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PROFESSIONAL PROJECT CONCEPT NOTE
CONCEPTUAL PETROLEUM FIELD DEVELOPMENT FRAMEWORK

GUINEA-BISSAU- July 2026

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CONCEPTUAL STUDY – FOR STRATEGIC, TECHNICAL AND COMMERCIAL DISCUSSION ONLY

This document is a conceptual project development framework. It does not constitute a petroleum reserve report, certified resource assessment, feasibility study, investment recommendation, development licence, production-sharing agreement, environmental approval, or final engineering design. All geological, reservoir, production, cost, schedule and economic parameters are indicative assumptions requiring validation through appropriate geological, geophysical, engineering, regulatory and commercial work.

1. EXECUTIVE SUMMARY

This Professional Project Concept Note presents an integrated conceptual framework for the evaluation and potential development of an onshore petroleum opportunity in Guinea-Bissau.
The purpose of the concept is to demonstrate how a petroleum project may be progressively developed from early geological evaluation and exploration through appraisal, field development planning, infrastructure construction and eventual production.
The development philosophy is based on a staged and risk-controlled approach:
CONCEPT EVALUATION → EXPLORATION → DISCOVERY → APPRAISAL → FIELD DEVELOPMENT PLANNING → FEED → FINAL INVESTMENT DECISION → EPC / CONSTRUCTION → FIRST OIL → PRODUCTION OPTIMIZATION
The central principle is to avoid committing major capital before the principal geological, technical, regulatory and commercial uncertainties have been progressively reduced.
The conceptual framework integrates:
• geological and geophysical evaluation; • exploration and appraisal drilling; • reservoir characterization; • production well planning; • central processing facilities; • produced water and associated gas management; • crude oil storage; • export infrastructure; • project financing and capital allocation; • health, safety and environmental management; • local content and national participation; • government and stakeholder engagement.

The concept is intended to provide a common framework for discussions between national authorities, Guinea-Bissau's petroleum stakeholders, international oil companies, technical service providers, infrastructure partners, financial institutions and strategic investors.

The project concept should not be interpreted as a claim that commercial petroleum reserves have already been established. Rather, it defines a structured methodology through which a potentially commercial petroleum development may be investigated, validated and, subject to successful results, developed.

2. PROJECT CONCEPT

2.1 Development Objective
The principal objective is to establish a technically disciplined and commercially scalable framework for the potential development of an onshore petroleum resource in Guinea-Bissau.
The project concept is based on a phased development model in which:

1. regional geological uncertainty is reduced;
2. prospective structures are identified;
3. exploration drilling tests the petroleum system;
4. successful discoveries are appraised;
5. reservoir performance is characterized;
6. a Field Development Plan is prepared;
7. infrastructure is engineered and constructed;
8. production begins through a controlled development programme.

The concept is designed to provide flexibility. The ultimate scale of development should be determined by the results of exploration, appraisal drilling, reservoir modelling and economic evaluation.

2.2 Development Philosophy

The project should be developed according to five fundamental principles:

1. DATA BEFORE CAPITAL

Major capital commitments should follow the progressive validation of geological and technical assumptions.

2. PHASED DEVELOPMENT

The project should be divided into decision gates, with each stage requiring a technical and commercial review before the next phase is authorized.

3. EARLY VALUE CREATION

Where technically and commercially justified, early production may be established through a pilot development before full-field expansion.

4. LONG-TERM RESOURCE OPTIMIZATION

Initial production should not unnecessarily compromise long-term recovery.

5. NATIONAL VALUE CREATION

The development should seek to maximize employment, technical capability, local procurement, infrastructure development and government participation.

3. GEOLOGICAL AND EXPLORATION FRAMEWORK

3.1 Exploration Objective

The initial exploration objective is to determine whether the selected area contains:

• a sufficiently thick sedimentary section; • mature or potentially mature source rocks; • viable reservoir formations; • effective seals; • structural or stratigraphic traps; • a petroleum migration and charge system; • hydrocarbons in commercial quantities.

The geological model used in this concept is conceptual and requires validation through regional geological work, geophysical surveys, exploration drilling and laboratory analysis.

3.2 Recommended Exploration Sequence

The recommended exploration programme is:

PHASE 1 – REGIONAL DATA REVIEW

Review of:

• existing geological maps; • historical exploration data; • previous wells and boreholes; • available seismic data; • gravity and magnetic data; • satellite and remote-sensing information; • regional petroleum system studies.

PHASE 2 – REGIONAL GEOPHYSICS

Potential work may include:

• gravity surveys; • aeromagnetic surveys; • remote sensing; • regional geochemical screening.

PHASE 3 – SEISMIC ACQUISITION

Depending on the geological setting, the programme may include:

• regional 2D seismic; • prospect-focused 2D seismic; • 3D seismic over selected prospects.

PHASE 4 – PROSPECT GENERATION

The data should be interpreted to identify:

• structural closures; • fault-related traps; • stratigraphic traps; • potential reservoir intervals; • source-rock distribution; • seal integrity.

PHASE 5 – EXPLORATION DRILLING

The first exploration well should be selected on the basis of the best-supported geological prospect rather than simply the geographical centre of the licence or study area.

4. EXPLORATION AND APPRAISAL DRILLING STRATEGY

4.1 Exploration Well

The first exploration well should be designed to answer the maximum number of critical geological questions while maintaining appropriate technical and economic discipline.

The exploration well may be designed to evaluate:

• stratigraphy; • reservoir presence; • reservoir quality; • hydrocarbon presence; • pressure regime; • fluid properties; • source and seal relationships.

The final target depth, casing programme, mud programme and well design should be established only after the geological and seismic interpretation has been completed.

4.2 Indicative Well Delivery

For a conceptual onshore exploration well in the approximately 2,500–3,000 m TVD range, the indicative drilling programme may include:
• well planning and engineering: approximately 2–3 months; • drilling: approximately 60–120 days; • logging and formation evaluation: approximately 5–10 days; • completion or suspension: approximately 10–20 days; • formation testing: approximately 15–30 days.
The actual duration will depend on:
• geological conditions; • well depth; • drilling performance; • formation pressure; • lost circulation; • well-control events; • equipment availability; • logistics; • weather; • regulatory requirements.

4.3 Appraisal Programme

A successful exploration well should not automatically be interpreted as proving the commerciality of an entire field.

Appraisal drilling may be required to determine:
• lateral reservoir continuity; • hydrocarbon-water contacts; • reservoir thickness; • pressure distribution; • fluid contacts; • permeability distribution; • production performance.
The appraisal programme should be designed around the geological uncertainties identified by the exploration well.

5. CONCEPTUAL RESERVOIR DEVELOPMENT

The conceptual model assumes a conventional sandstone-dominated reservoir system. The following parameters are illustrative and require validation:

• reservoir depth: approximately 2,200–2,800 m TVD; • net pay: approximately 18–42 m; • porosity: approximately 20–24%; • permeability: approximately 150–600 mD; • initial reservoir pressure: approximately 250–330 bar; • reservoir temperature: approximately 75–105°C.

The conceptual model may include aquifer support and natural pressure maintenance. However, the actual drive mechanism must be established through:
• pressure data; • core analysis; • fluid samples; • well testing; • material balance; • static geological modelling; • dynamic reservoir simulation.

6. PRODUCTION DEVELOPMENT CONCEPT

6.1 Development Philosophy

The proposed production concept follows a staged model:
Stage 1 – Pilot Production
A limited number of wells are used to establish:
• production performance; • reservoir pressure behaviour; • water cut; • fluid properties; • facility performance.
Stage 2 – Development Expansion
Additional wells are drilled as the reservoir model becomes more reliable.
Stage 3 – Plateau Production
Production is expanded toward the technically sustainable plateau.
Stage 4 – Optimization
The development may subsequently include:
• infill drilling; • artificial lift; • water injection; • gas management; • enhanced recovery methods where technically justified.

6.2 Conceptual Production Case

The underlying conceptual framework includes an illustrative production profile reaching approximately 50,000 barrels of oil per day at plateau.
This is not a production forecast based on certified reserves. It is a development scenario designed to demonstrate the scale of infrastructure and capital required under a hypothetical commercial case.
The final production profile must be based on:
• validated reservoir volumes; • reservoir simulation; • well productivity; • pressure support; • facility constraints; • export capacity.

7. CENTRAL PROCESSING FACILITY

7.1 CPF Function

The Central Processing Facility is the central operational hub of the development.
The conceptual CPF may include:
• inlet separation; • crude oil stabilization; • gas separation; • produced water treatment; • metering; • chemical injection; • compression; • power generation; • flare and relief systems; • control systems; • utilities.

7.2 Conceptual Capacity

The conceptual facility design basis includes:
• oil processing capacity: approximately 50,000 bopd; • associated gas handling: up to approximately 80 MMSCFD; • produced water handling: approximately 20,000 bwpd; • target availability: approximately 95%.
These parameters require confirmation through the Field Development Plan and FEED.

8. STORAGE AND EXPORT INFRASTRUCTURE

The development concept includes a dedicated crude oil logistics chain:

PRODUCTION WELLS → GATHERING SYSTEM → CENTRAL PROCESSING FACILITY → EXPORT PIPELINE → STORAGE FACILITY → MARINE LOADING SYSTEM → CRUDE OIL TANKER → INTERNATIONAL MARKET

The preferred export solution should be determined following:

• environmental assessment; • coastal and marine studies; • bathymetric surveys; • metocean studies; • pipeline route evaluation; • terminal engineering; • shipping and offtake analysis.

Potential export solutions may include:

• onshore storage with marine loading; • offshore loading; • floating storage and offloading; • pipeline-to-terminal systems; • hybrid solutions.

The final system should be selected on the basis of lifecycle cost, safety, environmental performance, reliability and commercial flexibility.

9. PROJECT EXECUTION STRATEGY

The project should be implemented through a staged execution roadmap.

PHASE 1 – CONCEPT EVALUATION

Objective:

• establish the geological and commercial opportunity; • identify critical data gaps; • define the exploration programme.

PHASE 2 – EXPLORATION AND APPRAISAL

Objective:

• discover hydrocarbons; • establish resource volume; • determine reservoir characteristics; • evaluate commercial potential.

PHASE 3 – FIELD DEVELOPMENT PLANNING

Objective:

• select the development concept; • define well count; • define facility requirements; • determine export strategy; • prepare the economic model.

PHASE 4 – FEED AND FINANCING

Objective:

• finalize engineering basis; • establish capital cost; • obtain approvals; • secure financing; • prepare the Final Investment Decision.

PHASE 5 – EPC AND CONSTRUCTION

Objective:

• construct wells; • construct production facilities; • develop storage; • construct export infrastructure; • prepare operations.

PHASE 6 – FIRST OIL AND OPERATIONS

Objective:

• achieve safe startup; • establish stable production; • optimize reservoir performance; • expand production where justified.

10. INDICATIVE PROJECT SCHEDULE

The conceptual project schedule is approximately:

• concept evaluation and exploration: Year 1–3; • FDP and development planning: Year 3–4; • FEED and financing: Year 4–5; • EPC and development construction: Year 5–6; • first oil: approximately 60–66 months from project commencement in the conceptual base case.

The schedule is indicative and subject to:

• geological success; • appraisal results; • regulatory approvals; • financing; • contracting; • procurement; • construction conditions; • local infrastructure; • weather and logistics.

11. CAPITAL AND OPERATING COST FRAMEWORK

The conceptual development framework assumes an initial development capital requirement in the approximate range of:

USD 1.7–2.7 billion

with a conceptual base case of approximately:

USD 2.275 billion.

Indicative annual operating expenditure is approximately:

USD 135–230 million per year.

The actual capital requirement will depend on:

• number of wells; • drilling depth; • facility capacity; • export method; • storage requirements; • local infrastructure; • contractor market conditions; • financing costs; • environmental requirements.

The capital structure should be determined only after the resource base and development plan have been independently evaluated.

12. CONCEPTUAL ECONOMIC FRAMEWORK

The conceptual economic model assumes:

• plateau production of approximately 50,000 bopd; • indicative oil price of approximately USD 70/bbl; • conceptual gross annual revenue at plateau of approximately USD 1.28 billion before costs, taxes, royalties and other fiscal obligations.

Under the conceptual base case, the project may potentially achieve:

• positive operating cash flow; • capital recovery over a multi-year period; • positive project economics under appropriate fiscal and commercial conditions.

However, the final economic outcome depends on:

• actual production; • realized oil price; • operating cost; • capital cost; • taxes; • royalties; • government participation; • transportation cost; • financing cost; • offtake terms.

The economic model should therefore be updated following the completion of the appraisal programme and the preparation of the Field Development Plan.

13. RISK MANAGEMENT

The principal project risks include:

13.1 Geological Risk

Mitigation:

• regional geological evaluation; • seismic acquisition; • exploration drilling; • appraisal drilling; • independent technical review.

13.2 Drilling Risk

Mitigation:

• detailed well design; • competent drilling contractors; • well-control systems; • BOP compliance; • real-time drilling monitoring; • contingency planning.

13.3 Reservoir Risk

Mitigation:

• core acquisition; • pressure data; • formation testing; • reservoir modelling; • dynamic simulation.

13.4 Construction Risk

Mitigation:

• FEED; • EPC contractor qualification; • contract management; • cost control; • schedule control.

13.5 Regulatory Risk

Mitigation:

• early government engagement; • transparent permitting; • environmental compliance; • legal and fiscal review.

13.6 Commercial Risk

Mitigation:

• offtake planning; • market analysis; • phased capital deployment; • strategic partnerships; • financing diversification.

14. GOVERNMENT AND NATIONAL VALUE CREATION

A successful petroleum development can potentially create value beyond direct production revenue.

Potential national benefits include:

• government revenues; • employment; • technical training; • local procurement; • industrial development; • infrastructure improvement; • logistics development; • energy-sector capability; • international investment.

A robust local content strategy should be developed before major construction begins.

Potential local content areas include:

• logistics; • transportation; • accommodation; • catering; • maintenance; • security; • civil works; • environmental services; • technical training.

Specialized petroleum engineering and major construction services may initially require international participation, but the project should establish a structured programme for progressive local capability development.

15. STAKEHOLDER AND PARTNERSHIP FRAMEWORK

The development of a major petroleum project requires coordination among multiple stakeholders.

Potential stakeholder groups include:

• Government of Guinea-Bissau; • national petroleum authorities; • PETROGUIN; • international oil companies; • drilling contractors; • EPC contractors; • technical service companies; • financial institutions; • insurers; • crude oil buyers; • shipping and logistics providers; • local communities.

The project should establish clear responsibilities, approval processes and communication channels.

The role of a project development strategist is particularly relevant at the interface between technical, commercial, governmental and investment stakeholders.

16. DATA VALIDATION REQUIREMENTS

Before any Final Investment Decision, the following areas require validation:

GEOLOGY

• geological mapping; • seismic interpretation; • source-rock evaluation; • reservoir identification; • seal evaluation.

WELLS

• exploration drilling; • logging; • coring; • formation testing; • fluid sampling.

RESERVOIR

• static model; • dynamic simulation; • pressure analysis; • production forecasting; • recovery factor determination.

FACILITIES

• process design; • capacity determination; • utilities; • power; • water treatment; • gas handling.

EXPORT

• route studies; • marine studies; • terminal design; • storage requirements; • shipping analysis.

ECONOMICS

• CAPEX; • OPEX; • fiscal terms; • financing; • oil price scenarios; • sensitivity analysis.

17. RECOMMENDED NEXT STEPS

The recommended next steps are:

STEP 1 – DEFINE THE TARGET AREA
Confirm:
• exact coordinates; • land status; • licence status; • existing geological data; • previous exploration activity.
STEP 2 – COMPLETE DATA REVIEW
Collect and evaluate:
• geological maps; • historical reports; • geophysical data; • previous wells; • satellite data.
STEP 3 – DESIGN THE EXPLORATION PROGRAMME
Define:
• geological mapping; • gravity and magnetic surveys; • geochemical work; • seismic programme.
STEP 4 – DEVELOP THE EXPLORATION WELL CONCEPT
Prepare:
• well target; • geological prognosis; • drilling programme; • logging programme; • testing programme; • cost estimate.
STEP 5 – INDEPENDENT TECHNICAL REVIEW
Engage appropriately qualified specialists to validate:
• geological assumptions; • reservoir assumptions; • well design; • production assumptions.
STEP 6 – PREPARE THE ACTUAL FIELD DEVELOPMENT PLAN

Following successful exploration and appraisal, develop a data-based FDP containing:
• reserves and resources; • well count; • production forecast; • facilities; • export; • CAPEX; • OPEX; • economics.

18. CONCLUSION

This Concept Note presents a structured framework for the potential development of an onshore petroleum opportunity in Guinea-Bissau.

The central conclusion is that a successful petroleum development should not be treated as a single drilling event. It is a progressive project-development process in which geological, technical, commercial, regulatory and financial uncertainties are reduced in sequence.

The concept therefore provides a framework for:

• early technical evaluation; • exploration planning; • staged capital deployment; • resource validation; • infrastructure planning; • government engagement; • investor dialogue; • international partnership development.

The next stage should be based on the actual geological area under consideration and the data available for that area.

The conceptual assumptions presented in this document should be progressively replaced by measured, interpreted and independently validated data.

The ultimate objective is to move from:

CONCEPTUAL OPPORTUNITY

to

VALIDATED GEOLOGICAL TARGET

to

DISCOVERY

to

APPRAISED RESOURCE

to

BANKABLE FIELD DEVELOPMENT

to

SAFE AND SUSTAINABLE PRODUCTION.

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