UNIVERSITY of HOUSTON

Carbon Capture, Use and Sequestration, 45Q, and Climate Intervention

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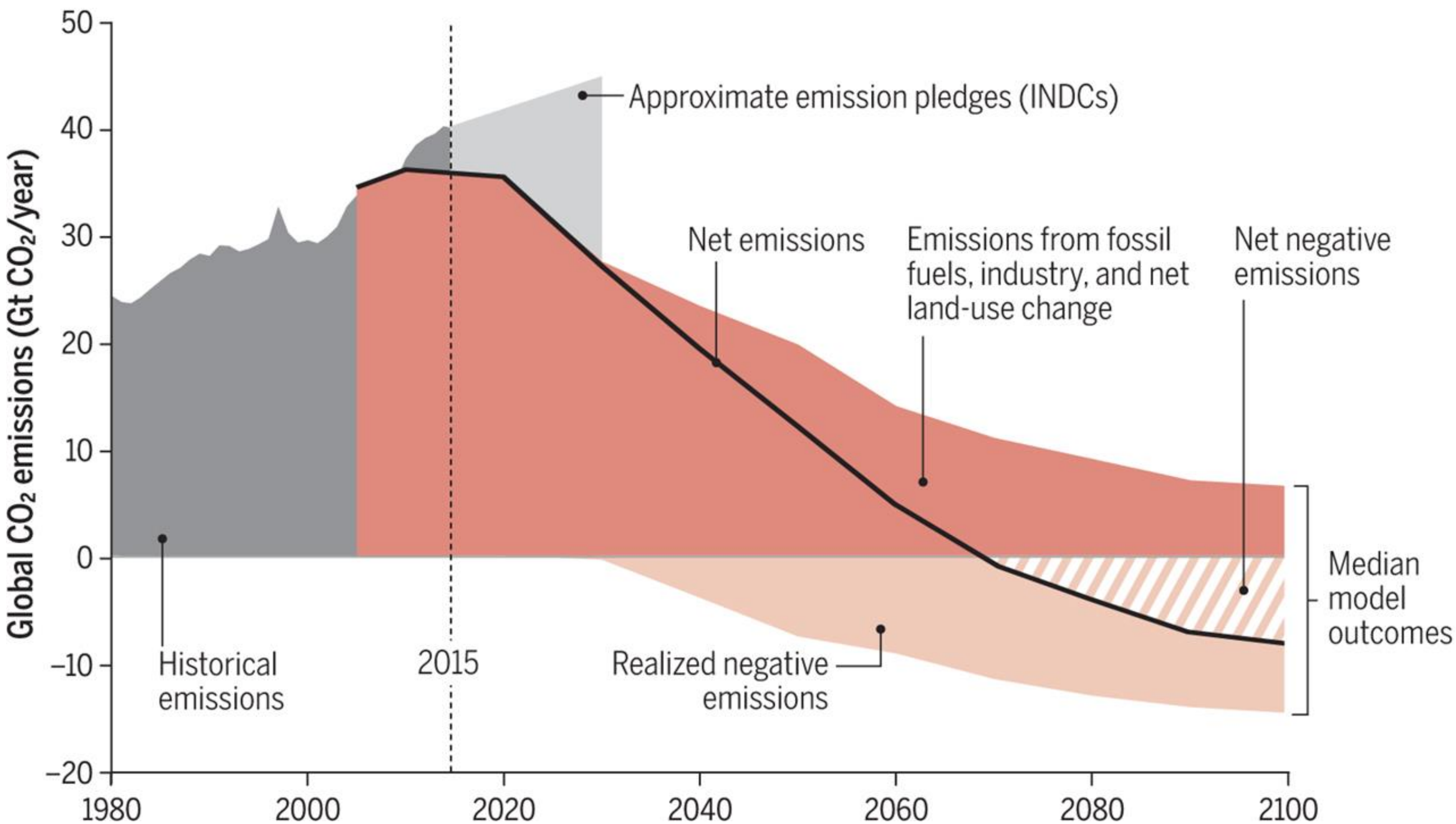
The Need for NETs

No quick fixes

Modelers generally report net carbon emissions, unintentionally hiding the scale of negative emissions. Separating out the positive CO_2 emissions from fossil fuel combustion, industry, and land-use change reveals the scale of negative CO_2 emissions in the model scenarios (*16*). INDCs, Intended Nationally Determined Contributions.



NETs of Note

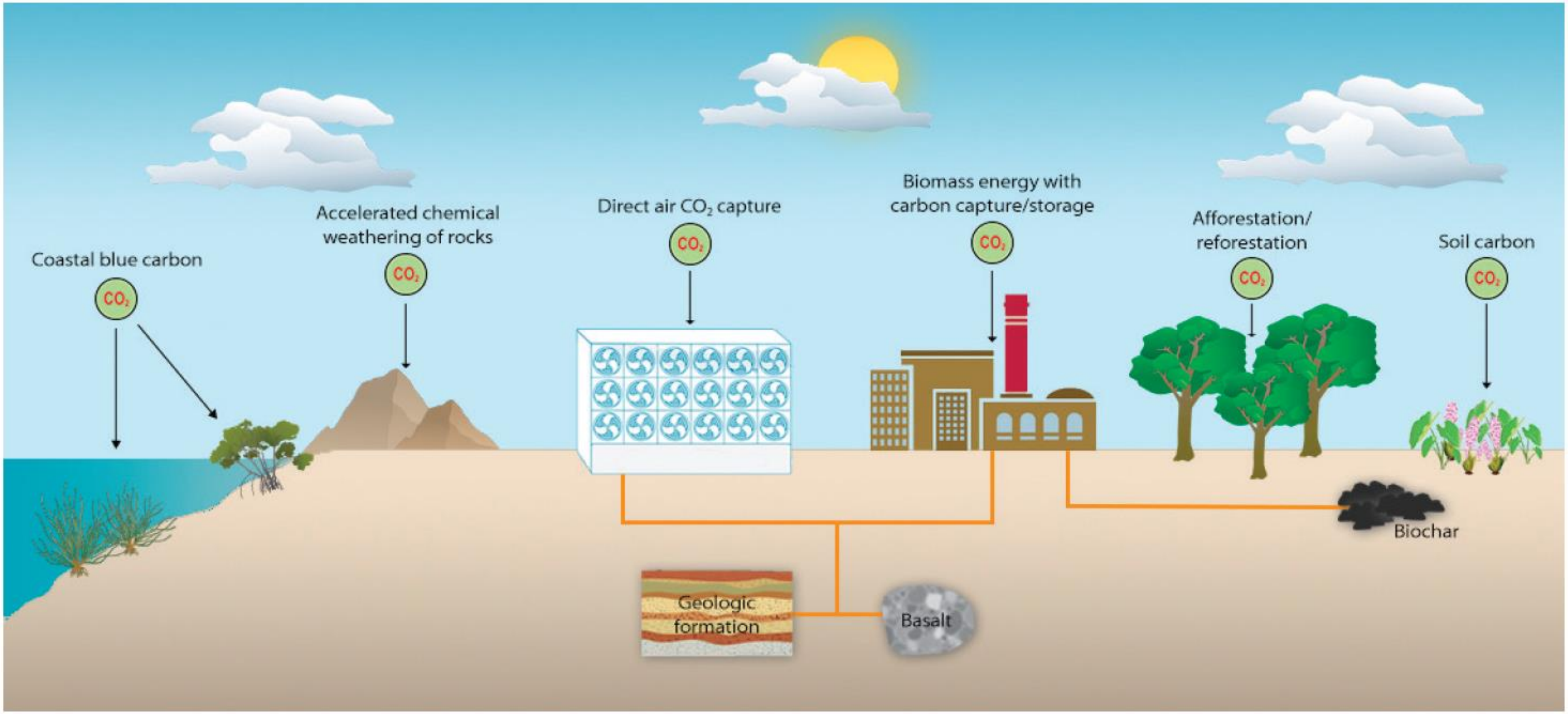


FIGURE 1.6 Negative emissions technologies

CCUS as a NET

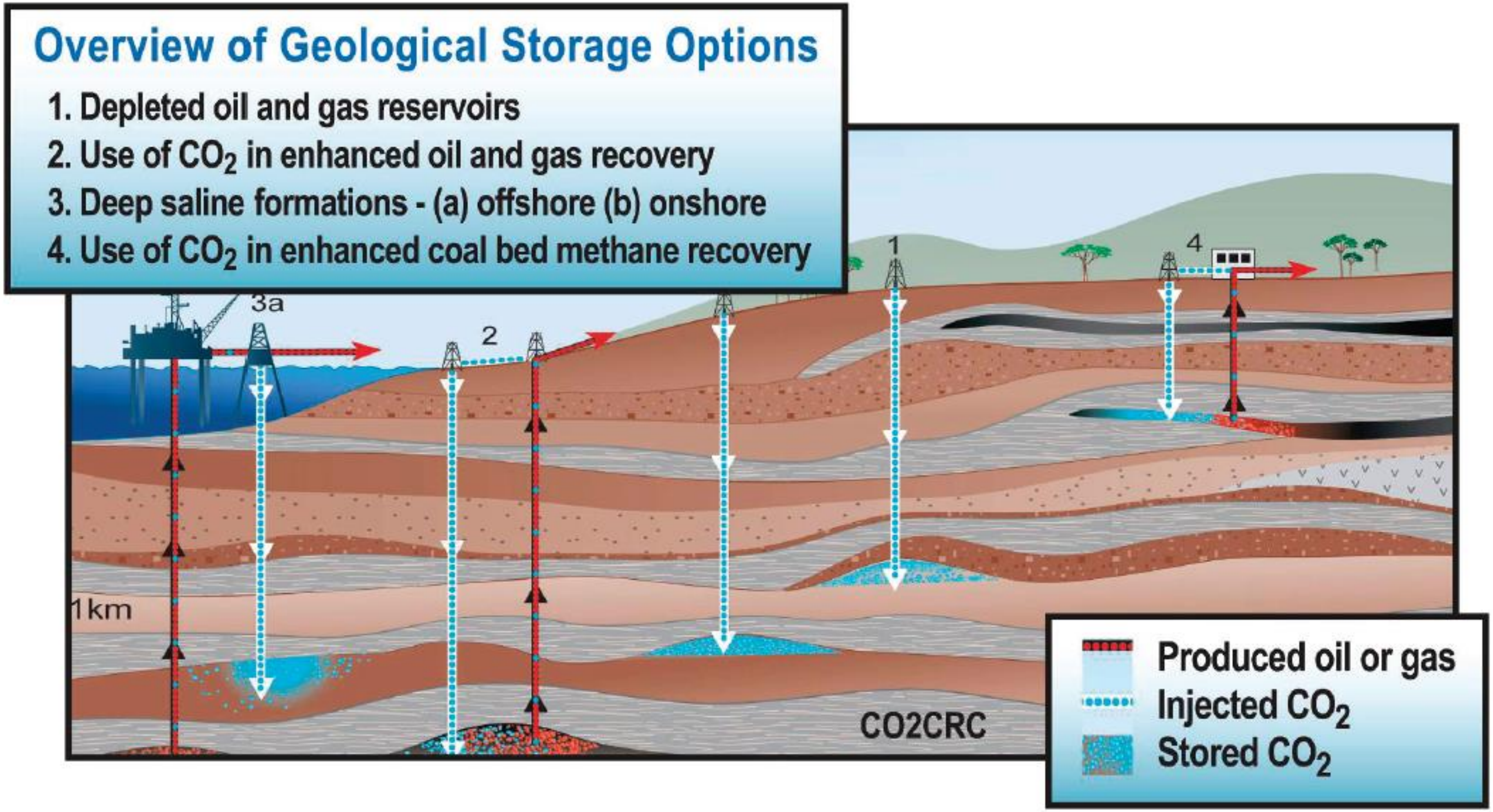


FIGURE 7.1 Options for geological storage in sedimentary rocks. SOURCE: Benson et al. (2005).

CCUS as a NET

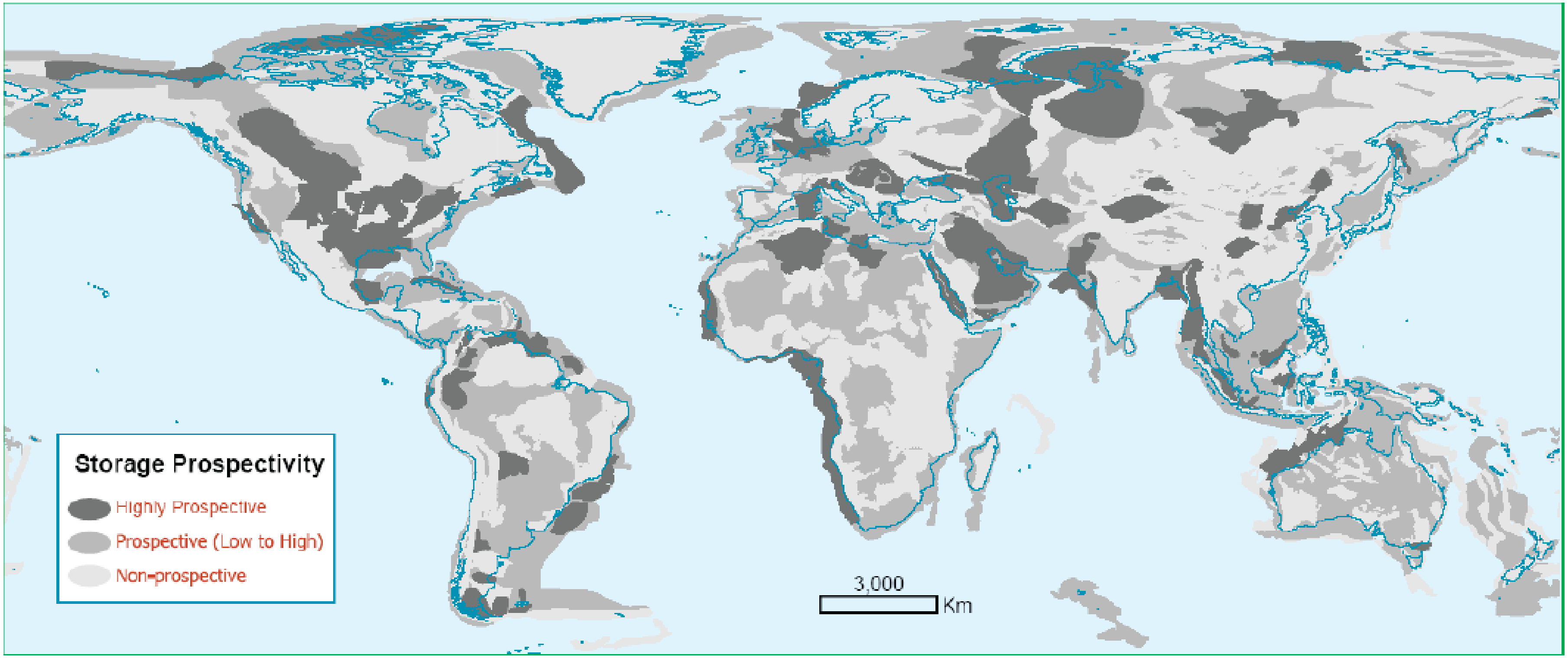
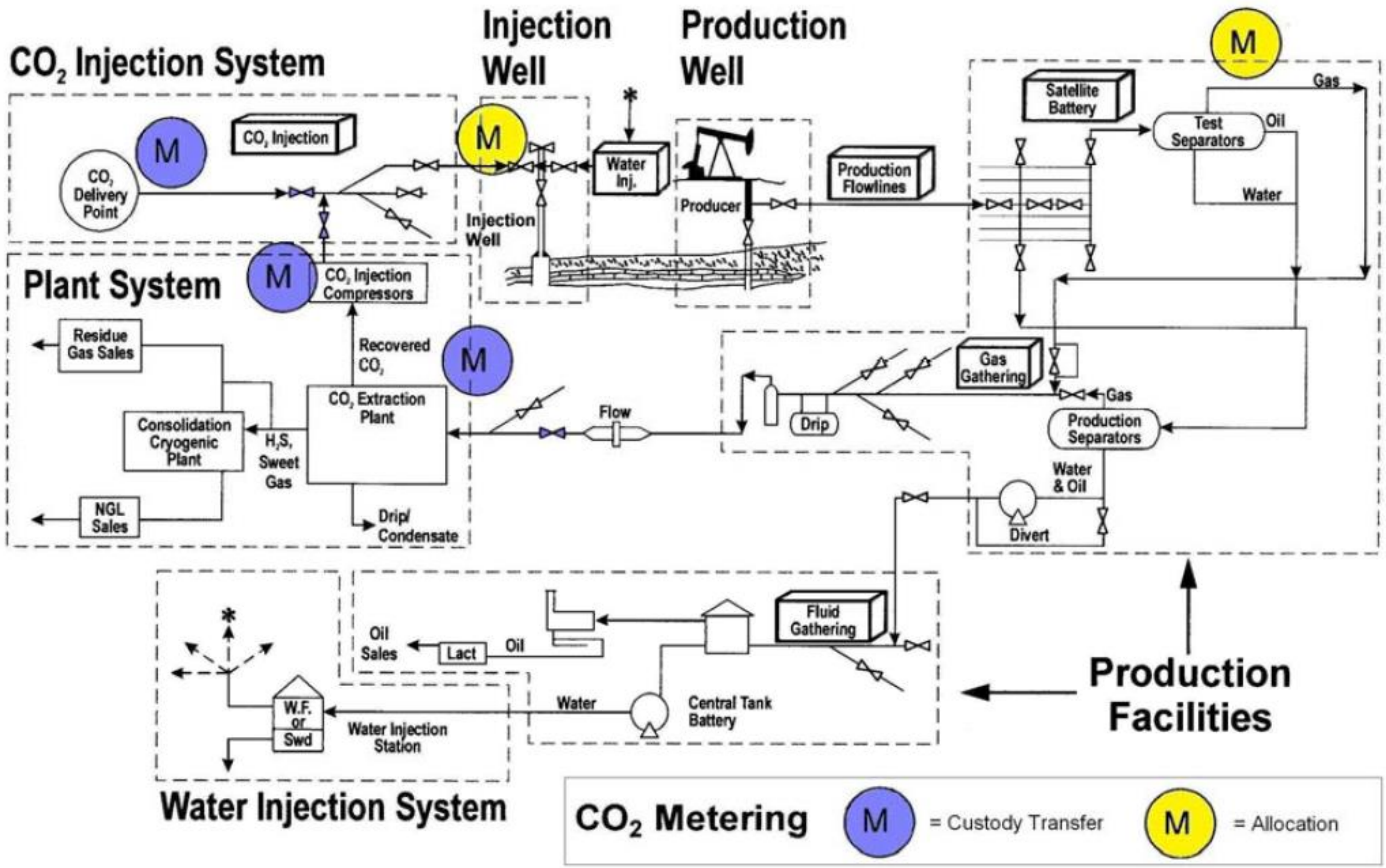


FIGURE 7.5 Location of sedimentary basins that are highly prospective for geological sequestration of CO_2. SOURCE: Bradshaw and Dance, 2005.

Figure 7
CO_2 EOR PROCESS FLOW

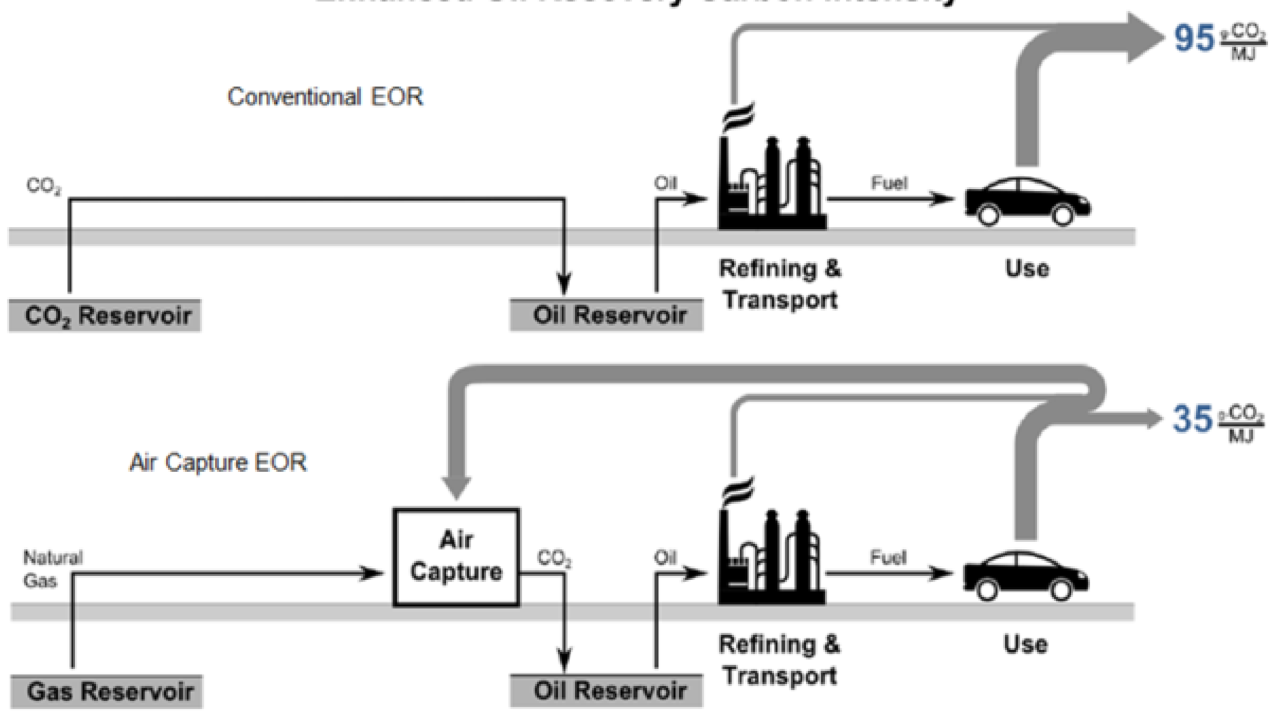


Adapted from SPE MONOGRAPH Practical Aspects of CO_2 Flooding, Figure 5.1

Oxy Low Carbon Ventures, LLC

Carbon Engineering

Conventional Enhanced Oil Recovery Fuel Production vs Air Capture to Enhanced Oil Recovery Carbon Intensity

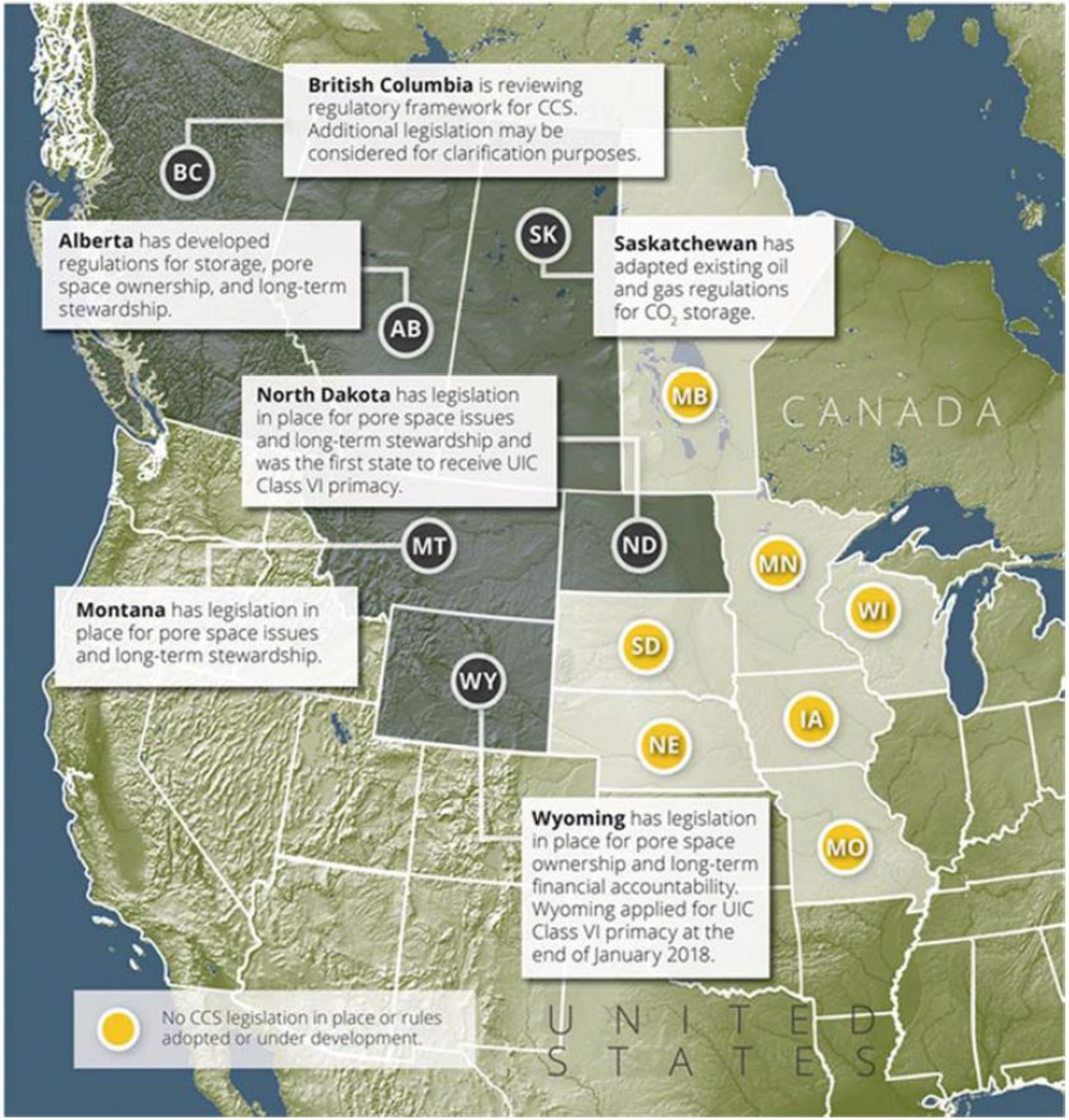


Source: Carbon Engineering

Questions for DAC EOR project in Texas

- Who owns the pore space? Unitization?
- Who authorizes the well?
  - Class II and Class VI wells
  - Delegation of authority to Texas
- Does potential liability for stored CO_2 ever end?
- If CO_2 pipeline required to multiple sites, what rules and procedures apply?
- Permit fights and contested case hearings?

Pore Space Ownership



45Q Tax Credit

- "Qualified carbon oxide" –
  - Captured from point source, and otherwise released into atmosphere; OR
  - Direct air capture, if measured at source of capture and verified at point of disposal, injection or utilization

- Tax credit: $35 per ton for EOR CO2; $50 for DAC CO2

- DAC requires capture from ambient air, but statute excludes photosynthesis or naturally occurring CO2 from subsurface springs

- Utilization of qualified carbon oxide – see Section 45Q(f)(5)
  - Chemical conversation to a material where "securely stored"
  - "any other purpose for which a commercial market exists"

45Q Tax Credit

- NOTE – for DAC, must capture at least 100,000 metric tons of qualified carbon oxide during taxable year to be "qualified facility" under Section 45Q(d)(2)(C). Deadline to build: <u>January 2024</u>

- Life cycle analysis required

- Heavily dependent on Secretary of Treasury guidance and regulations to implement

  – Economic substance doctrine
  – Definition of "secure geologic facility"
  – Safe harbors for recapture of tax credits (if CO2 escapes) and transfer to other parties (can't just buy tax credits)

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