



ENERGY AND NATURAL RESOURCES

# Tax Incentives for Capturing and Using Carbon – Real or Aspirational?

KPMG LLP

# Concurrent Session II-B

2:00 p.m. – 3:30 p.m.

## Tax Incentives for Capturing and Using Carbon – Real or Aspirational?

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# Agenda

- ◆ **Overview of tax legislative changes to encourage carbon sequestration**
- ◆ **Economics of carbon sequestration**
- ◆ **Future of carbon sequestration**

# Section 45Q

- ◆ **As a general rule, the carbon sequestration credit equals:**
  - **\$20** per metric ton of qualified carbon dioxide which is:
    - Captured by the taxpayer at a qualified facility, and
    - Disposed of by the taxpayer in secure geological storage; or
  - **\$10** per metric ton of qualified carbon dioxide which is:
    - Captured by the taxpayer at a qualified facility, and
    - Used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, and
    - Disposed of by the taxpayer in secure geological storage
  - After 2009 the \$10 and \$20 credit amounts are adjusted for inflation

# Section 45Q, continued

- ◆ The term “qualified carbon dioxide” means carbon dioxide captured from an industrial source which:
  - Would otherwise be released into the atmosphere as industrial emission of greenhouse gas, and
  - Is measured at the source of capture and verified at the point of disposal or injection
- ◆ The term “qualified carbon dioxide” includes the initial deposit of captured carbon dioxide used as a tertiary injectant. Such term does not include carbon dioxide that is re-captured, recycled, and re-injected as part of the enhanced oil and natural gas recovery process

# Section 45Q, continued

- ◆ The term “qualified facility” means any industrial facility:
  - Which is owned by the taxpayer
  - Which carbon capture equipment is placed in service, and
  - Which captures not less than 500,000 metric tons of carbon dioxide during the taxable year
  
- ◆ The credit shall be attributable to the person that captures and physically or contractually ensures the disposal of or the use as a tertiary injectant of the qualified carbon dioxide

# Section 45Q, continued

- ◆ The term “qualified enhanced oil or natural gas recovery project” has the meaning given to that term by section 43(c)(2), but substituting “crude or natural gas” for “crude oil” in definition
- ◆ Qualified enhanced oil or gas recovery project. -- for purposes of the section 43 EOR 15% investment credit:
  - The term “qualified enhanced oil or gas recovery project” means any project:
    - (1) which involves the application of 1 or more defined tertiary recovery methods which can reasonably be expected to result in more than an insignificant increase in the amount of crude oil or natural gas which will ultimately be recovered,
    - (2) which is located within the United States, and
    - with respect to which the first injection of liquids, gases, or other matter commences after December 31, 1990. A project shall not be treated as a qualified enhanced oil recovery project unless the operator submits to the Secretary a certification from a petroleum engineer that the project meets (and continues to meet) the requirements therefore

# Section 45Q, continued

- ◆ **Special rules and other definitions:**
  - Only carbon dioxide captured and disposed of or used within the United States taken into account
  - The credit under this section shall apply only with respect to qualified carbon dioxide the capture and disposal or use of which is within—
    - the United States (within the meaning of section 638(1)), or
    - a possession of the United States
  - The Secretary, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy and the Secretary of Interior, shall establish regulations for determining adequate security measures for the geological storage of carbon dioxide such that the carbon dioxide does not escape into the atmosphere. Such term shall include storage at deep saline formations and unminable coal seams under such conditions as the Secretary may determine under such regulations
- ◆ **Credit ends after the year the EPA certifies that 75 million metric tons have been captured and disposed of or used as a tertiary injectant**

# Section 7704 – Publicly Traded Partnerships

- ◆ PTPs get pass-through treatment if 90% of income is from qualifying sources
- ◆ Qualifying natural resource income defined as:
  - Income and gains derived from the exploration, development, mining or production, processing, refining, transportation (including pipelines transporting gas, oil, or products thereof), or the marketing of any mineral or natural resource (including fertilizer, geothermal energy, and timber), or industrial source carbon dioxide, or the transportation or storage of any fuel . . .
- ◆ What is industrial source carbon dioxide?
- ◆ Exactly what CO<sub>2</sub>-related income is good for 7704?

# CO2 Source Issues

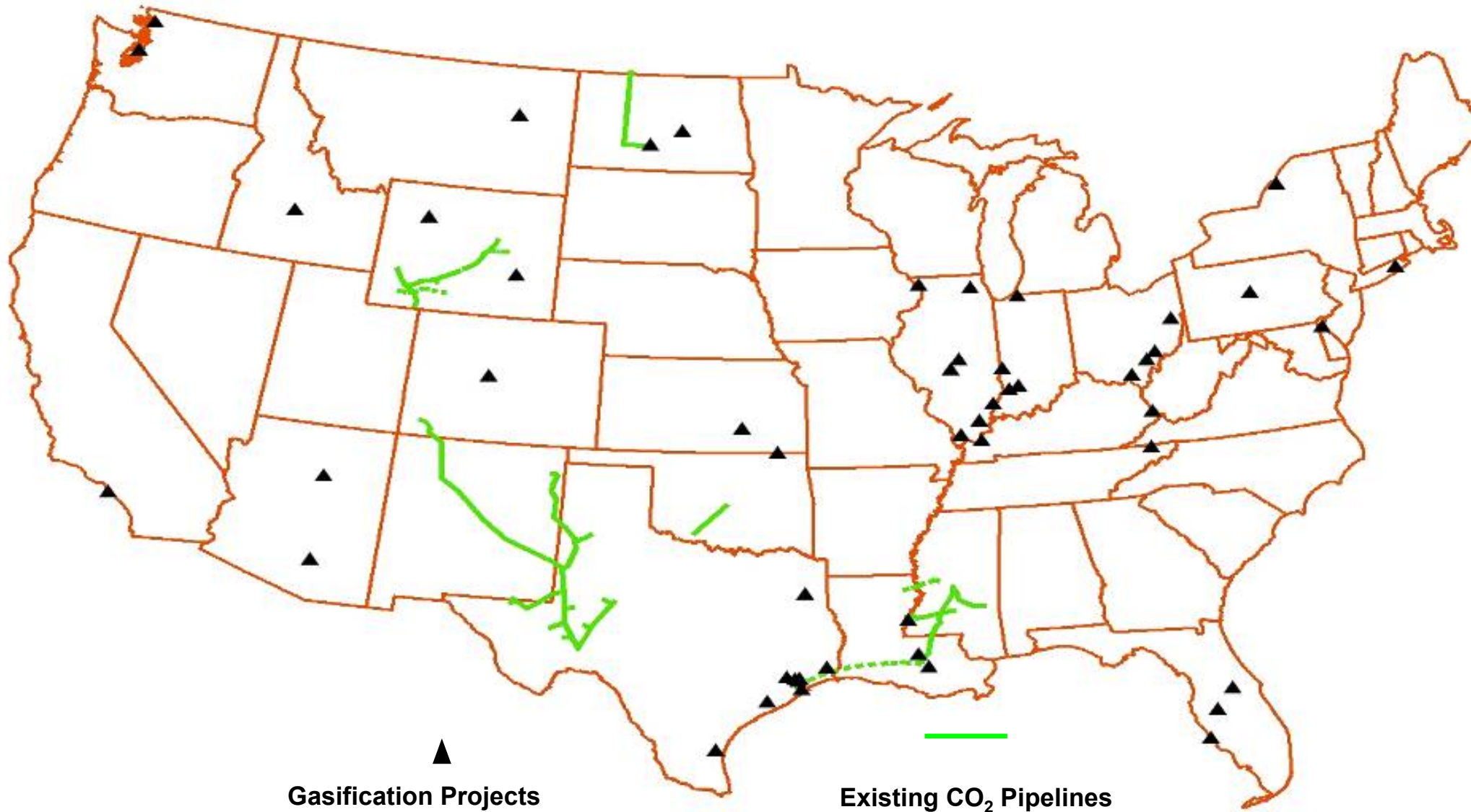
## ◆ Natural Sources

- Essentially Fully Subscribed
- Geographically Limited

## ◆ Anthropogenic Sources

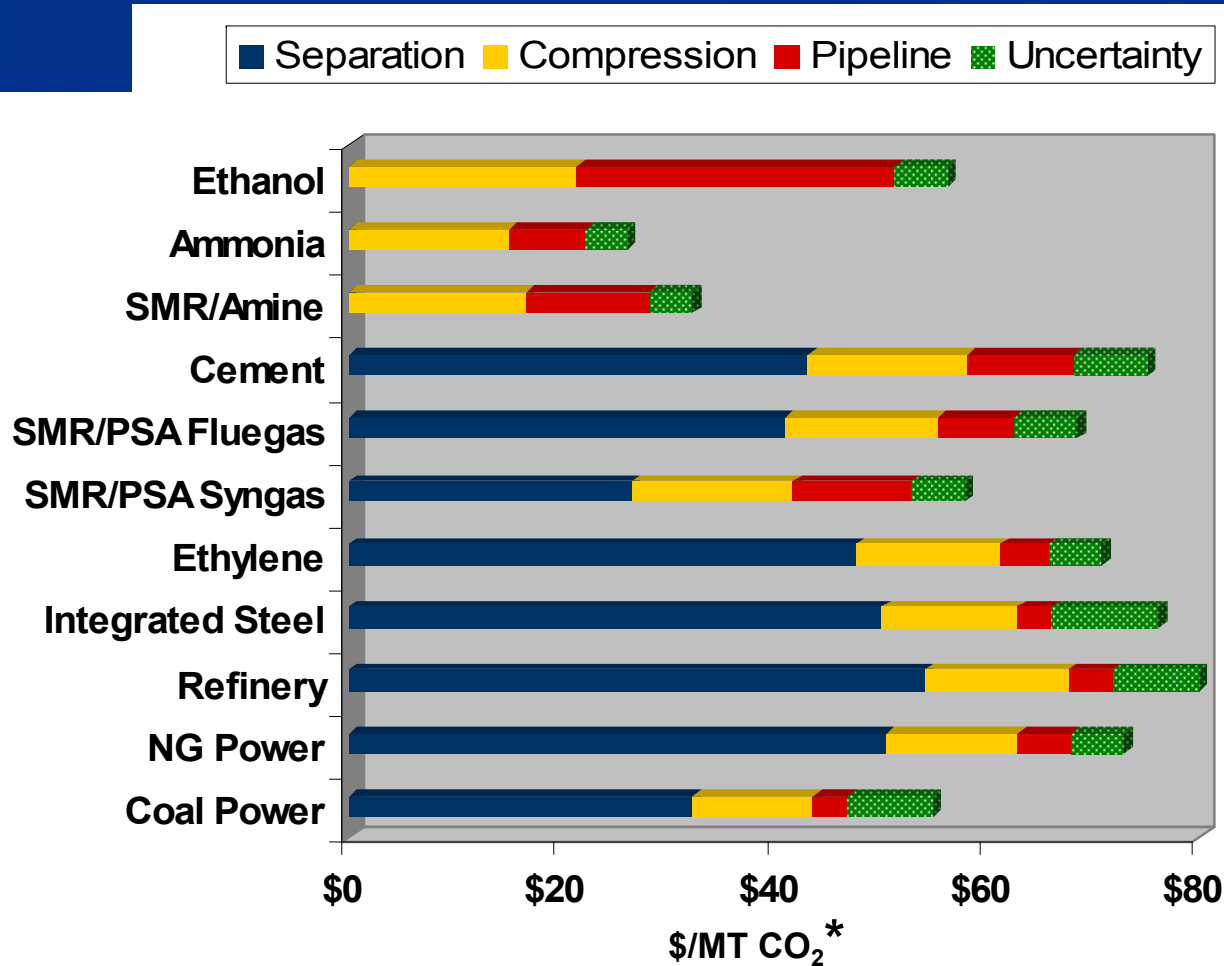
- Existing Sources
  - Low volumes < 30MMcf/d (ammonia, SMRs)
  - High cost (power plants, cement plants, etc)
- Future Sources
  - Gasification projects need access to capital
  - Capital markets are essentially closed

# US CO<sub>2</sub> Pipelines vs Proposed Gasification Projects





# Existing Sources of CO<sub>2</sub>

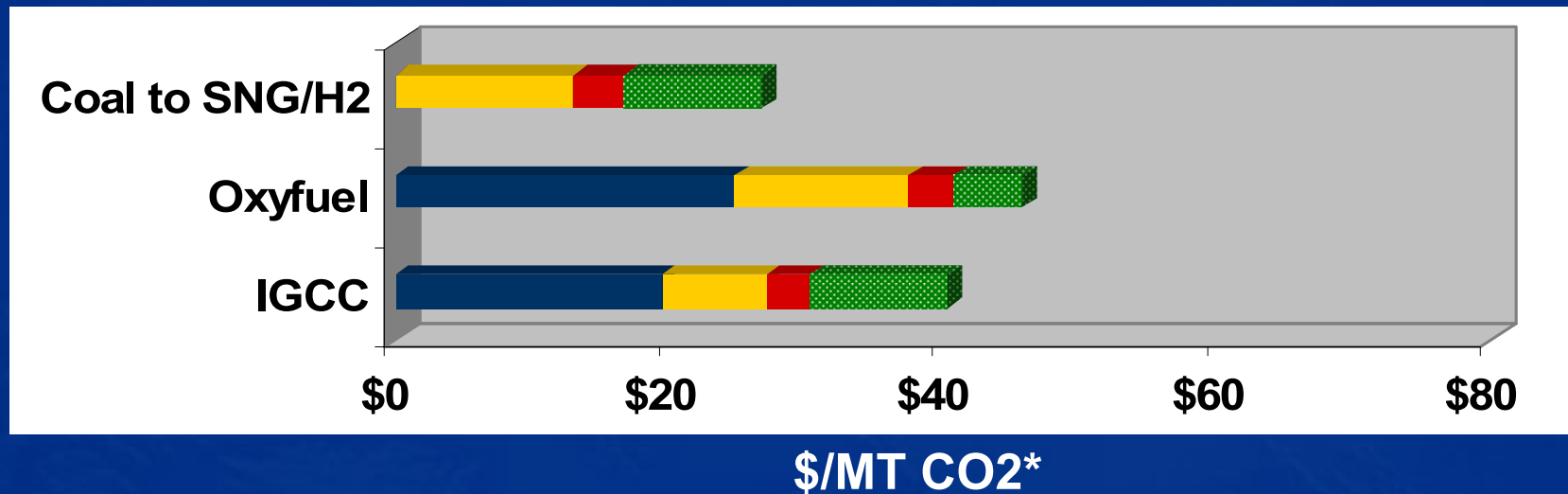


## Assumptions

- Capture from flue gas by amine
- 25 mile pipeline connects each source to major CO<sub>2</sub> pipeline
- Additional \$2/MT for transport in major pipeline
- COE - \$0.05/kWh for utilities and \$0.06/kWh for others
- NG - \$6/MMBtu HHV
- Coal - \$1.5/MMBtu HHV
- Capital recovery factor – 14%/yr

# Future Sources of CO<sub>2</sub>

■ Separation ■ Compression ■ Pipeline ■ Uncertainty



# Existing CO<sub>2</sub> Sources with 45Q Tax Credits (\$/ton)

## CCS from Existing CO<sub>2</sub> Sources in CO<sub>2</sub> EOR

<u>Emission Source</u>	<u>Estimated CCS Cost</u>	<u>EOR 45Q</u>	<u>CO<sub>2</sub> EOR Price \$50/bbl</u>	<u>Net Cost</u>	<u>CO<sub>2</sub> EOR Price \$100/bbl</u>	<u>Net Cost</u>
Coal Fired Power Plant	55	10	6	39	10	35
Natural Gas Power Plant	75	10	6	59	10	55
Cement Plant	75	10	6	59	10	55
Ammonia Plant	25	10	6	9	10	5
Steam Methane Reformer	70	10	6	54	10	50
Steel Plant	78	10	6	62	10	58
Ethanol Plant	60	10	6	44	10	40

**CO<sub>2</sub> EOR Generally Will Cover the Cost of the Major CO<sub>2</sub> Pipeline as Well (+/- \$10/ton)**

# Existing CO<sub>2</sub> Sources with 45Q Tax Credits (\$/ton), continued

## CCS from Existing CO<sub>2</sub> Sources in Saline Reservoirs

<u>Emission Source</u>	<u>Estimated CCS Cost</u>	<u>Saline 45Q</u>	<u>Net Cost</u>
Coal Fired Power Plant	55	20	35
Natural Gas Power Plant	75	20	55
Cement Plant	75	20	55
Ammonia Plant	25	20	5
Steam Methane Reformer	70	20	50
Steel Plant	78	20	58
Ethanol Plant	60	20	40

**Emitter Will Have to Cover the Cost of the Major CO<sub>2</sub> Pipeline as Well (+/- \$10/ton)**

# Future CO<sub>2</sub> Sources with 45Q Tax Credits (\$/ton)

## CCS from Gasification CO<sub>2</sub> Sources in CO<sub>2</sub> EOR

<u>Emission Source</u>	<u>Estimated CCS Cost</u>	<u>EOR 45Q</u>	<u>CO<sub>2</sub> EOR Price \$50/bbl</u>	<u>Net Cost</u>	<u>CO<sub>2</sub> EOR Price \$100/bbl</u>	<u>Net Cost</u>
Substitute Natural Gas	25	10	6	9	10	5
Oxy Fuel	45	10	6	29	10	25
Integrated Gasification CC	40	10	6	24	10	20

CO<sub>2</sub> EOR Generally Will Cover the Cost of the Major CO<sub>2</sub> Pipeline as Well (+/- \$10/ton)

## CCS from Gasification CO<sub>2</sub> Sources in Saline Reservoirs

<u>Emission Source</u>	<u>Estimated CCS Cost</u>	<u>Saline 45Q</u>	<u>Net Cost</u>
Substitute Natural Gas	25	20	5
Oxy Fuel	45	20	25
Integrated Gasification CC	40	20	20

Emitter Will Have to Cover the Cost of the Major CO<sub>2</sub> Pipeline as Well (+/- \$10/ton)

# Enhancing the Benefits of CO<sub>2</sub> Sequestration

## ◆ Consider the following scenario:

1. Oil company builds CO<sub>2</sub> capture equipment at Power company's coal to electricity "industrial facility"
2. Oil leases the capture equipment to Power (45Q(c)(2) does not appear to require Power to "own" the capture facility).
3. Lease payments from Power to Oil are denominated in CO<sub>2</sub> volumes.
4. Oil has a call to purchase any excess CO<sub>2</sub> volumes over the lease rentals.
5. The lease/call agreement contractually assures Power that Oil will use any CO<sub>2</sub> taken as a tertiary injectant in a qualified EOR project (45Q(d)(5)).
6. The economics for the lease and call take into account the 45Q credit that Power will receive and share that amount with Oil through the dollar value attributed to the CO<sub>2</sub> for the lease/purchase agreements.

# Q & A



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