

CO₂ Storage MMV and Monitoring Technology

Gaffney Cline Energy Advisory

28 October 2024

What does MMV bring?

NAVIGATING UNCERTAINTIES



PROJECT DE-RISKING

- Improved subsurface understanding
- Risk safeguard systems design
- Regulatory compliant framework
- Early alert system



OPEX OPTIMIZATION

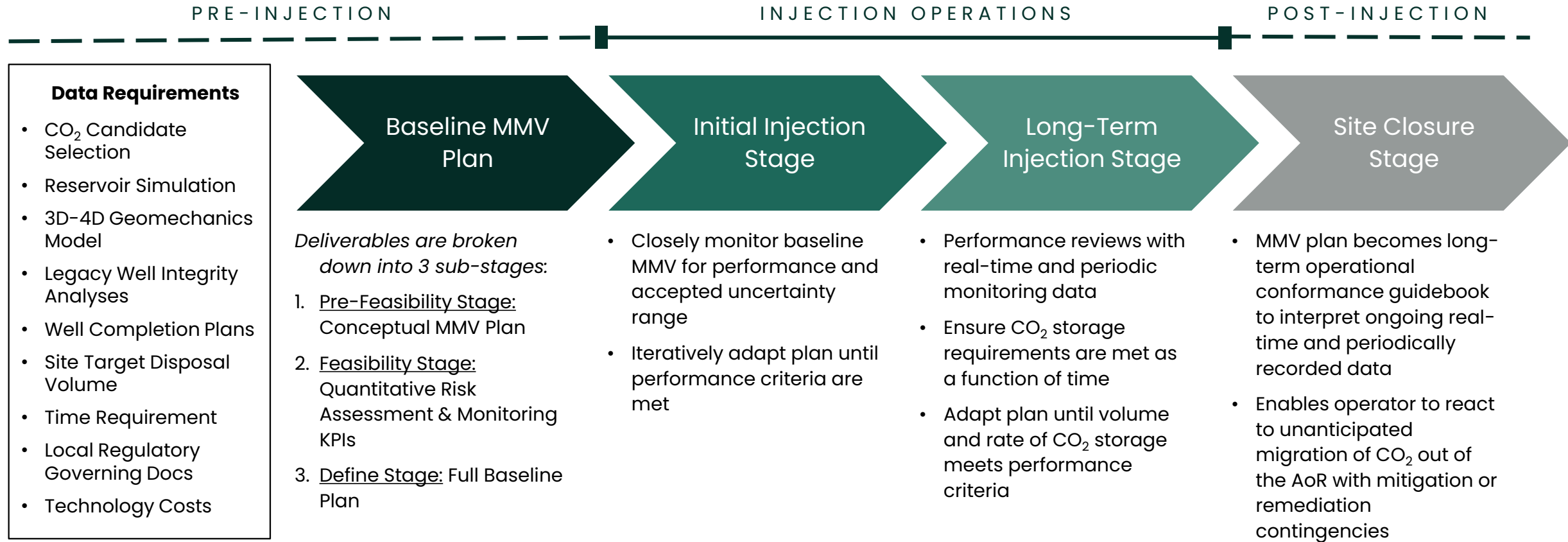
- Technology application innovation
- Passive and autonomous monitoring
- Technology cost/benefit analysis
- Minimal-intervention monitoring



PROJECT OPTIMIZATION

- Data management system
- Real-time data analytics
- Digital integration platform
- Streamlined communication

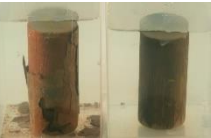
MMV Plan Development: Project Stage



Tested and proven design workflows enable best-in-class technology adoption

SUBSURFACE key technologies

Cementing



PermaSet™ Cement
CO2 & H2S Resistant

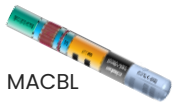
Wireline



INTeX™

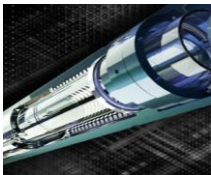


Hi-Resolution
Vertilog



MACBL

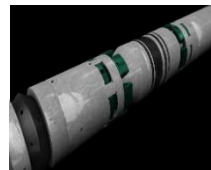
Completion



Safety Valve
Systems

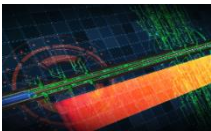


CO2 Injection
Control

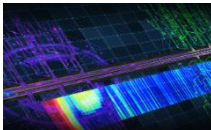


Premier™ Removable
Packer

Fibre optics



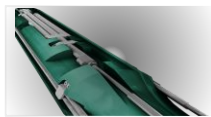
Temperature
SureVIEW™ DTS



Acoustic
SureVIEW™ DAS



Strain
SureVIEW™ WIRE



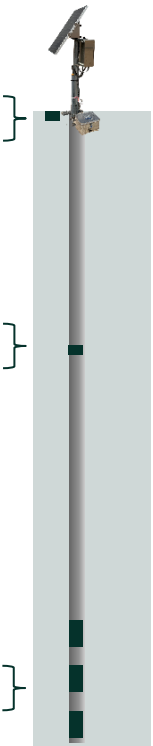
SureSENS™ QPT
ELITE

CO2Watch™

Surface seismic
sensors
Soil gas monitoring

Groundwater quality
monitoring / sampling

Shallow buried arrays
- Microseismic
- Spot monitoring
- Plume mapping



Not to scale

SURFACE key technologies

Panametrics



Tunable Diode Laser
Absorption Spectroscopy



Oxygen Measurement
Absorption Spectroscopy



Aurora RM
Reliable Moisture
Measurement

Bently Nevada



System 1 & Orbit 60



AHM Acceleration Sensors
Vibration Monitoring

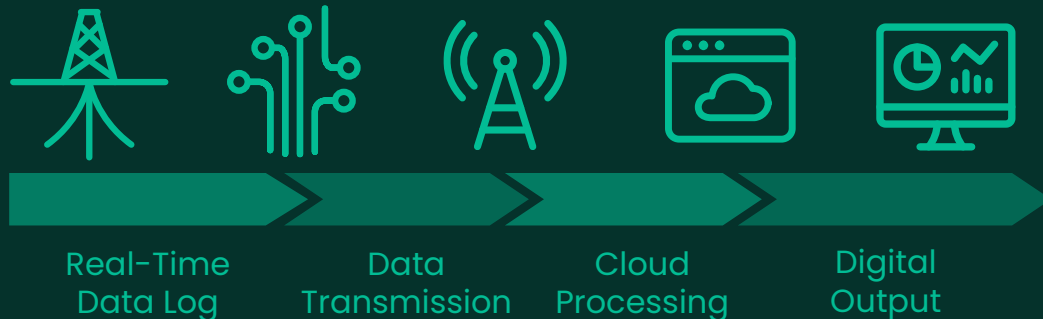


Wireless
Triaxial + Temperature
Sensor AHM

CO₂Watch™

Autonomous CO₂ Monitoring Service

- Proactive risk management for CO₂ containment and conformance
- Up to 30% lower OPEX as compared to similar measurements
- Fit-for-purpose data for regulatory reporting
- Effective protection against inaccurate claims of leakage



Featuring:

24/7 CO₂ Maps

CO₂ plume expansion mapping

CO₂ Spots

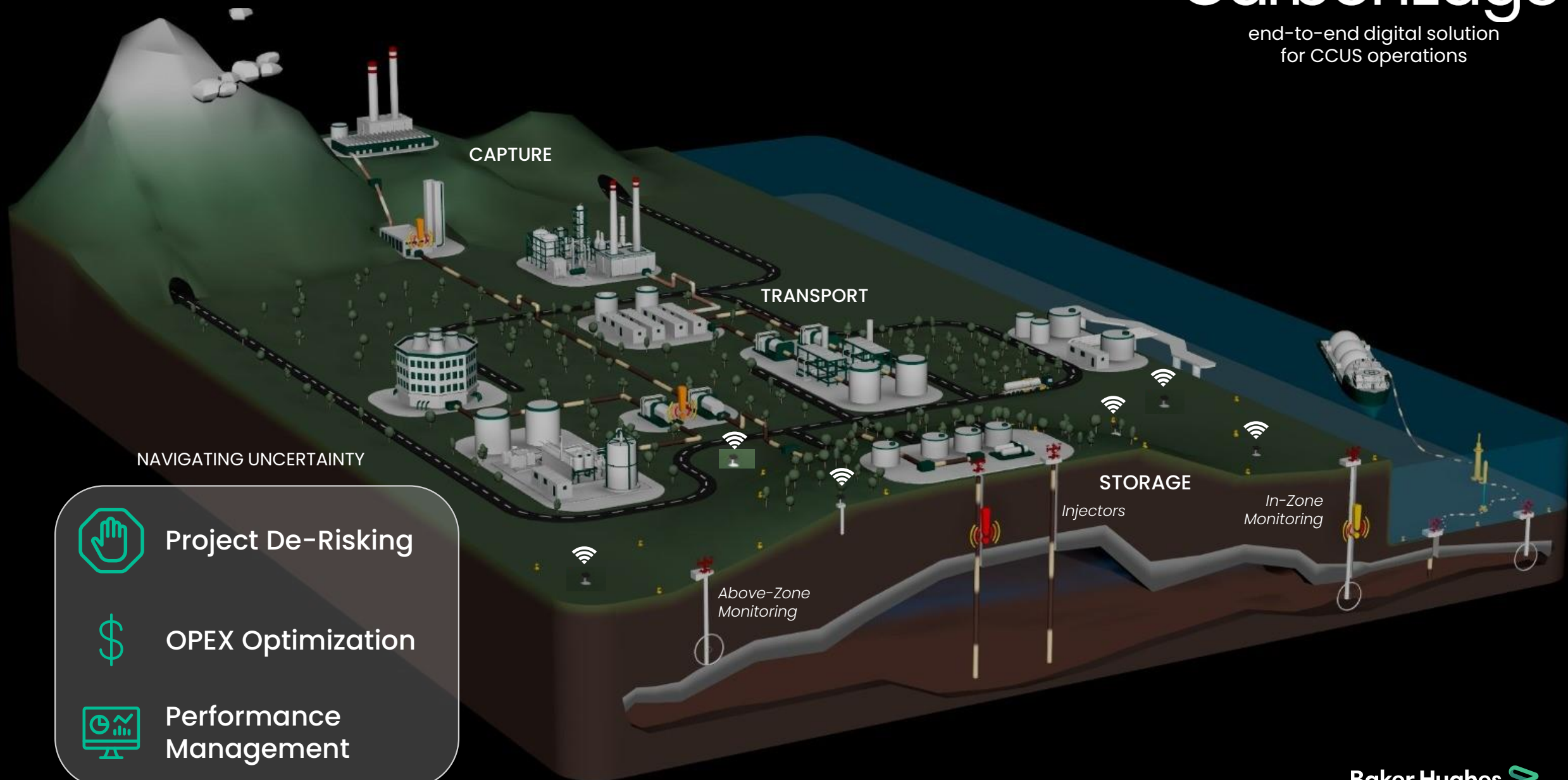
High-fidelity triggered check points

Containment

Integrity Monitoring

Soil & Groundwater

Monitoring options



NAVIGATING UNCERTAINTY



Project De-Risking



OPEX Optimization



Performance
Management



Interconnected CO₂Watch™ network

CarbonEdge™

end-to-end digital solution
for CCUS operations

How does CO₂Watch™ fit into your MMV Plan?

*It's a novel technology for plume mapping and site
integrity monitoring in-between seismic surveys*

CO₂ Capture

CO₂ Transport

Shallow Subsurface Monitoring

Featuring:

CO₂Watch™

Autonomous CO₂ Monitoring Service

Injectors

In-Zone
Monitoring

Above-Zone
Monitoring

CO₂ Storage



Interconnected CO₂Watch™ Station Network