

ENERGY & UTILITIES

AI in Gulf energy: from prediction to control

Production, maintenance and control: evidence across ten selected operating entities.



ORIGINAL MAYDEN GRAPHIC / OPERATING QUESTIONS

01 / THE EXECUTIVE VIEW

Predicting maintenance, adjusting a process and exploring scenarios confer different operational authority.

Production, maintenance and control: evidence across ten selected operating entities.

10

selected entity records

36

recorded claims

30

qualifying claim records

9

candidate research themes

01 / THE OPERATING QUESTION

Predicting maintenance, adjusting a process and exploring scenarios confer different operational authority.

02 / THE OPERATING QUESTION

Identify the observations entering the model, how the output is used, who authorises change and what constrains it. Keep source-described steps separate from proposed questions. A conceptual diagram must not imply an undisclosed connection.

03 / THE OPERATING QUESTION

The asset owner should state the decision and constraints. Engineering should show intervention history and responses to unusual conditions. Operations and finance should reconcile benefit claims with checking work, maintenance, costs and observed output. Expansion should follow that record.

AI-assisted, bounded public-source research. Purposefully selected entity scopes; no company participation, endorsement, independent assurance or population inference implied. Confidential assessment is in development.

02 / THE ARGUMENT

Four questions to carry into the business.

Read each step as a test of the operating claim. This is an analytical framework, not a measured maturity ladder.

- 1** **What is being predicted?**
Specify the equipment, event or process variable and the named asset. Predicting a maintenance need does not execute the intervention.
- 2** **What can change a physical process?**
Identify the observations entering the model, how the output is used, who authorises change and what constrains it. Keep source-described steps separate from proposed questions.
- 3** **Who selects the setpoint?**
Distinguish an engineer choosing a setpoint from a system permitted to adjust a process. Record the operating envelope, intervention owner and fallback.
- 4** **What operating evidence should survive review?**
The asset owner should state the decision and constraints. Engineering should show intervention history and responses to unusual conditions.

How to use this report

Follow the source accounts and their limits, use the diagrams to frame an evidence request, then choose one recurring workflow for deeper examination. A company name identifies an attributed account; it does not imply participation, endorsement or an enterprise rating.

03 / THE ANALYSIS

Predicting maintenance, adjusting a process and exploring scenarios confer different operational authority.

A prediction, a process adjustment and an engineer's scenario analysis are different forms of work. In energy and utilities, the point of action may affect a physical asset. The useful question is what the system can change, within which operating envelope, and who remains accountable.

Locate the asset and decision

Begin at the named plant, equipment class or engineering workflow. One facility does not establish group-wide coverage. A maintenance prediction can inform planning without executing maintenance. A scenario tool can help engineers choose setpoints while leaving authority with them.

Record the source's relationship to the operation. An issuer account and supplier account can be informative; neither is automatically independent verification of continuing use or achieved benefit.

Inspect the control boundary

Identify the observations entering the model, how the output is used, who authorises change and what constrains it. Keep source-described steps separate from proposed questions. A conceptual diagram must not imply an undisclosed connection.

Review intervention and fallback evidence within the operating envelope. This report offers a research structure; it does not assess process safety, certify a control system or replace engineering assurance.

Attributed operating examples

These separate cases were selected by the operating question, not company standing. The diagram does not imply one connected system.

Predict a maintenance need

ADNOC describes Neuron5 using sensor readings at NEB and Taweelah to predict maintenance needs. Prediction is not autonomous maintenance execution. The next research question is: Who accepts a prediction and schedules the intervention?

Source: [ADNOC Deploys Pioneering AI-Enabled Process Optimization Technology](#).

Adjust a process

Aramco describes AI/ML automatically adjusting the oil-stabilisation process. Named site; group-wide control authority is not established. The next research question is: What operating envelope, intervention and fallback have been tested?

Source: [AI and Big Data](#).

Compare operating scenarios

The supplier account describes a model through which engineers test scenarios and choose setpoints. Supplier account of an initial field test; continuing routine use unresolved. The next research question is: Which decisions remained with engineers after the field test?

Source: [Geminus AI, Bapco Energies and SLB to Deploy Physics-Native AI to Optimize Bahrain's Energy Infrastructure](#).

EXHIBIT 01 / ATTRIBUTED ACCOUNT

Prediction, automatic adjustment and scenario testing are not equivalent

Different decision arrangements in selected source accounts; no ordering implies that more autonomy is better.

01	Predict a maintenance need Equipment at named facilities	ADNOC describes Neuron5 using sensor readings at NEB and Taweelah to predict maintenance needs. Boundary: Prediction is not autonomous maintenance execution. Ask: Who accepts a prediction and schedules the intervention?
02	Adjust a process Oil stabilisation at Abqaiq	Aramco describes AI/ML automatically adjusting the oil-stabilisation process. Boundary: Named site; group-wide control authority is not established. Ask: What operating envelope, intervention and fallback have been tested?
03	Compare operating scenarios Bapco upstream field test	The supplier account describes a model through which engineers test scenarios and choose setpoints. Boundary: Account describes an initial field test; continuing routine use is unresolved. Ask: Which decisions remained with engineers after the field test?

Company and supplier accounts are attributed descriptions, not independent assurance. Each row describes a different operating task; no company comparison or rating is intended.

Unit: Separate source-described operating cases. Research cutoff: 2026-10-10.

Sources: ADNOC01 / ARAMCO02 / BAPCOU02

03 / THE ANALYSIS

Build a complete benefit account

Maintenance prediction might be evaluated against intervention decisions and downtime; process adjustment against output, quality, energy and constraints; engineering support against accepted decisions and verification time. Record baseline, operating conditions and period before combining results.

A technology label or projected target does not establish benefit. The productivity J-curve literature describes how complementary investment can delay measured gains; it does not prove that an AI investment will repay its costs. [The Productivity J-Curve: How Intangibles Complement General Purpose Technologies](#).

Decide what justifies the next boundary

The asset owner should state the decision and constraints. Engineering should show intervention history and responses to unusual conditions. Operations and finance should reconcile benefit claims with checking work, maintenance, costs and observed output. Expansion should follow that record.

For the eventual private study, source publication date and confirmation of continuing use must be separate fields. A historic implementation remains

useful, while a current-operation claim needs dated evidence of its own.

Leadership agenda

Asset owner: specify the site, operating envelope and authority.

Engineering: inspect an actual intervention and tested fallback.

Operations and finance: reconcile output, quality, energy, downtime and full delivery cost.

Scope and reading boundaries

The source corpus contains 80 purposefully selected entity records across eight sectors, ten per sector. Headquarters markets are Saudi Arabia, the UAE, Qatar, Kuwait and Bahrain; Oman is outside this edition. Groups, subsidiaries and specific operations have different scopes. This is not a representative sample. Source cutoff: 10 October 2026; publication edition: 11 October 2026.

Source extraction and challenge were AI-assisted, not independent human assurance or verification of current operations. Source visibility is not adoption prevalence. Unreported details are unresolved questions, not absent capabilities. Named examples imply neither participation, endorsement, confidential access nor a Mayden client relationship.

EXHIBIT 02 / CONCEPTUAL TOOL

Follow a process change through its operating envelope

Mayden analytical framework / questions to test, not measured maturity stages



Mayden conceptual framework. These questions specify evidence to request; they do not assert that a named organisation has or lacks the practice. This is not a validated instrument or an observed causal sequence.

Unit: Conceptual decision or evidence request. Research cutoff: 2026-10-10.

EXHIBIT 03 / CONCEPTUAL TOOL

A benefit account must include what the plant had to absorb

Mayden analytical framework / questions to test, not measured maturity stages

Production and quality	Comparable output, accepted product, yield and quality exceptions.
Reliability and energy	Downtime, maintenance, energy use and safety-related constraints.
Cost of the change	Integration, verification, operator effort and continuing maintenance.
Attribution	State the comparator, concurrent changes and uncertainty in any benefit estimate.

Mayden conceptual framework. These questions specify evidence to request; they do not assert that a named organisation has or lacks the practice. This is not a validated instrument or an observed causal sequence.

Unit: Conceptual decision or evidence request. Research cutoff: 2026-10-10.

04 / SOURCE ACCOUNT

Predict a maintenance need

Operating object: Equipment at named facilities

ADNOC01 / ATTRIBUTED ACCOUNT

Neuron5 monitors equipment at NEB and Taweelah using sensor readings to predict maintenance needs.

Scope. ADNOC group; asset-level claims confined to named operating subsidiaries.

Source date. 2024-08-27. Publication date does not confirm continuing operation.

Locator. Release paragraphs1-5

ADNOC Deploys Pioneering AI-Enabled Process Optimization Technology

Boundary and next question

Prediction is not autonomous maintenance execution.

Who accepts a prediction and schedules the intervention?

04 / SOURCE ACCOUNT

Adjust a process

Operating object: Oil stabilisation at Abqaiq

ARAMCO02 / ATTRIBUTED ACCOUNT

At Abqaiq, AI/ML automatically adjusts the oil-stabilization process.

Scope. Saudi Aramco group; each claim restricted to named site or function.

Source date. Undated. Publication date does not confirm continuing operation.

Locator. Abqaiq Plants

AI and Big Data

Boundary and next question

Named site; group-wide control authority is not established.

What operating envelope, intervention and fallback have been tested?

04 / SOURCE ACCOUNT

Compare operating scenarios

Operating object: Bapco upstream field test

BAPCOU02 / ATTRIBUTED ACCOUNT

The supplier account describes an initial field test in which engineers test scenarios and choose network setpoints.

Scope. Upstream subsidiary of Bapco Energies (formerly Tatweer); group announcements included only where upstream scope explicit.

Source date. 2026-04-14. Publication date does not confirm continuing operation.

Locator. Engineering what-if paragraph

Geminus AI, Bapco Energies and SLB to Deploy Physics-Native AI to Optimize Bahrain's Energy Infrastructure

Boundary and next question

Account describes an initial field test; continuing routine use is unresolved.

Which decisions remained with engineers after the field test?

05 / THE LEADERSHIP AGENDA

Ask for evidence that changes the decision.

01 / Asset owner

Evidence to request: specify the site, operating envelope and authority.

02 / Engineering

Evidence to request: inspect an actual intervention and tested fallback.

03 / Operations and finance

Evidence to request: reconcile output, quality, energy, downtime and full delivery cost.

Method and boundaries

This is an AI-assisted, bounded public-source review of a purposefully selected corpus. It publishes sector research and attributed operating examples, without current individual-company scores, ranks or coded profiles. Source accounts establish what a publisher reports; they do not independently assure operations. The working definition and nine candidate themes require empirical validation.

Recorded source dates run from 2023-03-08 to 2026-07-06. 8 of 30 qualifying claim records have no recorded publication date. This is not a common observation window or confirmation of continuing use.

The confidential opt-in diagnostic remains in development. Independent human review, instrument testing, participant data collection and comparable benchmark norms are future gates. Prior named public-evidence comparisons remain explicitly historical; changes in publication format do not establish changes inside companies.

[Inspect the method](#) / [Explore sector research](#)

06 / SOURCES & PROVENANCE

Follow the argument back to its source.

The following sources support the cited analysis or attributed examples. Inclusion is not independent verification, company endorsement or assurance. Research cutoff: 10 October 2026. Publication revision: 11 October 2026.

S01 / ADNOC Deploys Pioneering AI-Enabled Process Optimization Technology

ADNOC / 2024-08-27 / corporate-release

Locator: Release paragraphs1-5

[Open source](#)

S02 / AI and Big Data

Aramco / Undated / corporate-operating-page

Locator: Abqaiq Plants

[Open source](#)

S03 / Geminus AI, Bapco Energies and SLB to Deploy Physics-Native AI to Optimize Bahrain's Energy Infrastructure

Geminus AI release carried by Automation.com / 2026-04-14 / company-issued-syndication

Locator: Engineering what-if paragraph

[Open source](#)

S04 / The Productivity J-Curve: How Intangibles Complement General Purpose Technologies

NBER; American Economic Journal: Macroeconomics 13(1), 2021 / 2021-01 / peer-reviewed theory and empirical analysis

Locator: Economic model and historical empirical analysis

[Open source](#)

About Mayden

Mayden connects senior judgement, research and engineering to help organisations turn strategic choices into working capabilities. The AI Native Index is a research programme on recurring work, decisions and accountability.

[Explore the Index](#) / [Submit a correction](#)