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Strengthening Marginal and Mature Field Ecosystems: Technology, Innovation, and Collaboration

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An Uncertainty-Driven Well-Pairing Strategy to Deliver Domestic Gas Supply and Full-Field Recovery in Late-Life Gas-Condensate Assets

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Problem Statement

Supply Commitment & Demand Growth

Existing wells are **unable to sustain increased gas demand in near future**

Reservoir & Production Performance

- **Declining reservoir pressure**
- **Declining production rates**
- **Maximize recovery** within **PSC** tenure

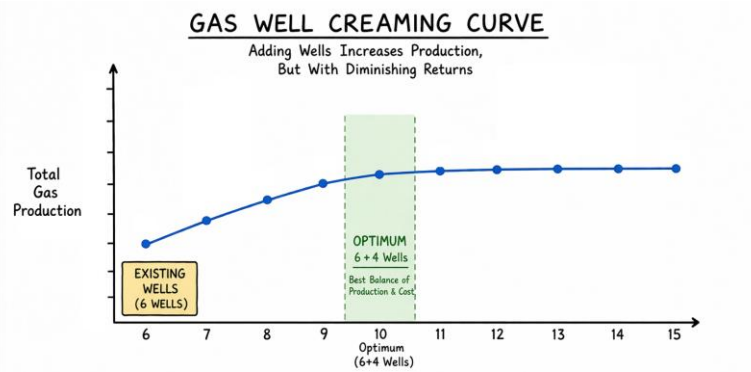
Unlock Additional Resources

- Opportunity to **unlock volumes below TDR**
- **Undeveloped reservoir interval** representing future development upside

Current Development

Operational & Rig Constraints – Phased Execution Strategy

- The infill drilling campaign has been structured to align with cross-asset operational constraints, particularly limited rig availability during the target window.
- Synergies with nearby assets executing concurrent drilling programs have resulted in a two-phase execution strategy (Phase A and B).
- Thus, it necessitates the evaluation of well sequencing and combinations to enable early gas delivery in line with demand requirements



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Key Challenges

Uncertain reservoir connectivity and compartmentalisation

Well-to-well interference

Late-life heterogeneity in remaining gas distribution

Dynamic aquifer encroachment

High capital exposure associated with four planned wells

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Methodology & Best Practices

1. Scenario Generation and Probabilistic Mapping

- **Multiple probabilistic realizations** capture the full spectrum of subsurface uncertainty and potential reservoir behavior.

- **Key uncertainties incorporated:**
  - Inter-reservoir connectivity (undeveloped reservoir focus)
  - Inter-fault block communication (undeveloped reservoir focus)
  - Aquifer size and strength

- **Deterministic cases (Low, Base, High)** are anchored to the probabilistic distribution, ensuring consistency and transparency:
  - **Base Case:** undeveloped reservoir is **isolated**; no inter-fault block or inter-reservoir connectivity.
  - **Low Case (Pessimistic):** undeveloped reservoir is **connected across fault blocks and between reservoirs** and uses **lower in-place volume**, representing worst-case production potential.
  - **High Case (Optimistic):** undeveloped reservoir is **isolated** (like Base Case) but uses **higher in-place volume**, representing favorable volumetrics.

Anchoring deterministic cases to probabilistic outcomes ensures a **robust, transparent, and risk-informed development strategy**, enabling confident decision-making under uncertainty.

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Methodology & Best Practices (Continued)

2. Multi-Criteria Well Ranking Framework for Gas Field Development

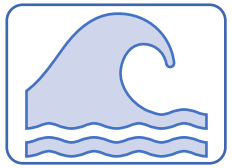
- **Qualitatively establish the priority and phasing strategy** of current development wells by integrating geological uncertainties, dynamic values, and business requirements.

Well	Geological Confidence	Resource Potential	Plateau Impact	Learning Value	Water Risk	Ranking
W1	Medium	Highest	Highest	High	Low	1
W2	Medium	High	Medium	High	Low	3
W3	High	Lowest	Lowest	Low	High	4
W4	High	Medium	High	Medium	Low	2

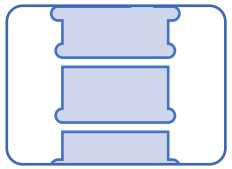
Legend:
- Low Risk / High Value / Strong Performance
- Medium Risk / Medium Value / Moderate Performance
- High Risk / Low Value / Weak Performance

W1 – Primary Value Driver
Highest EUR and strongest plateau impact; drilled near an appraisal well with proven DST flow, providing higher confidence and critical early learning to de-risk follow-on wells.

W2 – High Upside, Dependent Well
Strong resource potential but higher uncertainty; located in a separate fault block with uncertainty in inter-fault block and inter-reservoir communication—best drilled after W1 to reduce risk.



W3 – Lower Value, Higher Risk
Limited upside with elevated water breakthrough risk; lowest priority and more suitable for later-phase development.



W4 – Low Risk, Plateau Supporter
More certain reservoir with moderate upside; effective for sustaining production and balancing overall development risk.

Prioritized Well Sequencing to Optimizes Value, Reduces Risk, and Enables Learning

Methodology & Best Practices (Continued)

3. Well-Pairing and Interference Assessment

- **Dynamic simulation sensitivities** - to determine the **optimal pairing** in terms of cumulative recovery (EUR) and plateau sustainability.

Dynamic ranking under multiple well sequence combination indicates :

- **W1 consistently ranks highest**
- **W3 consistently ranks lowest**

Pairing Sensitivity Analysis shows **Scenario C maximises plateau duration**, while **Scenario A delivers the highest incremental EUR**

Scenario	Well Pairing	Incremental EUR	Plateau Duration	Key Insight
A	W1 + W2	**Highest**	Moderate	Maximises recovery potential
B	W1 + W3	Low	Low	Least favourable case
C	W1 + W4	Moderate	**Highest**	Maximises production stability

4. Phased Execution with Surveillance-Driven Learning

- Drill **highest-value pair** in Phase A to maximise early production and subsurface learning
- **Decouple W1 & W2**: Outcome from W1 to guide W2
- **Risk-based decision tree** ensures gas delivery

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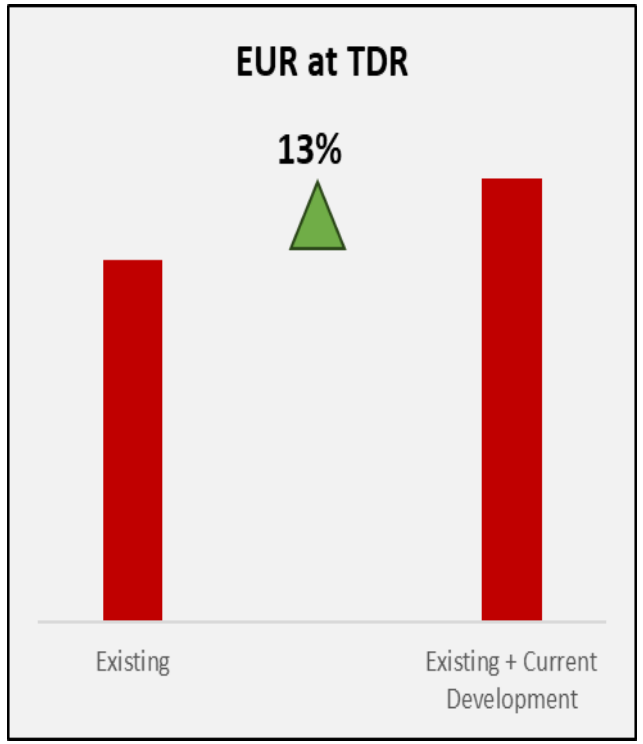
Impact of Current Development

1. **Increases gas production (up to 3X)** to meet rising demand, sustaining a **~3-year production plateau**
2. Accelerates production, **bringing TDR forward by~1 year** and **unlocks 2% of initial gas in place** earlier within the PSC timeframe.
3. **Maximises recovery** and **value** realisation **prior to PSC expiry**



Conclusion

Cross-Asset Synergy & Value-Uncertainties Driven Well Pairing

- Leveraged cross-asset collaboration to secure a constrained rig window
- Aligned drilling schedule with neighbouring asset's infill campaign
- Applied value & uncertainties management driven in well pairing to optimise sequencing within the limited window
- Maximised rig efficiency, accelerated early value delivery (Current Development – Phase A), and **supported increased gas demand**

Key Takeaway

Integrated cross-asset planning — enabled by strategic well pairing — ensured timely execution, **supply continuity**, and value delivery despite rig constraints.

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