

MARSH

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Regulating and financing carbon capture and storage

Options for managing liability in CCS technology

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Liability Management in CCS Projects

Why is this important?

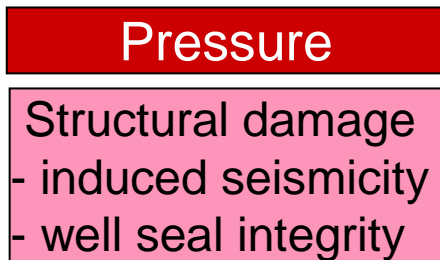
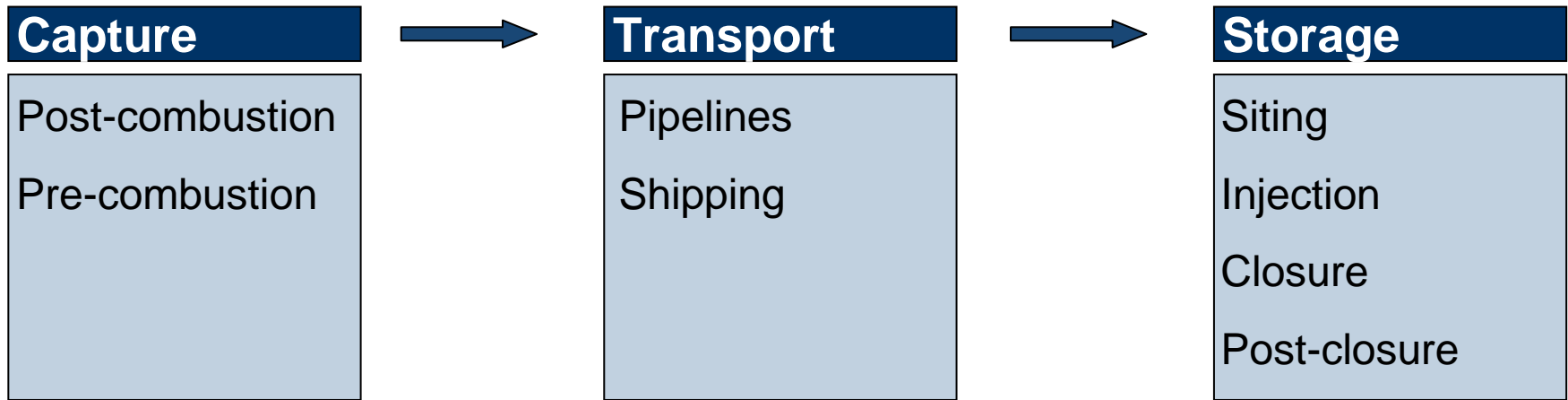
- CCS projects expose stakeholders to new, unique and potentially significant project risks and liabilities
- Liabilities extend beyond the life of the assets
- Lack of actuarial data on performance of large scale CCS projects
- Absence of uniform international regulatory framework

BUT

- CCS has significant technological potential
- Analogous information is available for Enhanced Oil Recover and Natural Gas Storage projects, and
- Commitment from global stakeholder groups to work with the insurance industry to overcome the long term risk and liability issues

Liability Management in CCS Projects

Potential risks and long term liabilities



CO₂ can have direct, indirect, local and global impacts



Liability Risk Management

What are the optimal approaches to long-term liability management?

- Risk quantification of all CCS project exposures will be needed but many fundamentals remain unanswered:
 - What is the nature of the possible risks?
 - What is the scale and likelihood of all potential liabilities?
 - Who will be liable and who is best placed to shoulder liability?
 - Operator/Developer/Owner
 - Credit benefactor
 - Government
 - Who could be an injured party?
 - Property owners
 - Public
 - “Environment”
 - How will Measuring, Monitoring and Validation and remediation be undertaken?

All of these?

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 liabilities more difficult due to the lengthy timeframes and lack of experience in estimating significance of intrinsic risks:
 - Environmental
 - Damage to “the climate”
 - “Value” of credits
 - In-situ
 - Public health
 - Ecosystems
 - Resources
 - Cross-border issues
 - Leakage in other regions / countries
- Private to public transfer of long term liabilities seems to be most applicable solution and could take several structures

“Underwriting” the risk
-How much could it cost?
- What is likelihood and timing?
-Who will be responsible?

Long-term Liability Management

Government involvement in liability management

Example: Nuclear industry (Price – Anderson)

- No-fault indemnity for liability caused by accidental release
 - Aimed to provide incentive to private developers when risks and potential liabilities were not known
- Provides a layered risk pool
 - Primary layer: individual plant owner / operator obtains primary cover
 - Excess layer: collective layer provided through capped funding if an accident occurs
 - Tertiary layer: government will finance any outstanding balances over that provided by individual and collective layers above

Example: Contaminated land (Superfund)

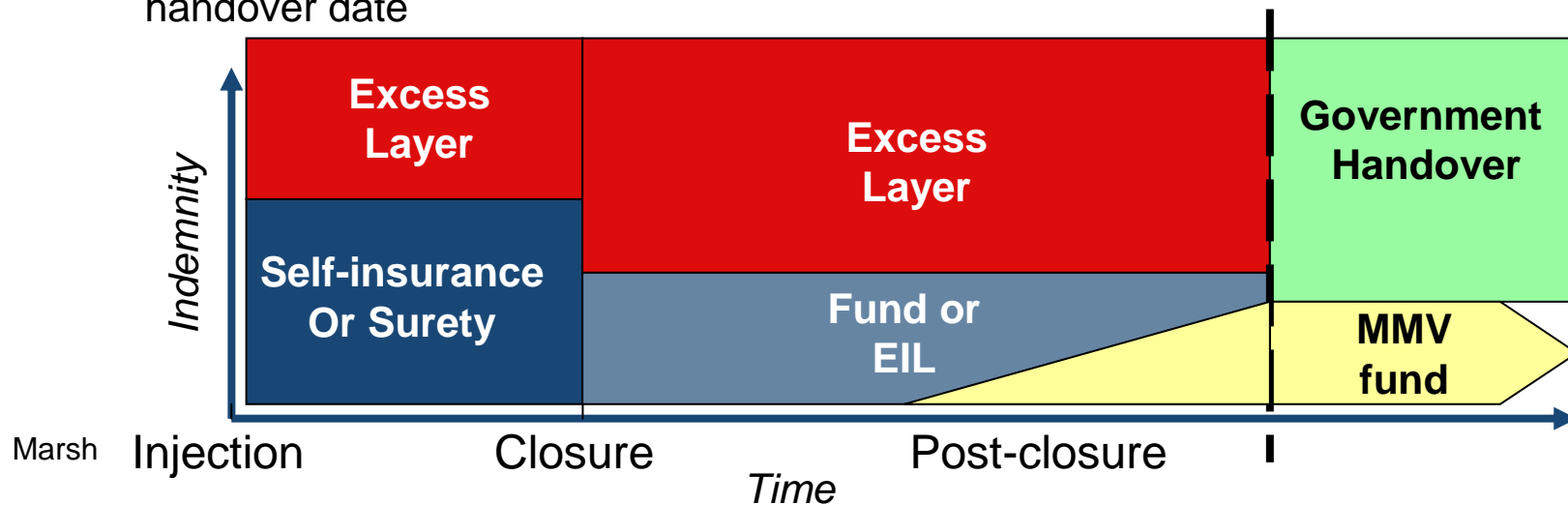
- Regulator administered fund to address liabilities at problem site
- Site owners/operators can be jointly and severally liable for clean-up
- Liable parties can use hybrid instruments – risk transfer - to cap their responsibilities

Long-term Liability Management

Structural options – Phased liability

Example: Private/Public Liability Transfer

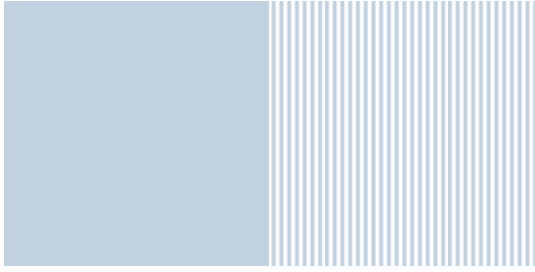
- During operational phase of injection, closure and (agreed) post-closure period prior to transfer to government, liable party(s) provide:
 - Self insurance or insolvency proof financial guarantee for expected costs incurred during operational period
 - Liability risk transfer for unexpected XS costs during operational phase
 - Funded and XS for post-injection phase liabilities and / or risk transfer e.g. environmental impairment insurance up to agreed hand over date
 - Fund for post closure Measuring, Monitoring and Verification up to and past agreed handover date



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 risks



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