MARSH

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Options for managing liability in CCS projects

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Liability Management in CCS Projects
Why is this important?

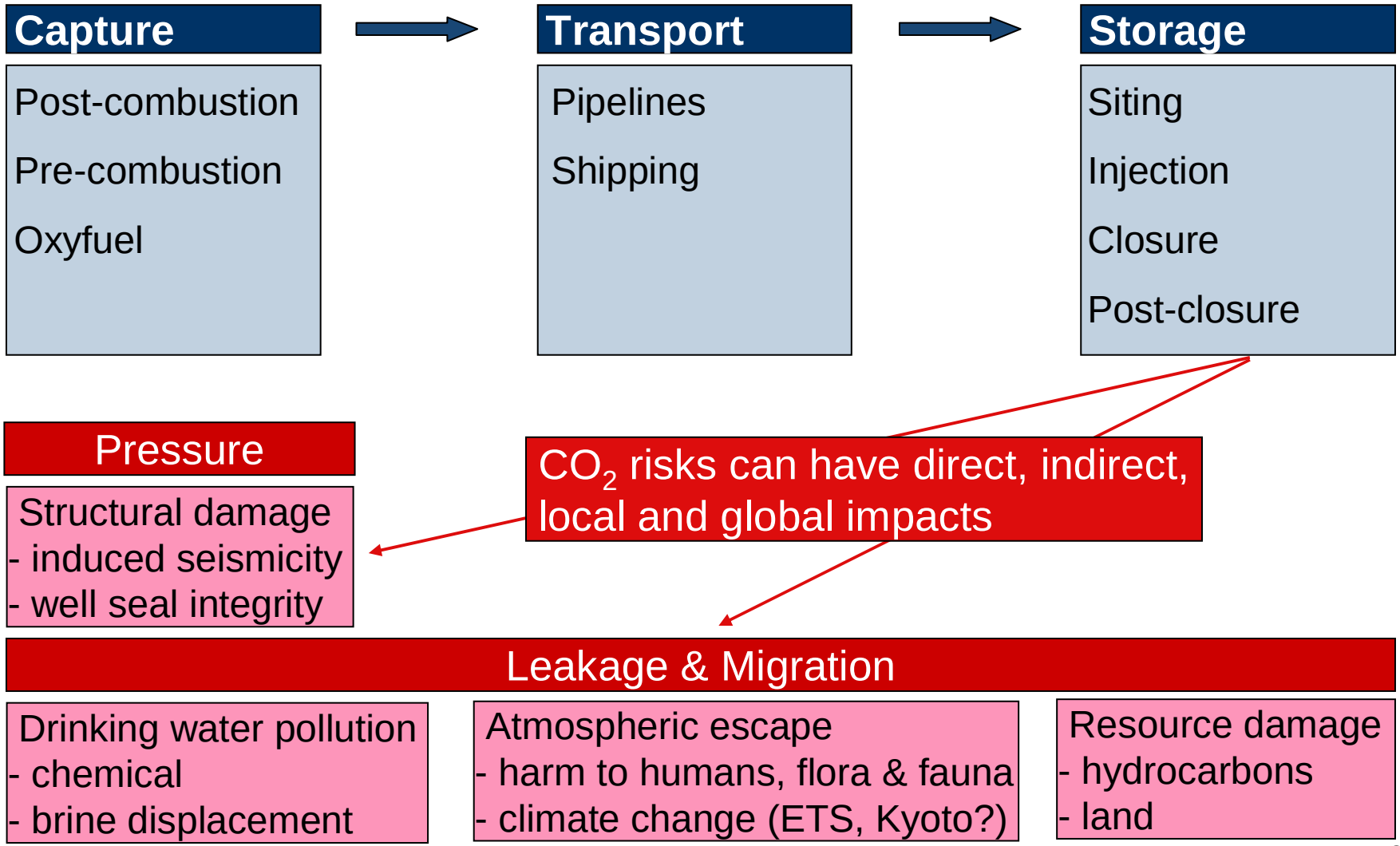
- CCS projects expose stakeholders to new, unique and potentially significant risks and liabilities
- Long-term nature of storage creates potential for liability to manifest itself over timeframes that are beyond the scope of the private sector alone
- Lack of actuarial data on integrated large scale projects coupled with an absence of uniform international regulation creates major obstacles to risk management, private investment and wide-scale deployment

BUT

- CCS potential as a primary tool against climate change, the availability of analogous information in EOR, and the commitment of global stakeholder groups is recognised and supported by the risk management industry

Liability Management in CCS Projects

Storage liability is the major sequestration risk



Liability Risk Management
Exposures are complex and lack certainty

- Holistic risk assessment and quantification of CCS project exposures is a precursor to mitigating financial risk and liability, but many fundamentals remain unanswered:
  - What are the size and likelihood of potential liabilities?
  - What is the definition of CO_2?
  - Who is liable and best placed to shoulder liability?
    - Operator/Developer/Owner
    - Credit benefactor
    - Government

    } All of these?
  - Who could be an injured party?
    - Property owners
    - Public
  - How will MMV and remediation be undertaken?
  - What are the optimal approaches to long-term liability management?
    - Public/Private phasing

Long-term Liability Management
Structural options

- Liability during (short-term) operational phase can mainly be covered by contract and traditional risk transfer (once modelled)
- Long-term liability is much more difficult to hedge due to timeframe of when and how significant intrinsic risk manifestation could be:
  - Environmental
    - Damage to climate
    - National inventories and assigned credits
  - In-situ
    - Public health
    - Ecosystems
    - Resources
  - Cross-border
    - Leakage and migration in other countries

<u>Underwriting the Risk</u>
- How likely is this and when?
- How much could it cost?
- Who is responsible?

- Private to public transfer of liability seems most feasible solution and could take several structures

Long-term Liability Management
Structural options – Government backed indemnity

Example: US Price-Andersen Act

- No-fault (strict) indemnity for nuclear industry against liability caused by accidental releases
  - Aimed to provide incentive to private developers when risks and potential liabilities were unknown
- Provides a layered risk pool
  - 1st layer: each individual plant obtains $300 million primary cover
  - 2nd layer: each plant must contribute up to $95.8 million to a fund if an accident occurs (capped at $15 million annually)
  - 3rd layer: federal government finances any outstanding balance over and above individual and collective layers

CCS cost/benefit

- ✓ – Provides liability cap for industry
- ?/ ✗ – More suitable for very rare and catastrophic risks
- ✗ – Negative public perception
- ✗ – Inaccurate risk assessment and pricing could leave insurers and public exposed

Long-term Liability Management
Structural options – Hybrid compensation

Example: CERCLA (US Superfund)

- EPA administered fund created via taxes on oil and chemical corporates to address investigation and clean up of abandoned hazardous waste sites
  - Can make current and past site owners/operators strictly and joint and severally liable for clean up, as well as persons who arranged disposal or transport to site (with disposal)
- Liable parties can use hybrid instruments – risk transfer e.g. stop loss, and self insurance to cap and manage their responsibilities

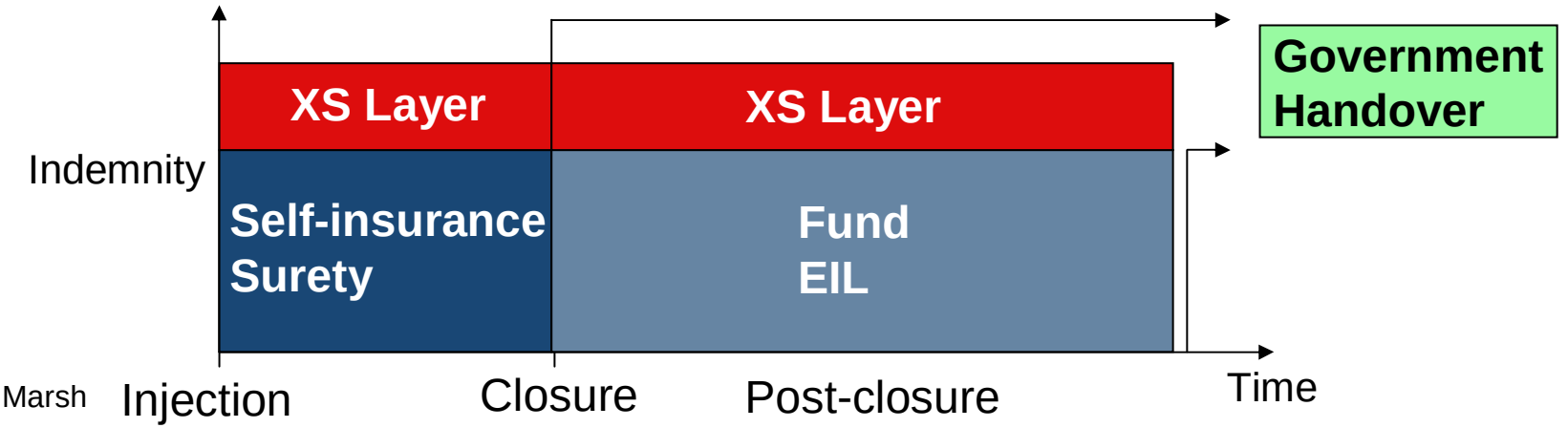
CCS cost/benefit

- ✓ – CERCLA is flexible and responds to developments in market conditions
- ✓ – Allows use of hybrid instruments for optimal risk hedging and provides security (remediation fund) for orphan sites
- ✗ – Fund is too small – insufficient collection and poor solvency hedging
- ?/ ✗ – Joint and several positions can be problematic

Long-term Liability Management
Structural options – Phased liability

Example: Private/Public Liability Transfer

- During operational phase of injection, closure and (agreed) post-closure period prior to transfer to government, liable party provides:
  - Self insurance or insolvency proof financial guarantee for expected costs incurred during operational period
  - Liability risk transfer for unexpected XS costs during operational phase
  - Fund with XS layer for post-injection phase liability or full risk transfer e.g. environmental impairment insurance up to agreed hand over date
  - Fund for post closure MMV up to or past agreed handover date



Long-term Liability Management
Structural options – Phased liability

Example: Private/Public Liability Transfer

- Development of risk transfer will be contingent on many factors, including:
  - Creation of actuarial data and models
  - Ex ante and regulatory confirmation of:
    - Liable parties
    - CO_2 status
    - Cross-border treatment
    - CCS in GHG mechanisms

<u>Pricing the Risk</u>
In addition to these factors, amount sequestered, length of term, and site risk will determine sum insured and premium rates

  - Capacity may ultimately only be available for certain project methodologies

CCS cost/benefit

✓ – Long-term liability is transferred from private sector

✓ – Allows use of hybrid instruments for optimal risk hedging and caps liability

✓ – Flexible and responds to developments in market conditions

?/ ✗ – Risk transfer cost could remove economic feasibility of project

✗ – Negative public perception – government subsidy

Long-term Liability Management
Conclusions

- Long-term nature of CCS liability poses major challenge to its successful large-scale deployment
- Multiple uncertainties and a lack of real actuarial data makes risk management complex and underwriting risky, though analogous data is available
- Existing models such as Price-Anderson and Superfund have elements of public/private liability management with potential application in CCS but none are ideal
- Liability management model will most likely be determined on a case-by-case basis and require robust actuarial and contractual analysis combined with regulatory backing
- Insurance market is committed to supporting companies and governments manage climate change risk – talk to us!

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