



Offshore Enormous CO₂ Storage Atlas and Its Critical Role for Safe Subsurface Storage

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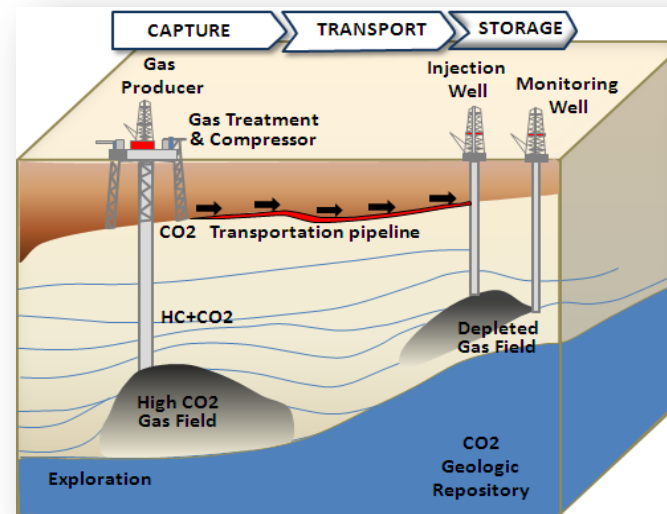
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Carbon Capture and Storage (CCS)

Carbon Capture & Storage (CCS) Technology

A technology which attempts to prevent CO₂ discharge in large quantities by capturing CO₂ gas, transporting it and ultimately, pumping it into underground geologic formations to securely store it away from the atmosphere (green environment, reduce GHG emission).



Capture

A stage where CO₂ is separated from high CO₂ gas field.
Constitutes 60% CAPEX (Surface facilities & technology).
Challenges:

- High power load.
- Separation inefficient (cause Hydrocarbon losses).
- Required compressor

Transport

A stage where CO₂ is compressed, dehydrated, transported to the suitable storage site.
Constitutes 30% CAPEX (pipelines & compressor).
Challenges:

- Pipeline standard for CO₂ (supercritical).
- Significant distance between high CO₂ gas field and storage site.

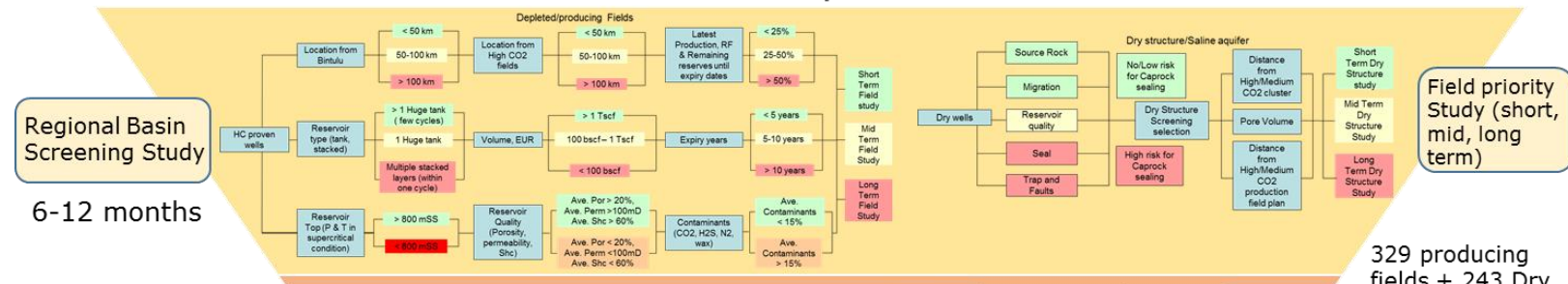
Storage

A stage where CO₂ is safely injected into the suitable storage site.
Constitutes 10% CAPEX (appraisal and monitoring technology).
Challenges:

- Site development and management.
- Reservoir characterization.
- Risk assessment.

Storage Site Maturation Study

Level of Maturation Description Deliverables



Regional Basin Screening Study
6-12 months

Level 1 Regional Study
2 fields/year

Level 2 Site Specific
1 field/3-5 years

Level 3 Implementation
1 field/3-5 years

Level 4 Abandonment

Storage Atlas

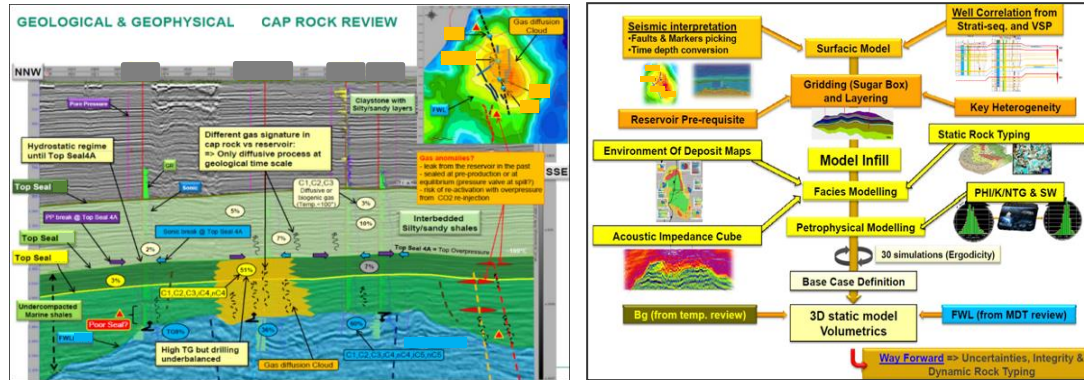
- Producing fields: 10
- Dry structures: 4

Measurement, Monitoring and Verification (MMV)

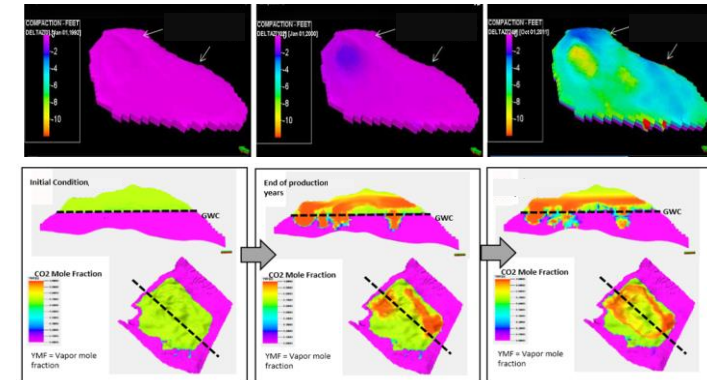
*SDR : Storage Development Review

Storage Development Plan (SDP)

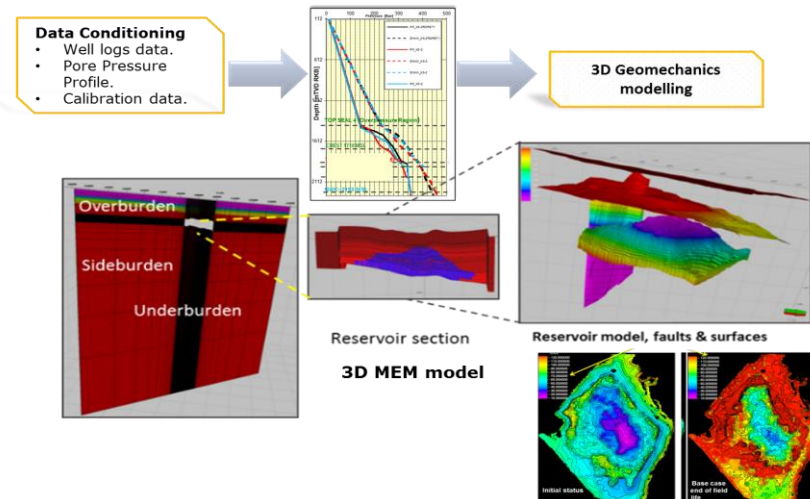
Overburden and reservoir geological Model



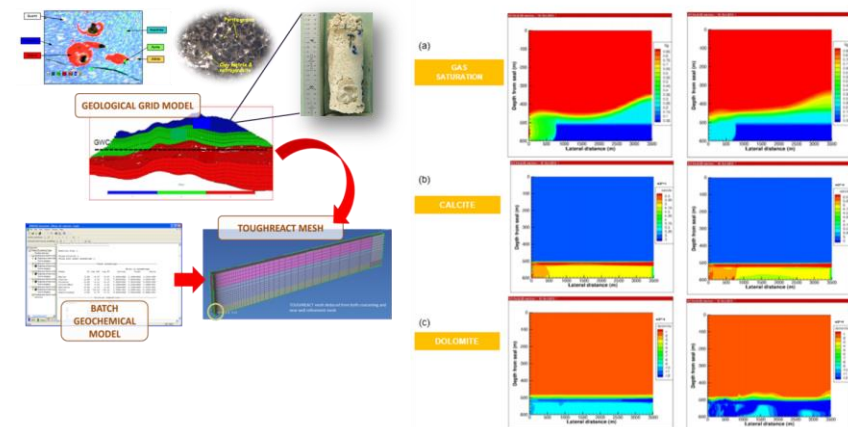
Dynamic Model



Geomechanics Model



Geochemical Model



Conclusions and Way Forward

- Storage sites maturation studies level : Regional basin screening (Level 1), Storage Development Plan of site specific (Level 2), Storage implementation (Level 3).
- Sarawak Storage Atlas : potential storage sites capacity has double size the source of CO₂ and location-wise is very strategic.
- Challenges:
 - SDP maturation studies complexity.
 - Relevant and reliable maturation studies and R&D technology to reduce uncertainties and mitigate the risk.
 - Cost-effective subsurface and surface R&D and delivery technology.
 - Future Storage sites readiness.
- Based on available storage capacity in Sarawak, we are able to cater CO₂ storage site for other industry.
- Future technology to be matured : Storage Implementation and Utilisation.



Thank you



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