

Effective Phase-Gate project management

Optimizing upstream energy projects through
effective Phase-Gate project management

Process development guidelines



Introduction

In the dynamic and capital-intensive upstream energy sector, the ability to systematically assess, prioritize, and execute projects is paramount.

A structured Phase-Gate project management process offers a disciplined framework that not only guides projects from initial exploration to decommissioning but also aligns project execution with corporate strategy.

The evolving energy context: Navigating the energy transition

Today's energy landscape is undergoing a historic transformation. Driven by the global imperative to reduce carbon emissions, the industry is experiencing an accelerated energy transition. Traditional upstream energy companies are increasingly diversifying their portfolios to include renewable energy projects, such as wind, solar, and bioenergy, while still managing the maturation of conventional oil and gas assets.

In this evolving context, the Phase-Gate process proves invaluable as it offers a flexible, robust project governance framework that is applicable across different energy domains.

Whether it is the development of new hydrocarbon reserves, renewable energy assets, or Carbon Capture & Storage (CC&S) projects, a well-structured Phase-Gate methodology can help companies manage risk, optimize investments, and align projects with long-term strategic and sustainability goals.

In this guide I delve into the Phase-Gate methodology, outlining its benefits, detailing the generic steps for its implementation, and illustrating how energy companies - whether focused on conventional upstream supply or renewable projects - can leverage it to maximize returns and maintain operational excellence.

Adrian

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Principal, Energy Sector



Summary

Key benefits of a Phase-Gate corporate governance process

Implementing a well-structured Phase-Gate process can transform project management across the energy sector. Key benefits include:



Improved efficiency

By standardizing project phases and reviews, companies can streamline processes, reduce delays, and ensure that each project component is executed with precision.



Consistent decision making

The use of predetermined criteria at each decision gate minimizes subjective judgments, leading to more consistent and data-driven decisions.



Enhanced quality assurance

Regular gate reviews and cross-functional evaluations ensure that projects adhere to high standards of quality, safety, and compliance.



Strategic alignment

Linking corporate strategy to project execution ensures that every initiative contributes to the broader goals of the organization, balancing short-term wins with long-term objectives, including sustainability targets.



Risk mitigation

Systematic reviews at each phase help identify and address potential risks early, reducing the likelihood of costly project failures.



Optimal resource allocation

By continuously evaluating projects against defined metrics and financial models, companies can prioritize investments that offer the best return, ensuring efficient use of limited corporate resources.



Generic steps for implementing a Phase-Gate process

Starting point

The journey toward a mature Phase-Gate process begins with careful planning and collaboration across departments.



1) DEFINE YOUR OBJECTIVES AND SCOPE

Set clear **goals**

Establish what the organization aims to achieve with the Phase-Gate process - be it enhanced efficiency, improved risk management, better strategic alignment, or support for the energy transition.

Scope **identification**

Define which types of projects and portfolios will be governed by the process, spanning both conventional upstream initiatives and renewable energy projects.



2) ENGAGE YOUR STAKEHOLDERS

Cross-functional **involvement**

Bring together representatives from geoscience, engineering, finance, HSE (Health, Safety, and Environment), and sustainability teams to ensure a holistic view.

Establish governance **structures**

Form a steering committee or Project Management Office (PMO) to oversee the process and ensure accountability.



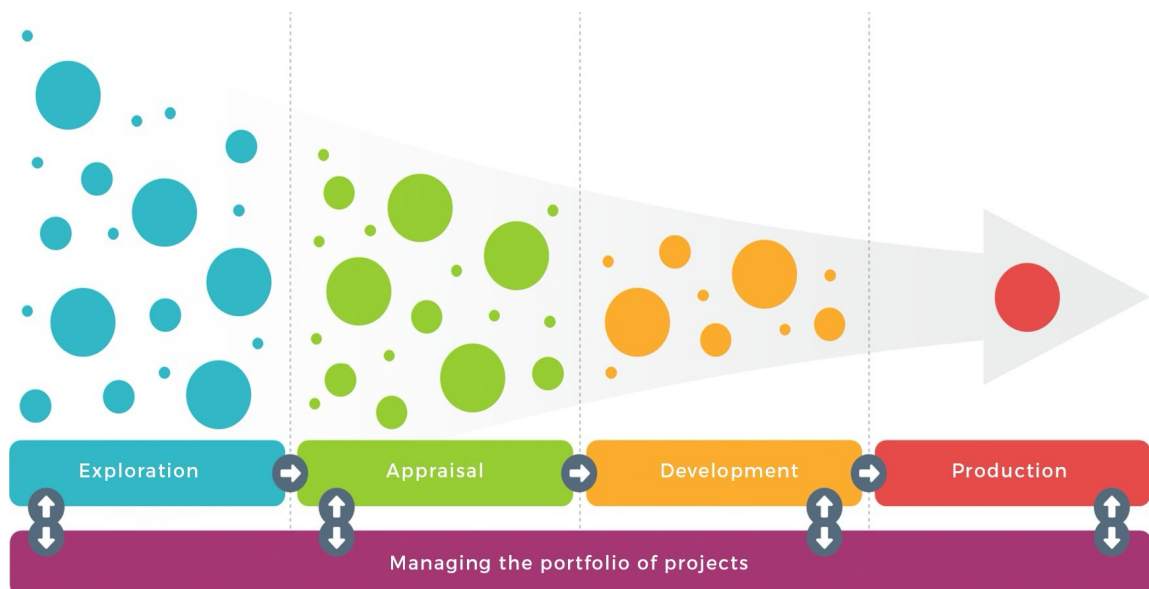
3) DEFINE PROJECT LIFECYCLE PHASES & DECISION GATES

Lifecycle **phases**

Outline the distinct phases - e.g., exploration, appraisal, development, production, and decommissioning - and establish the criteria for successful completion of each phase.

Decision **gates**

Determine what constitutes a successful transition from one phase to the next by setting clear criteria and deliverables at each gate.



Your phases and gates are the natural points where key go/no-go decisions get made (i.e. making an investment). They stay consistent over time, so it is important to ensure definitions are broad enough.



4) DEVELOP APPROPRIATE METRICS AND CRITERIA

Quantitative and qualitative **measures**

Define key performance indicators (KPIs) for project progress, technical feasibility, financial viability, risk management, and environmental impact.

Work-stream specific **criteria**

Tailor criteria for different disciplines, ensuring that each work-stream - from reservoir evaluation to renewable technology assessments - has specific, measurable targets.



5) IMPLEMENT TOOLS AND PROCESSES

Project management **software**

Invest in digital tools that support documentation, tracking, and reporting of project metrics.

Training and **communication**

Ensure all team members understand the process through comprehensive training and regular updates.



Software dashboards provide better visibility and transparency of all your projects and resources, helping you interrogate, monitor, and manage data in the way that suits your organization.



6) MONITOR, REVIEW, AND ADJUST

Regular **reviews**

Hold periodic review meetings at each decision gate to assess progress against predefined criteria.

Continuous **improvement**

Use lessons learned to refine and improve the Phase-Gate process over time.

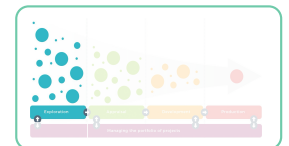
The energy project lifecycle

A dual-approach framework

The Phase-Gate process typically follows an industry-standard maturation approach for the upstream energy sector, comprising five key project lifecycle phases, which can be tailored to development of hydrocarbon resources, renewable energy, and CC&S projects.



PHASE 1: EXPLORATION



Objective

Identify potential opportunities - be it hydrocarbon resources maturation, suitable sites for renewable installations, or CC&S potential - through comprehensive surveys and feasibility studies.

Key deliverables

Initial energy Prospective Resources assessments, feasibility studies, and strategic alignment reviews.

Gate criteria

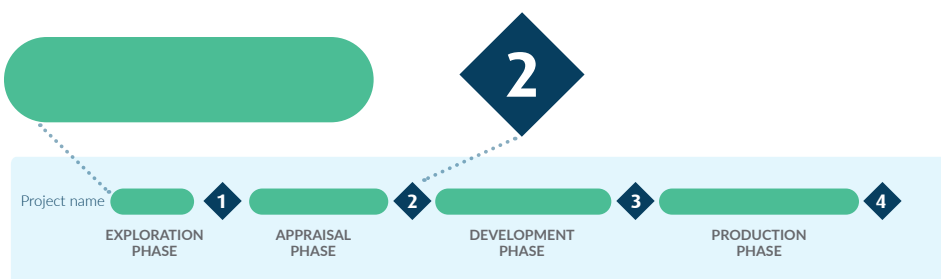
Adequacy of preliminary data, initial economic viability, environmental impact considerations, and strategic fit with corporate objectives.

PHASE

All the activities that need to be completed to meet the requirements of the next gate

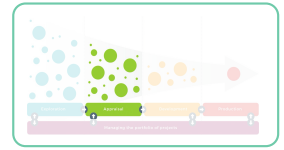
GATE

The pre-determined check point in the process





PHASE 2: APPRAISAL



Objective

Post discovery, further evaluation of Contingent Resources including the commercial and technical viability of identified development opportunities.

Key deliverables

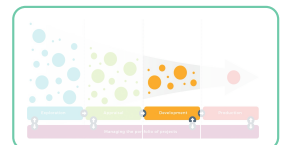
Further appraisal data acquisition and assessment, pilot project results, refined resource uncertainty estimates, and preliminary technology assessments for renewables.

Gate criteria

Robustness of data, clear delineation of opportunity potential, and initial economic models supporting further investment.



PHASE 3: DEVELOPMENT



Objective

Plan and design the necessary infrastructure and processes to bring the project to fruition.

Key deliverables

Detailed engineering designs, regulatory approvals, environmental impact assessments, and final investment decisions.

Gate criteria

Technical feasibility, confirmed economic models, comprehensive risk assessments, and compliance with regulatory and sustainability standards.





PHASE 4: PRODUCTION



Objective

Efficiently operate facilities to maximise output, whether it's hydrocarbon extraction, renewable energy generation, or CC&S.

Key deliverables

Operational performance data, safety and environmental compliance reports, and optimisation strategies

Gate criteria

Achievement of operational targets, sustained efficiency, and adherence to safety, environmental, and sustainability benchmarks.



DECOMMISSIONING



Objective

Safely and efficiently shut down or repurpose facilities, minimizing environmental impact and maximizing residual value.

Key deliverables

Decommissioning or repowering plans, cost estimates, and environmental restoration strategies.

Gate criteria

Regulatory compliance, effective risk mitigation, and availability of funds for closure or transition to new energy solutions.



PORTFOLIO MANAGEMENT



Integrating Portfolio Management with the Phase-Gate process

While the Phase-Gate process focuses on the lifecycle management of individual projects, effective portfolio management is essential for overseeing an entire pipeline of opportunities.

In today's energy sector - where traditional and renewable projects may coexist - portfolio management activities are designed to monitor and control the opportunity pipeline to maximize returns within available corporate resource constraints.

Key aspects of Portfolio Management

Implementing a portfolio management approach helps connect project, process, and stakeholder management efforts. Key benefits include:



Opportunity pipeline **monitoring**

Visibility: Develop a centralized view of all ongoing and potential projects to track progress, risk, and resource allocation.

Prioritization: Continuously assess projects based on strategic fit, risk profiles, and potential returns to ensure that the most promising opportunities are prioritized.



Defined project **metrics**

Standardized metrics: Implement KPIs that cover financial performance, technical progress, safety and environmental compliance, and schedule adherence.

Benchmarking: Use historical data and industry benchmarks to evaluate the performance of each project phase.

✓ Standard financial models

Economic evaluation: Use models such as discounted cash flow (DCF), net present value (NPV), and internal rate of return (IRR) to assess the financial viability of projects.

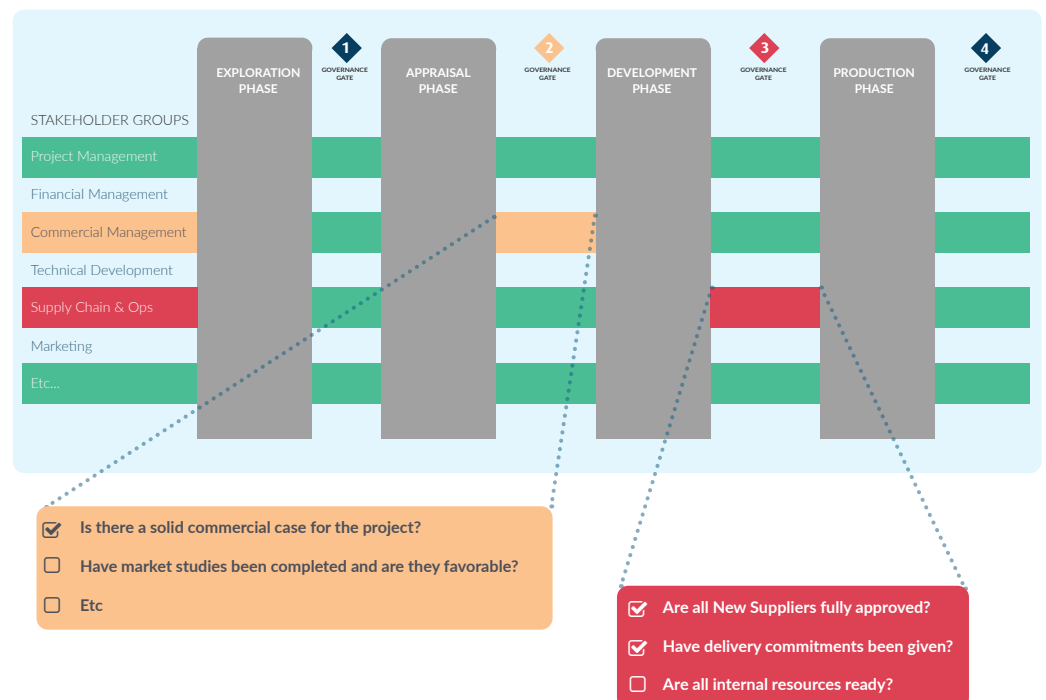
Scenario analysis: Conduct sensitivity and scenario analyses to understand the impact of variable market conditions on project economics.

✓ Project pipeline gate review governance meetings

Regular reviews: Schedule periodic meetings to review each project's performance at the decision gates, ensuring transparency and accountability.

Cross-functional Input: Involve key stakeholders from various disciplines to provide a comprehensive assessment.

Resource reallocation: Make decisions on resource reallocation based on the performance data and strategic priorities, ensuring that capital and operational resources are optimally deployed.



Gates at the end of each phase include all the key criteria that the relevant stakeholder group(s) need to answer before a project can progress to the next delivery phase. Typically criteria are standardized within each phase (e.g. exploration) so that portfolio and process adherence / completion metrics are consistent.

Understanding decision gates and their criteria

At the core of the Phase-Gate process are decision gates - the critical review points that determine whether a project can progress to the next phase. These gates serve several key purposes:

Risk assessment

Evaluate whether identified risks have been sufficiently mitigated.

Resource allocation

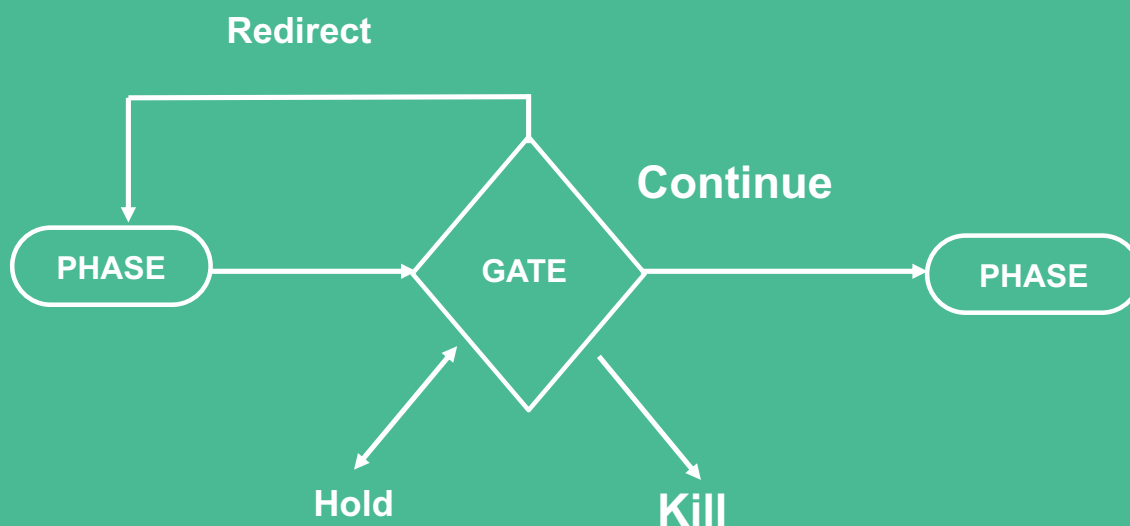
Confirm that the project aligns with current corporate priorities and that resources are available.

Performance verification

Assess whether the project has met all predefined criteria and milestones.

Strategic fit

Ensure that the project continues to align with long-term strategic and sustainability goals.



At the end of each development phase, you hold a gate review to determine if the project should be:

- **Continued:** Go to the next stage
- **Redirected:** Go back to the previous stage
- **Held:** Put the project on hold
- **Killed:** End the project

Typical criteria to apply to your decision gates

While criteria can vary depending on project specifics, common elements include:

Technical feasibility

Verification of geological, engineering, operational, or technological assumptions.

Financial viability

Assessment using standard financial models (e.g., net present value, internal rate of return, payback period) to ensure robust economic justification.

Regulatory and environmental compliance

Confirmation that all regulatory, environmental, and sustainability standards have been addressed

Risk management

A comprehensive review of identified risks and the effectiveness of mitigation strategies.

Market and strategic considerations

Evaluation of market conditions, commodity prices, and alignment with corporate strategic objectives

Project plan example

A typical project plan could include the following:

- **Phases/Stages:** A period of time defined by the total duration of its tasks or key dates in the plan (e.g. milestones).
- **Minor Phases/Stages:** Interim versions of above (potentially with less requirements/risk/investment etc).
- **Gates:** Your decision/quality assurance points.
- **Criteria:** The business requirements of the Gate that need to be met in order for the project to continue.

TYPE	EVENT NAME	PROGRESS	PLANNED END	ACTUAL COMPLETED DATE	DURATION	OWNER(S)	EVENT RISK
Stage	Exploration	Done	28 Jun 2004	25 Oct '23	1609 days	Adrian Starkey	Complete
Stage	Appraisal	Done	27 Jun 2009	25 Oct '23	1825 days	Adrian Starkey	Complete
Minor Stage	Stage 2.1: Validate whether the Discovery has potential for commercial viability	Done	28 Jun 2005	27 Oct '23	365 days	Adrian Starkey	Complete
Minor Stage	Stage 2.2 - Further clarify the Discovery's characteristics	Done	28 Jun 2006	27 Oct '23	365 days	Adrian Starkey	Complete
Minor Stage	Stage 2.3 - Await development planning prioritization confirmation	Done	28 Jun 2007	27 Oct '23	365 days	Laura Erickson	Complete
Minor Stage	Stage 2.4 - Conduct detailed development planning	Done	27 Jun 2009	27 Oct '23	730 days	Mark Ilman	Complete
Gate	Gate 2 - Commit to Development Plan Execution?	Passed	27 Jun 2009	05 Sep '23		Isla Input User	Complete
Gate Criteria	Has formal commitment to proceed with project execution been received from relevant managing entity and JV partners' officers?	Met	27 Jun 2009	30 Oct '23			Complete
Gate Criteria	Has the commercial viability of the Field Development Plan been assessed by the managing entity and JV Partners?	Met	27 Jun 2009	30 Oct '23			Complete
Stage	Development	In Progr...	26 Jun 2012		1095 days	Adrian Starkey	Off track
Stage	Production	Future	21 Jun 2032		7300 days	Adrian Starkey	Not Set
Stage	Decommissioning	Future	20 Jun 2036		1460 days	Adrian Starkey	Not Set

Work-stream specific criteria examples

Different disciplines within energy projects will have tailored criteria at each decision gate. For example:

Geoscience and reservoir engineering:

- Accuracy and resolution of seismic and geological data.
- Confidence in resources or renewable potential estimates.
- Evaluation of drilling or site development risks.

Engineering and infrastructure:

- Technical feasibility of extraction, renewable integration, or infrastructure development.
- Reliability and scalability of designs.
- Safety, environmental, and sustainability considerations in engineering plans.

Finance and commercial:

- Sensitivity analyses and financial stress tests.
- Clarity of funding mechanisms and investment timelines.
- Alignment of project economics with corporate return and sustainability targets.

Health, Safety, Environment (HSE) and sustainability:

- Comprehensive environmental and sustainability impact assessments.
- Health and safety risk evaluations.
- Plans for community engagement, regulatory compliance, and achieving net-zero targets.

Gate governance progress example

Gate: Gate 4 - Confirm Cessation Of Production (CoP)?

Lifecycle state Active	Project Health On track	Gate Criteria 33% Met	Development Concept Tension Leg Platform	Gate progress 	Gate Date 21 Jun 203
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Gate Criteria

EVENT NAME	PROGRESS	STATUS	OWNERS	FILE
Technical	1 of 1 completed.			
Have all technical issues been resolved?	Yes	Complete	Jennifer Renshaw, Lee-Anne Griessen	
Legal, Regulatory & Quality	2 of 2 completed.			
Is the EH&S plan ready?	Yes	Complete	Jennifer Renshaw	
Is patent on track for being granted?	Yes	Complete	Ken Jones	
Commercial	1 of 5 completed.			
Has the HIPAA compliance plan been agreed?	Yes	☐ Not Set	Laura Erickson, Mark Illman, Amy .	
Have unmet needs been confirmed?	Ready	☐ Not Set	Jennifer Renshaw, Lee-Anne Griessen	
Can unmet needs be sufficiently met?	Ready	☐ Not Set	Peter Hoyland, Kim Lorman, Lee-Anne Griessen	

The strategic impact

By integrating portfolio management with a structured Phase-Gate process, energy companies can achieve:

Key benefits:



Optimized capital allocation

Ensuring that investment capital is channelled towards projects with the highest strategic and economic value.



Enhanced decision-making

Data-driven insights from project metrics and financial models support more informed, objective decisions.



Balancing of risk and return

Continuous monitoring of the portfolio helps balance high-risk, high-return opportunities with more stable, lower-risk projects.



Alignment with corporate strategy and sustainability

The ability to dynamically adjust the project pipeline ensures that the overall portfolio remains aligned with evolving corporate strategies and environmental goals.

Conclusion

The integration of a Phase-Gate project management process with robust Portfolio Management practices represents a significant strategic advantage for upstream energy companies navigating the complexities of the current energy transition.

By breaking down the project lifecycle into clearly defined phases - *whether managing conventional upstream assets, developing renewable energy, or CC&S projects* - and establishing rigorous decision gates, organizations can drive greater efficiency, consistency, and quality assurance in project execution.

Furthermore, aligning these processes with standard financial models and continuous performance reviews ensures that corporate resources are deployed in the most effective manner.

In a sector where uncertainty, high capital costs, and evolving sustainability requirements are the norms, a disciplined Phase-Gate approach not only mitigates risks but also strengthens the connection between corporate strategy, environmental objectives, and project delivery.

By embracing these structured processes, energy companies can confidently navigate the multifaceted challenges of today's energy landscape, maximizing returns on investment while contributing to a more sustainable and resilient energy future.

Bubble®

Software

Bubble® is a leading provider of Project and Portfolio Management software.

Its cloud-based solutions help organizations to select the right projects, execute them reliably, and continuously increase their productivity.



iRIS PPM has been created especially for organizations involved in the assessment or development of commercial upstream energy projects.

It provides the tools to quantify risks and manage uncertainties by delivering new efficiencies and value throughout the project maturation process.

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