GaffneyCline™
energy advisory

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CO_2 Sequestration Basics

Capacity, Injectivity Containment & MMV

David Katz

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Integrated CO_2 storage

Site screening

- Pre-FEED and FEED consultation
- Site selection
- Containment risk register
- Storage capacity potential

Site characterization

- Area of Review (AoR) determination
- Coring, CH & OH logging
- Permit application support & MMV
- Reservoir & geological modeling

Site development

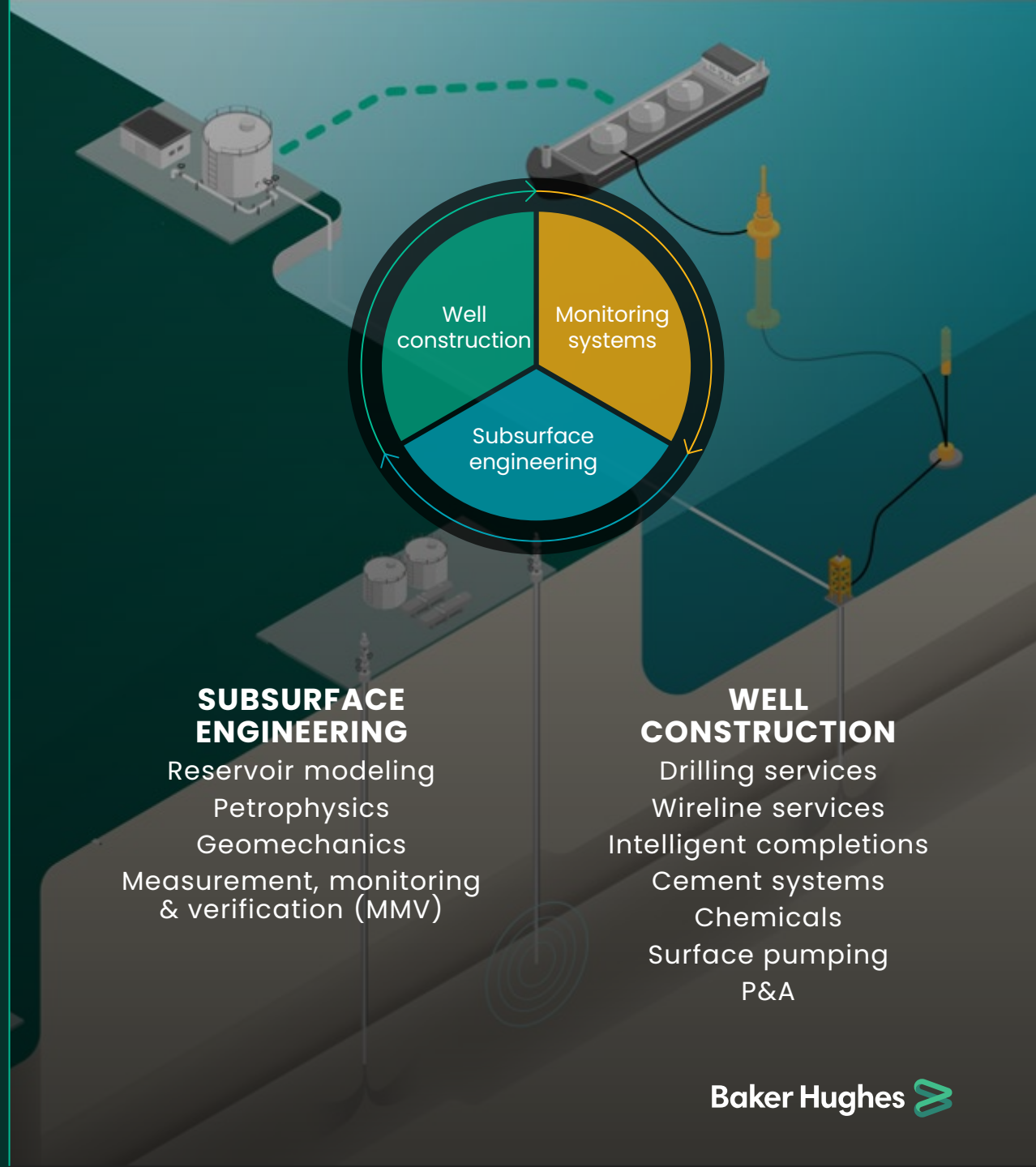
- Well basis of design
- Integrated well construction
- Multi-stage completions
- Permanent monitoring solutions

Site operations & expansion

- Integrated well services
- Operations field support
- MMV plan revision
- Permanent monitoring solutions

Site stewardship

- Post-Injection Site Care (PISC)
- Intervention (if needed)
- Monitoring solutions
- Abandonment & decommissioning



SUBSURFACE ENGINEERING

Reservoir modeling
Petrophysics
Geomechanics
Measurement, monitoring & verification (MMV)

WELL CONSTRUCTION

Drilling services
Wireline services
Intelligent completions
Cement systems
Chemicals
Surface pumping
P&A

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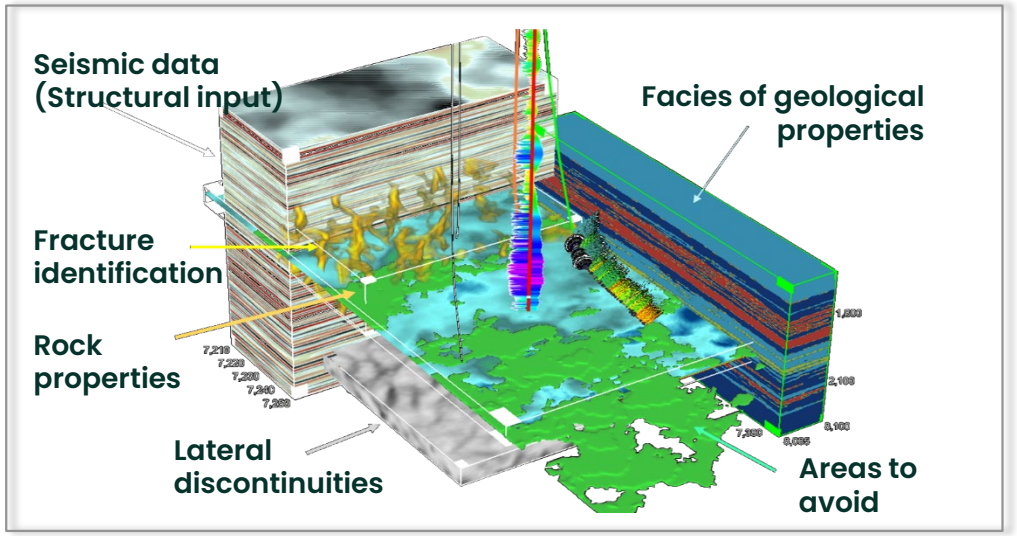
Site Screening

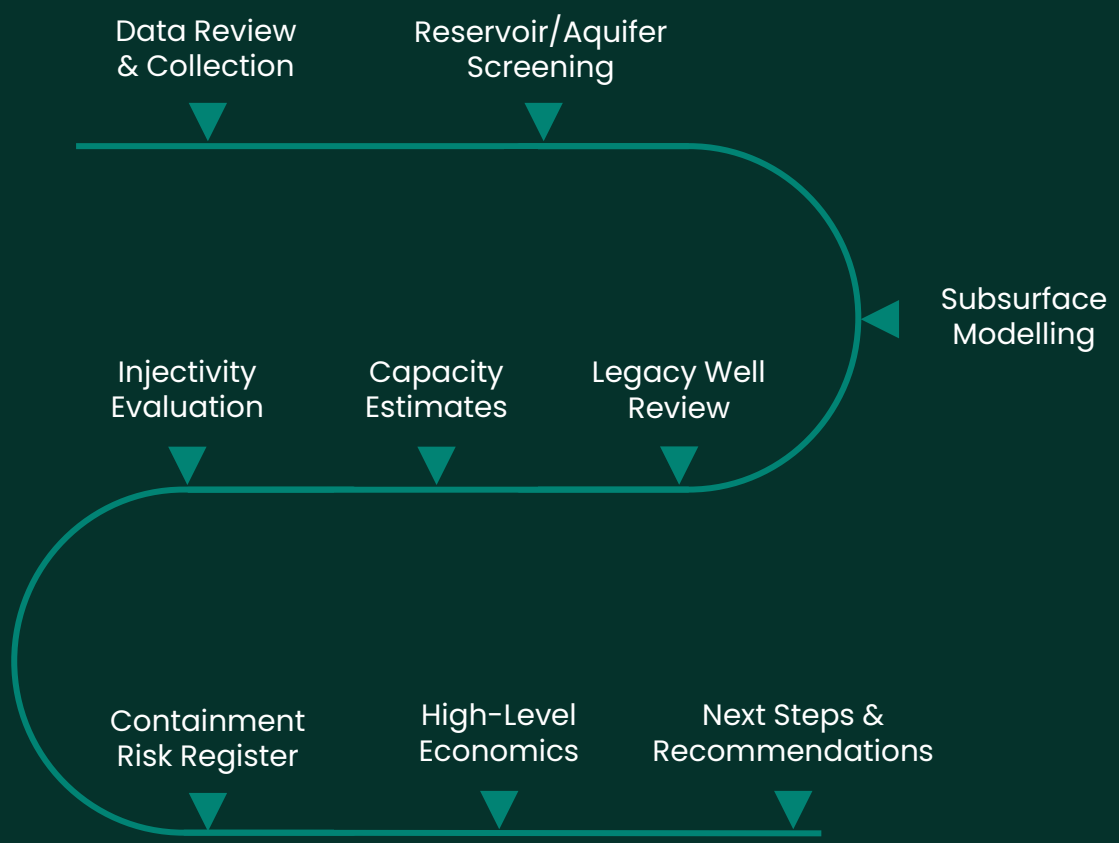
Sub-surface studies for storage site selection and ranking

Site screening, ranking & selection is a process by which a sub-surface high level due diligence study can :

- Help identifying multiple potential storage sites with suitable properties.
- Help narrow down investment decisions with high level risk and economic models based on the screened properties.



Simplified Workflow Example



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Site Characterization

Capacity

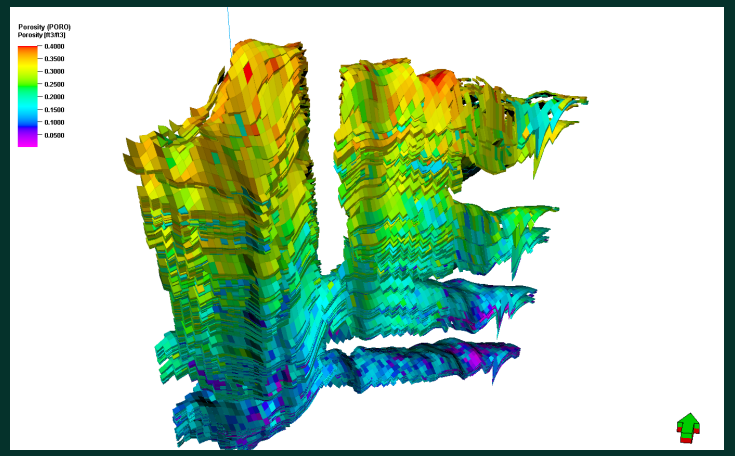
- Available pore volume & pressure space
- Trapping and storage mechanisms

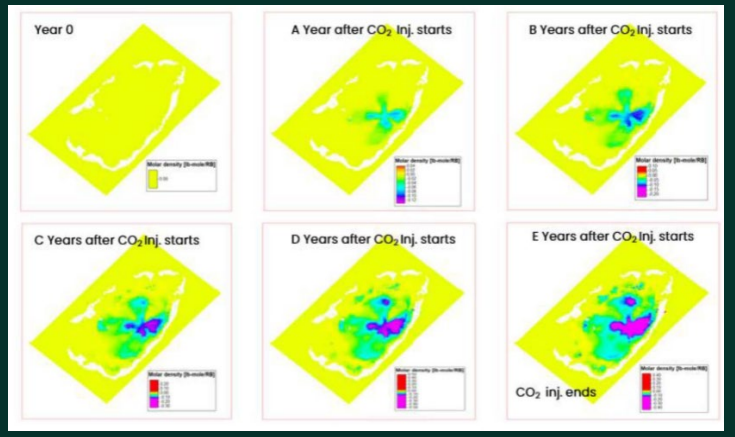
Injectivity

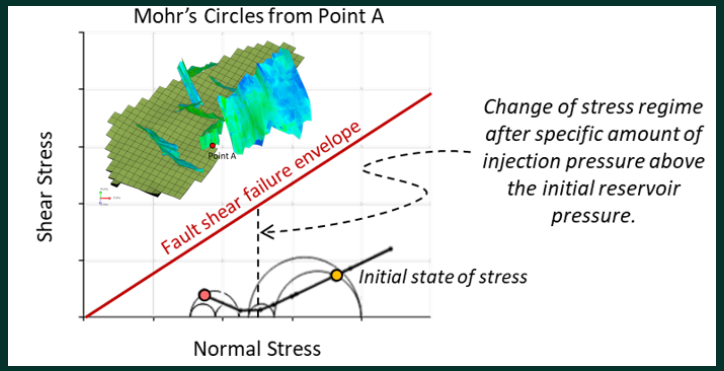
- Operating Conditions (Injection Rate, Max/Min WHIP)
- Fast Geochemical Reactions
- Perforation Strategy, Development Strategy (Well Count)

Containment

- Reservoir/seal integrity
- Well Integrity, Material Selection, Well Design
- Legacy Wells







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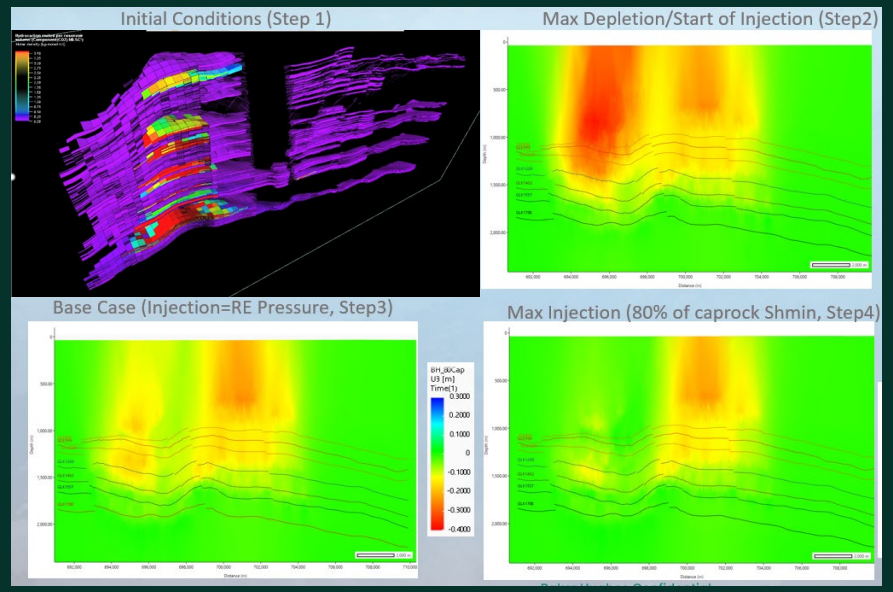
Depleted Fields vs Saline Aquifers

	Depleted Reservoirs	Saline Aquifers
Opportunities	• Proven seals & Reservoirs • Often large legacy datasets • Possible reusable infrastructure	• Widely available • Giant capacity • Fewer legacy wells • Can be optimized for CCS
Challenges	• Geographical constraints for source • Legacy wells volume high	• Requires significant characterization • High capex for data acquisition • New infrastructure to mitigate water chemistry reaction with CO2.



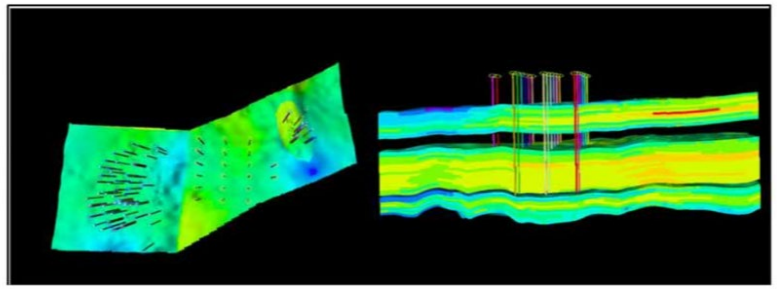


Figure 10—CO_2 Vertical Injection Wells

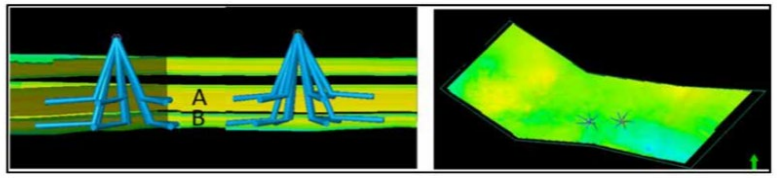


Figure 11—CO_2 Horizontal Injection Wells

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Measurement Monitoring & Verification Plan

Robust workflow to understand long term liability & regulatory compliance

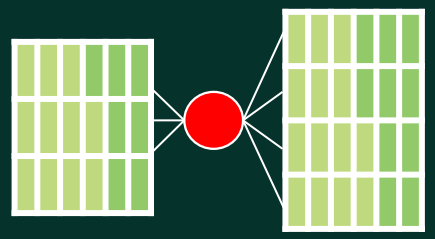
Pre-Feasibility

Qualitative Risk Analysis

Monitoring Technology Identification

Cost/Benefit Analysis

Conceptual MMV Outline



Bowtie Plot

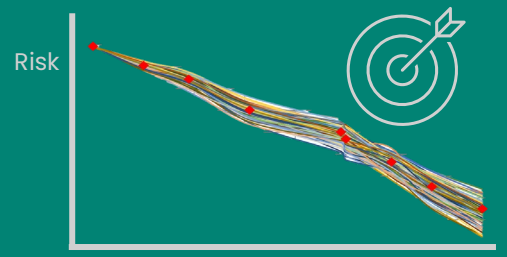
Feasibility

Quantitative Risk Assessment

Evidence-Based Technology Evaluation

Monitoring Deployment Schedule

Key Performance Indicators



Define

Technology Performance Targets

Contingency Monitoring

Control Response and Mitigation Procedures

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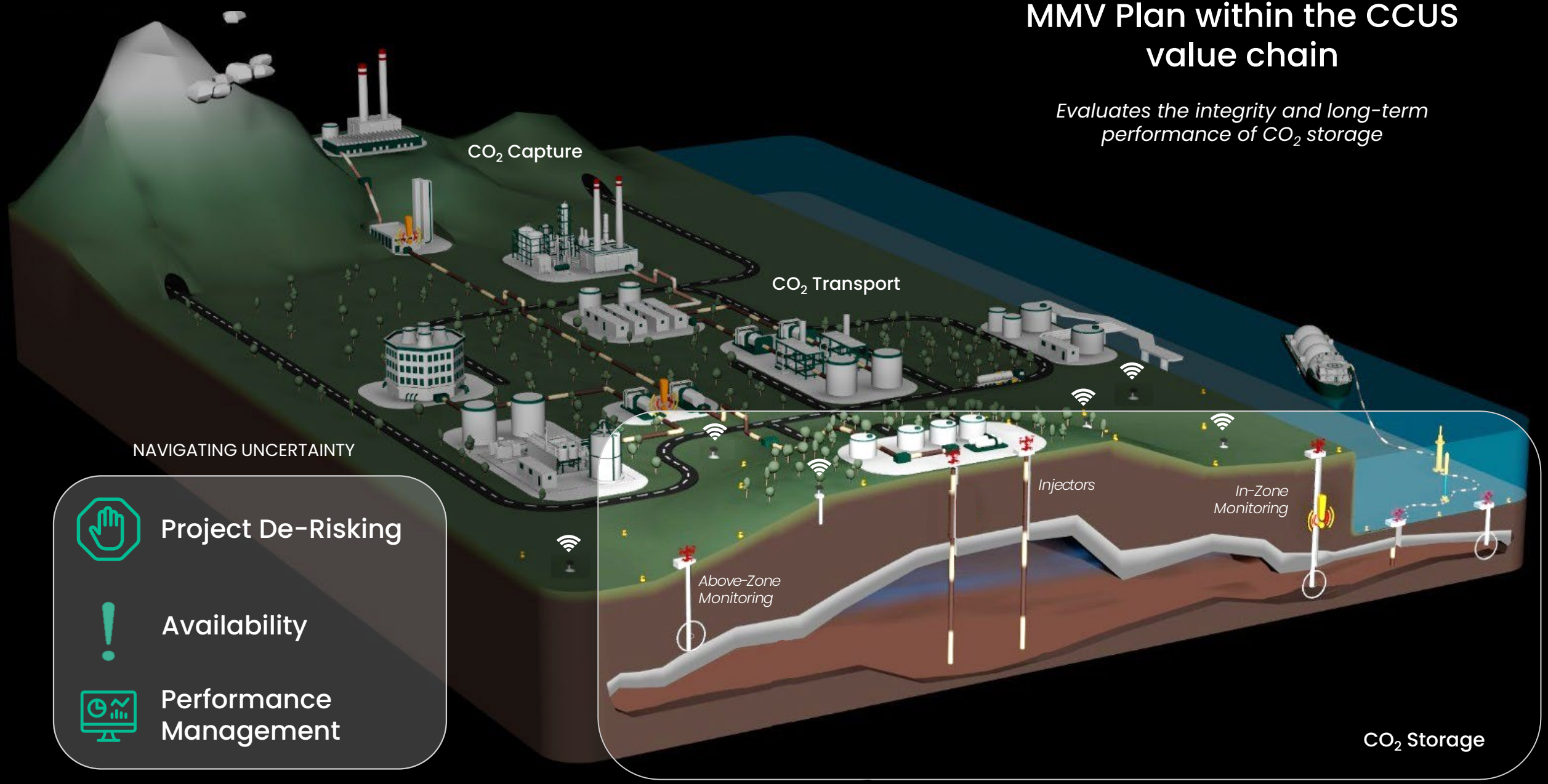
MMV Plan within the CCUS value chain

Evaluates the integrity and long-term performance of CO_2 storage



NAVIGATING UNCERTAINTY

- Project De-Risking
- Availability
- Performance Management

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Thank you!

David Katz

New Energies Lead NAM, GaffneyCline energy advisory