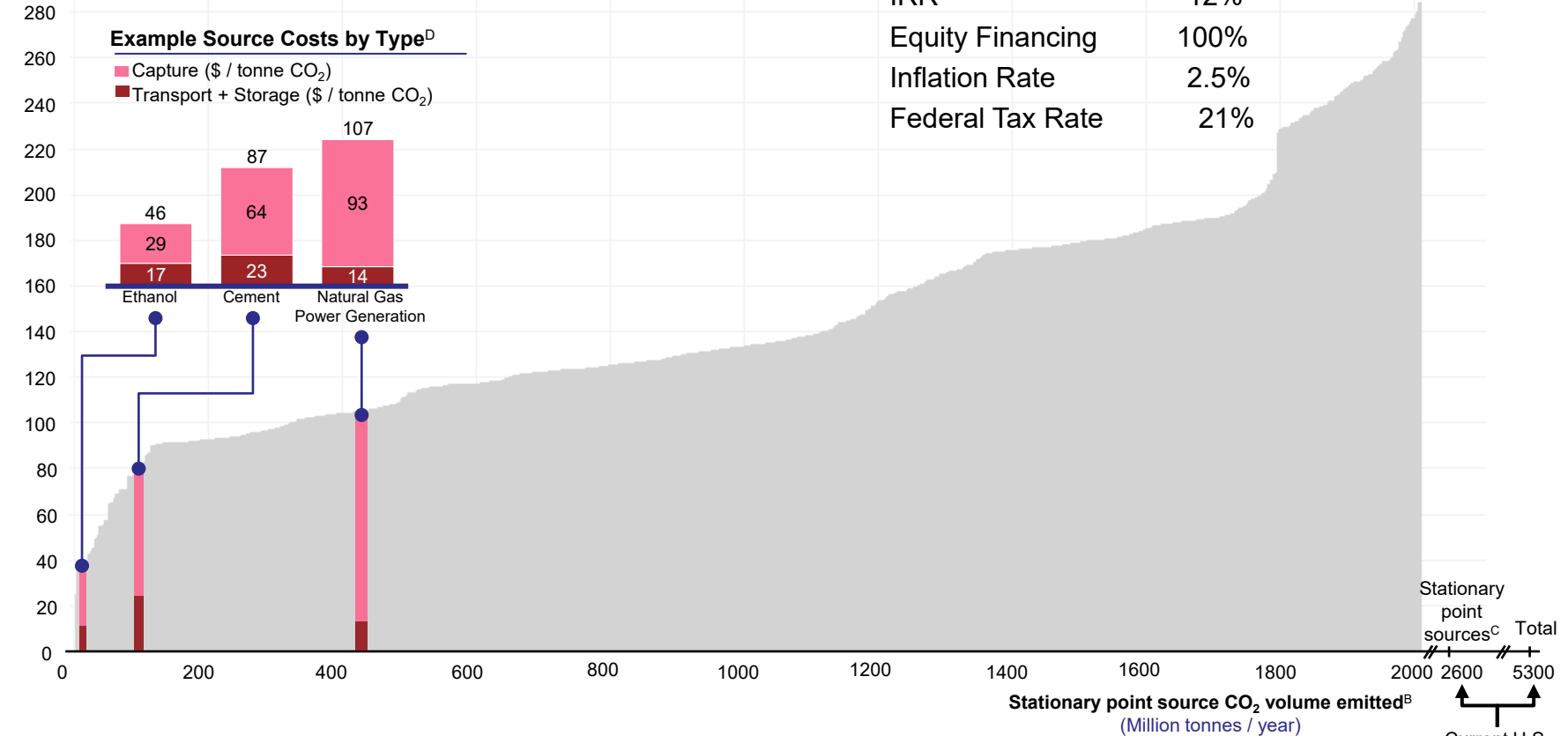
- Moving from 25 to **500 Million tonnes per annum** of CCUS capacity
- Infrastructure buildout equivalent of **13 million barrels per day** capacity
- Incremental investment of **\$680 billion**
- Support for **236,000 U.S. jobs** and **GDP of \$21 billion** annually

**Requiring:**

- Improved **policies, incentives, regulations** and **legislation**
- Broad-based **innovation** and **technology** development
- Strong **collaboration** between **industry** and **government**
- Increased **understanding** and **confidence** in CCUS

# CCUS cost assessment

## U.S. CCUS Costs by Point Source<sup>A</sup> (\$ / tonne of CO<sub>2</sub>)



## Financial Assumptions

Asset Life	20 year
IRR	12%
Equity Financing	100%
Inflation Rate	2.5%
Federal Tax Rate	21%

A Includes project capture costs, transportation costs to defined use or storage location, and use/storage costs; does not include direct air capture

B This curve is built from bars that each represent an individual point source with a width corresponding to the total CO<sub>2</sub> emitted from that individual source

C Total point sources include ~600 MTPA of point sources emissions without characterized CCUS costs

D Widths of bars are illustrative and not indicative of volumes associated with each source

# Improved policies, incentives, regulations and legislation

## Activation Phase

Clarifying existing tax policy and regulations could activate an additional 25 to 40 million tons per annum (Mtpa) of CCUS, doubling existing U.S. capacity within the next 5 to 7 years.

### Recommendations

#### *Agency Action & Rulemaking:*

- IRS/Treasury to clarify Section 45Q
- DOI and states to establish a process for access to and use of pore space
- EPA should shorten period of Class VI permit process
- EPA to review Class VI permit process to be site-specific risk and performance-based

## Expansion Phase

Extending and expanding current policies and developing a durable legal and regulatory framework could enable the next phase of CCUS projects (an additional 75-85 Mtpa) within the next 15 years.

### Recommendations

#### *Congress to:*

- Amend 45Q
- Expand access to Section 48 tax credits
- Expand use of MLPs, private activity bonds, and TIFIA eligibility/funding
- Increase funding to support well permitting and timely reviews
- Allow geologic storage in federal waters from all CO<sub>2</sub> sources

#### *Agencies to:*

- DOE & DOI to implement process for pore space access
- DOE to create CO<sub>2</sub> pipeline working group for development of large scale CO<sub>2</sub> pipeline infrastructure
- DOE to convene stakeholder forum to address geologic storage long-term liabilities
- State policymakers enable access to pore space on private lands

## At-scale Deployment

Achieving CCUS deployment at scale, an additional 350-400 Mtpa, in the next 25 years will require substantially increased support driven by national policies.

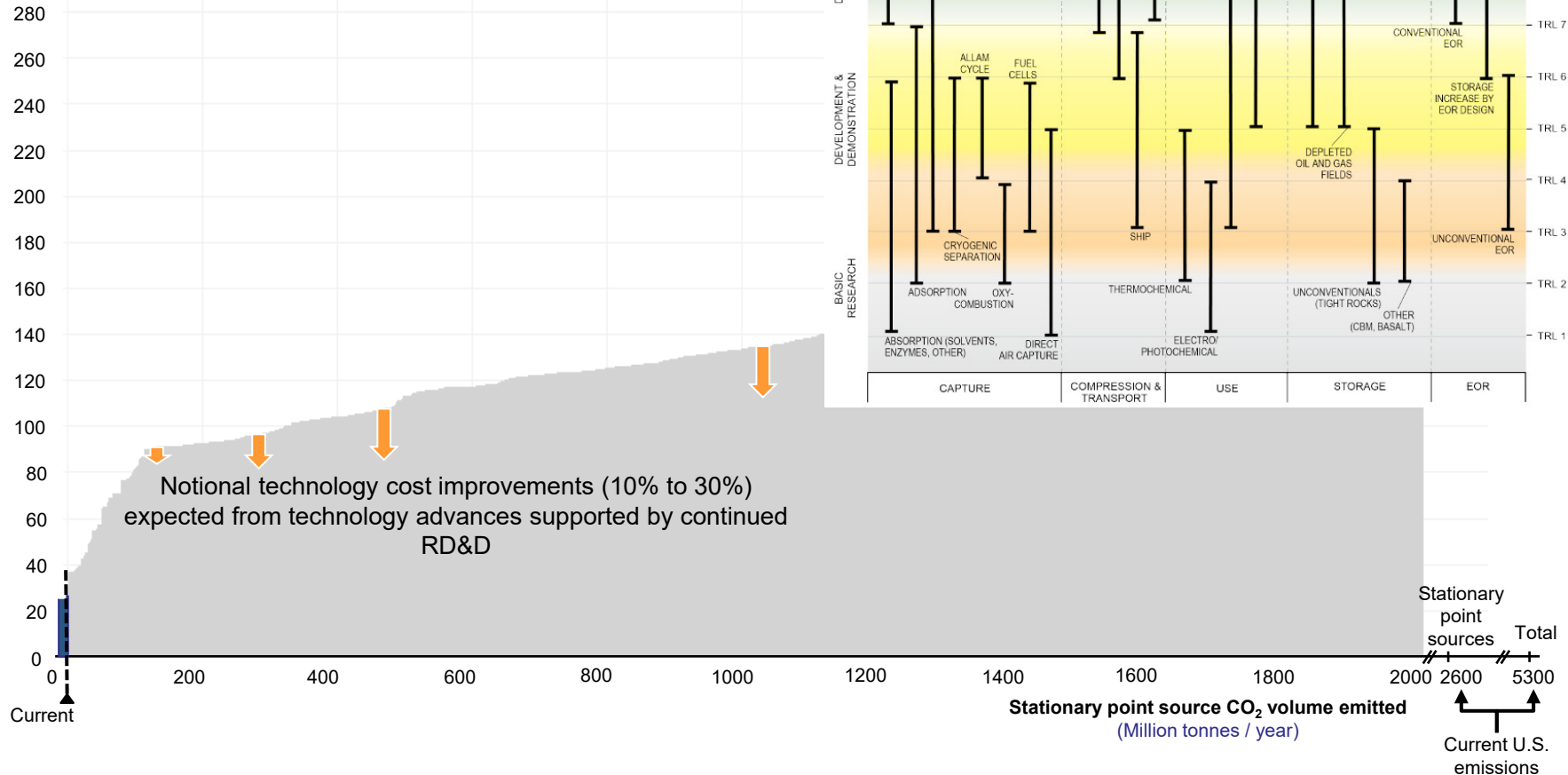
### Recommendation:

To achieve at-scale deployment, congressional action should be taken to implement economic policies amounting to about \$110/tonne. The evaluation of those policies should occur concurrently with the expansion phase.

# Broad-based innovation and technology development

**U.S. CCUS Costs by Point Source**

(\$ / tonne of CO<sub>2</sub>)

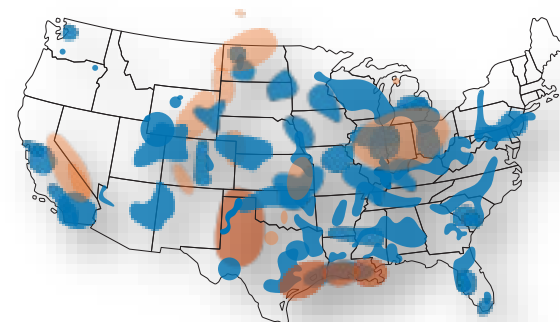
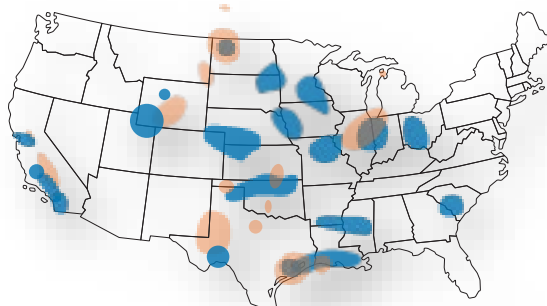
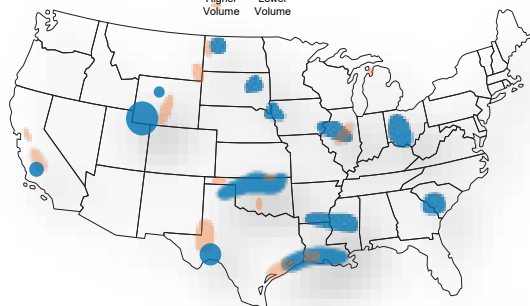
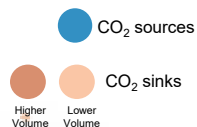


# Strong collaboration between industry and government

## Activation Phase

## Expansion Phase

## At-scale Deployment



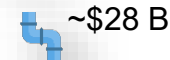
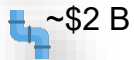
Cumulative annual CCUS Volume



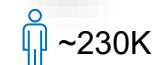
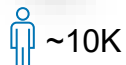
Investment (cumulative)



Pipeline infrastructure investment



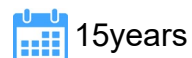
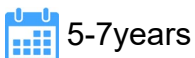
Annual jobs



US crude oil system by volume



Timeframe from now



## Meeting the Dual Challenge

\* note: 60 mtpa is likely overstated based on current 12 year life of 45Q tax credit – the increase to 20 years does not come until Expansion phase



# Increased understanding and confidence in CCUS



CCUS Spheres of Public Engagement (S. Greenburg, 2019)

## Project Stakeholder Engagement

1. Conduct projects to demonstrate safety and address gaps in knowledge or experience
2. Engage local stakeholders, regulators, and project developers
3. Provide proof of concept

## Policy Stakeholder Engagement

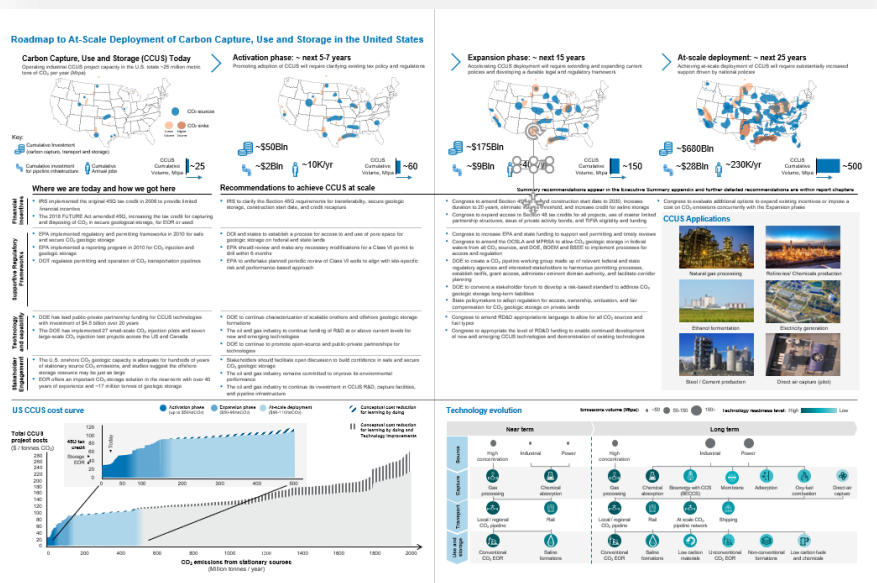
1. Create effective legal and regulatory mechanisms and policy to support widespread deployment of CCUS
2. Engage lawmakers, coalitions, policymakers, and industry
3. Set policy to incentivize CCUS actions and development
4. Identify common ground and potential opposition points

## Public Stakeholder Engagement

1. Create public engagement programs and opportunities
2. Engage the public to build trust in carbon management
3. Increase understanding and support
4. Connect with the “big picture” – economy, climate, creation of jobs

# Roadmap and full list of recommendations

## Roadmap to At-Scale CCUS Deployment



## All Study Recommendations

NATIONAL PETROLEUM COUNCIL  
*WORKING DRAFT*  
Carbon Capture, Use and Storage

Complete List of Study Recommendations  
**CSC ENDORSED**  
September 23, 2019

DO NOT QUOTE OR CITE

NPC CCUS Study      **DRAFT - Do Not Quote or Cite**      September 23, 2019

**I. POLICY, REGULATORY AND LEGAL RECOMMENDATIONS**

**A. PHASE I - ACTIVATION**

The NPC recommends that the IRS clarify the Section 45Q requirement, specifically:

1. Establish that "beginning construction" is satisfied when the taxpayer has spent or incurred 5% of the expected total expenditures and construction commences without interruption for 6 years.
2. Clarify options for demonstrating secure geological storage as it related to CO<sub>2</sub> via EOR. One potential option that has attracted significant stakeholder interest is ISO Standard 7916. Utility of the Standard for 45Q purposes has more to do with implementation than with the substance of the Standard. The IRS should assess implementation issues and potential utility of this Standard.
3. Make credit transferrable to encourage tax equity investment. The tax credit should be transferrable, in full or in part, to any party that has a vested interest in the capture project including project developer, the party capturing the CO<sub>2</sub> or the entity that stores the CO<sub>2</sub>.
4. Provide that the tax credit will not be subject to recapture for longer than three years<sup>1</sup> after the time of injection provided that the taxpayer continues to comply with a Treasury recognized method for demonstrating SGS and has a plan to remediate leaks of CO<sub>2</sub> should they occur, or (2) has by contract required another party to continue to comply with Treasury recognized method for demonstrating SGS and requires such party to remediate leaks of CO<sub>2</sub> should they occur.
5. Clarify that additional "carbon dioxide capture capacity" placed in service after the BBA should be based on the average of the amount of CO<sub>2</sub> captured in the 3-years prior to enactment of the BBA or the facility's nameplate annual capacity.
6. The IRS should also specifically provide that the economic substance doctrine and provisions of Section 7701(o) will not be deemed relevant to a transaction involving the 45Q credit that is consistent with the congressionally mandated purpose of the credit: capture and geological storage or utilization of CO<sub>2</sub>.

**The NPC recommends:** DOE, with EPA and Treasury, should begin to develop robust life cycle analysis framework with common parameters to support technology development and direct RD&D funding.

<sup>1</sup> Current year (time of injection) + 2-3 years.

Executive Summary - All Recommendations      1