



ASTRAL ENERGY INDUSTRIAL PROJECTS

INTRODUCTION

AstralEnergies E&P Limited is Embarking on a project to build the first Ultramodern integrated industrial energy terminal, the facility shall be built in the southern region of Nigeria (Rivers & Delta State). And by extension to the east African subregion. The Astral Integrated Industrial Energy Project is to be the first regional integrated industrial export hub in west Africa for refinery & Petrochemical, Gas and non – oil business, it shall be a destination of choice for investment, is a signature project of the Astral Group Limited.

The \$20.8 billion dollars project shall be executed in three phases, when completed is targeted at generating about (\$80billion) in 15 years, it comprises of an industrial Gas processing plant for LNG, LPG, Gas bulk storage facility, a Gas power plant, a refinery, Petrochemical and Fertilizer plants respectively, and a smart logistic hub, the Astral Energy Terminal shall be driven by top management professionals, innovation, technology and the new global energy transition, it is sure game changer in Nigeria and a major catalyst to bringing about huge economic development, increased GDP, reduction in unemployment, insecurity, and increased revenue for the Nigerian Government, and huge return on investment for our investors.

The Energy infrastructure when completed and operational will deliver gas to industrial, manufacturing and power generation companies, it will impact on projects for not only industrial purpose but for residential use within the state.

Astral is a conglomerate committed in improving and transforming lives, deepening Business investments in Africa, we are constantly forging mutually beneficial relationships to create value for all stakeholders, we are Committed in making sustainable impact within our various areas of investment. Our activities are aligned to the UN SDGs thus establishing strategic synergies, strengthen relationships in accomplishing strong social development, protect the environment and promote development on local and global scale, we are committed in achieving the united Nations SDG in Nigeria & Africa, through various corporate social responsibility (CRS) activities under the (API) Astral people initiative, to address hunger, unemployment and insecurity, we have the school for all initiative(SFA) to address educational challenges, the (AHEW) initiative to address challenges of access to clean water, health related issues, our (Asos) Initiative is to address the plight of widows, women and children in rural areas, this underlines our empowerment strategies, while our clean up Friday initiative is where we set out to clean and address environmental and climate challenges of our host communities, by taking actions that will affect them positively.

Our Private Initiative (API) Is purely People driven, we have strong conviction that investment in human capital, is a reduction in hunger, unemployment, and a better society, We are passionate about developing our society by creating jobs, uplifting the standard of living for our youths and eradicating poverty in Africa.

Therefore, we seek funding and financing from investors in this critical sector.

OVERVIEWS AND SUMMARY OF THE ASTRAL ENERGY TERMINALS

stral Energy Terminal: Redefining Energy Processing and Distribution in Nigeria.

Astral Energy Terminal is a state – of – the – art oil & gas processing, trading and distribution facility located in Delta State, Nigeria, is designed to capitalize on Nigeria's abundant natural resources, the terminal will process natural gas, blend and distribute compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum gas (LPG), as well as oxygen and nitrogen gases. With robust export and reception facilities supported by cutting – edge storage tanks, the facility will be a cornerstone in advancing clean energy solutions and industrial development in Nigeria and across West Africa.

The feedstock for the Astral Energy Terminal will be sourced through a dual strategy. It will leverage trunk pipelines operated by the Nigerian Gas Company Limited, Nigerian Gas Investment Company, Nigerian Exploration & Production Company Limited (NEPCL), Pan Ocean Oil Corporation Nigeria and secure strategic gas purchase agreements for wet gas from nearby oil drilling rigs. This ensures a consistent and reliable supply chain, positioning the facility as a leading player in the regional and global energy markets.

The terminal's strategic location in Delta & Rivers State, a hub of industrial and energy activities in the Niger Delta region, provides unparalleled access to markets across Nigeria and neighboring countries. The facility is designed to meet the growing demand for cleaner energy alternatives driven by urbanization, industrialization, and global environmental policies. With its advanced infrastructure, innovative technologies, and commitment to operational excellence, Astral Energy Terminal is poised to redefine the energy landscape.

BUSINESS OVERVIEW

AstralEnergies vision is to establish an integrated energy terminal that incorporates gas processing, petrochemical production, refinery operations, and fertilizer manufacturing. This holistic approach ensures the terminal serves as a multi-purpose energy and industrial hub, addressing diverse market needs. The facility will provide critical infrastructure for cleaner fuel options like CNG and LPG, while also contributing to downstream industries through its refinery and petrochemical capabilities. The fertilizer plant will further strengthen agricultural productivity in Nigeria, aligning with national goals for food security.

In the next 12 months, the project aims to achieve significant milestones in infrastructure development, and initial operations. Phase one includes securing funding, obtaining regulatory approvals, and finalizing engineering designs. Phase two will focus on construction and procurement of equipment, followed by the commissioning of initial refinery & gas processing and distribution facilities. By the end of the year 2027, Astral Energy Terminal intends to begin operations, targeting key sectors such as transportation, industrial power generation, and export markets.

Strategic Objectives and Market Position

The Astral Energy Terminal aligns its objectives with Nigeria's drive for energy transition and economic diversification. The facility aims to:

1. Facilitate Energy Transition: Provide cleaner energy alternatives to reduce environmental impacts.
2. Enhance Energy Security: Leverage abundant local gas resources to meet growing domestic and regional energy demands.
3. Generate Economic Value: Stimulate local economies through job creation, industrial development, and export revenue.
4. Promote Sustainability: Adopt world-class safety, environmental, and operational standards in refining and petrochemical production.

Port Harcourt, and Delta State as the location for the energy hub, offers significant advantages. It connects to a robust transportation network, hosts a vibrant industrial sector, and serves as a key gateway for export markets to countries like Cameroon and the Democratic Republic of Congo. The growing energy needs of urban centers and industrial hubs in southeastern Nigeria and the broader West African region present substantial market opportunities.

Future Vision

Astral Energy Terminal is currently in its developmental phase, focusing on detailed feasibility studies, regulatory compliance, and funding acquisition.

Over the next 12 months, the goal is to transform this vision into a fully operational facility, setting the stage for long-term growth and market leadership.

In the short term, the focus will be on completing infrastructure for refining & gas processing, trade and distribution, including the installation of reception and export facilities, storage tanks, and distribution networks. At the same time, partnerships with local and international stakeholders will be strengthened to ensure a seamless supply chain and market penetration.

By the end of the first operational year, Astral Energy Terminal aspires to establish itself as a reliable and sustainable energy provider, contributing to Nigeria's energy transition, while positioning itself for expansion into petrochemical production, refinery operations, and fertilizer manufacturing in subsequent phases. The project will serve as a catalyst for economic growth, environmental sustainability, and energy security across the region.

THE ASTRAL BUSINESS PLAN AND FEASIBILITY FOR LNG EXPORT

The success story of Nigerian Liquefied Natural Gas (NLNG) has shown that LNG is the most successful gas utilization option in Nigeria. NLNG has within 21 years of operation moved from production capacity of 6.4MMTPA in 1999 to 22MTPA in 2007, it also takes in 3.5bcf/d of natural gas (www.nigeriainlg.com). Unfortunately, the effort put into making NLNG a success has not been replicated in other LNG companies/projects such as: the Brass LNG and the Olokola LNG companies have only been in the construction stage since their outset. Even with the worldwide evolution of the LNG industry, the Nigeria government are yet to invest in the infrastructure required to make Nigeria an LNG hub.

A privately owned mini-LNG plant (Greenville LNG) that produces 750 tons of LNG annually is the only other LNG company in Nigeria aside NLNG which is surprising that it is the only owned private LNG plat in Nigeria despite the huge potential and market the industry has. With the country's geographical location and gas reserves, Nigeria has the advantage over other players in the industry and should be consumers' first stop for reliable LNG. Leading global LNG producers like Cheniere Energy, Dominion Energy Inc., Woodside Energy, Novatek, Rosneft, etc. should have an operating license and plant in the Nigeria LNG industry.

INDUSTRY OVERVIEW

Efforts should be geared towards LNG utilization as it is the most successful venture among the natural gas utilization options in Nigeria. Countries like Trinidad and Tobago, Qatar, and Canada etc have had all-out benefits (like employment, improved GDP, foreign earnings etc.) from the global LNG market; Nigeria should also partake in the benefits that comes with the LNG market to its full capacity if Nigeria invests in this sector as it should.

The construction of another LNG facility would enable Nigeria expand the LNG sector and boost LNG export. This business plan recommends the construction of an gas infrastructure in Astral Energy Hub in addition to the existing NLNG plant. This facility would comprise of an LNG and CNG processing facility containing two (2) processing trains that produces 1,000,000MMTPA (50 MMSCFD x 2) condensate and LPG, and storage tank(s), a 60MW combined-cycle power plant and a product load-out jetty. Quality gas from existing pipelines from various gas gathering projects that already exists in Okrika, Andoni and Carthon Channel axis in Rivers State, will supply gas to the proposed gas facility, as phase

Proposed project size and structure:

AstralEnergies is accelerating the construction of An integrated energy and gas hybrid processing plant.

- 300 MMSCF = \$3billion USD
- 500,000bpd crude oil refinery = \$5billion USD
- 1.5mtpa petrochemical plant = \$3.5billion USD
- 3 million urea fertilizer plant = \$2.8billion USD
- Shipyard and Drydock = \$4.8billion USD
- E&P = \$1.7billion USD

1. Field development: the field development is beyond the scope of this paper and therefore the upstream section would not be discussed.
2. Pipeline to the facility: the pipeline facility would be routed from a gas gathering facility in Delta & Rivers State, owned by Seplat, Nepl, Shell and Ngic, and based on the existing pipelines.
3. The liquefaction facility: the recommended facility would be made up of two-train liquefaction plant with other supporting infrastructure which would handle a capacity of 2 million mtpa.
4. Construction of storage for petroleum product and gas storage
5. Construction of petrochemical and fertilizer plants and warehouses
6. Constructible of waste management facility
7. Construction of an Independent Power Project (IPP)
8. Oil Tanker and truck transportation: In order to limit risk exposure and reduce the initial capital, most of the product would be sold on free on board (F.o.b) while those that cannot be sold on that term would be on charter agreement with notably shipping syndicates. Hence, the charter transport would be treated as operating cost instead of capital investment in the cash flow statement.
9. Sales Agreement and Pricing: Liquefied Natural Gas around the world is usually sold on the basis of a pricing formula which links the price of LNG to the price of crude oil. The exact pricing formulas are usually considered trade secrets and not available to be accessed by the public. However, the accessible information discloses that LNG price is typically calculated using either cost-insurance-freight (c.i.b) or free on board (f.o.b.). The facility would sell most of its products based on free on board pricing formula even though some would be on cost-insurance-freight using chartered vessels.
10. Establishment of energy/investment bank and securing of all regulatory permits

Mission Statement : Our mission is to be a leading provider of sustainable and affordable energy solutions through the production, export and distribution of gas, petroleum products, while adhering to environmental standards.

Key Objectives :

- Achieve production capacity within the first 3 years.
- Secure long-term contracts with major buyers in Asia and Europe.
- Expand production capacity by 30% in the next five years.
- Operate with minimal carbon emissions and ensure energy efficiency.

THE ASTRAL ENERGY TERMINAL MANAGEMENT PROJECT TEAM

The management team shall be headed by the executive director Refinery & Petrochemical and the Chief Operating Officer (COO) Astral Energy Terminal Project, The team shall develop both technical & financial capabilities, the Astral energy project is conceptualized and designed to strengthen, regional integration & corporation, accelerating African trade potentials. The project has social, environmental and humanitarian benefit, job creation, community initiatives (CRS).

- Project Planning team
- Administration/Secretary
- Technical/engineering team (EPC)
- Commercial/trade/marketing team
- Financial & accounting team
- Procurement & logistics team
- Security team
- Legal & advisory team
- Project research and evaluation team
- Project consultant
- Media & IT team

TERM OF REFERENCE/ RESPONSIBILITY.

- Define scope of work
- Policy & Regulatory framework
- Project Strategic planning & Analysis
- Financial Proposal development & Cost analysis
- Terminal transactional Advisory
- Project visibility (media & IT)
- Investment master plan & Memorandum
- Conceptualizing Bank investment & master plan
- Project program and timetable

AstralEnergy Terminal

PRELIMINARY PROPOSAL &
SCOPE OF WORKS
2025





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Design Narrative

We envision the Astral Energy Terminal Project as a pivotal node in the global energy network, embodying principles of sustainability, resilience, and human-centered design. This facility is not only a critical infrastructure hub but also a beacon of environmentally responsible construction, integrating cutting-edge technology with an adaptable, sustainable design that meets the energy needs of today while anticipating those of tomorrow.



Design Narrative

Located at the intersection of land and sea, the terminal would leverages its unique geographic setting to optimize both its logistical functions and environmental impact.

The terminal's form is anticipated to draw inspiration from the fluidity and flow of energy itself, emphasizing efficiency and connection. The design features a modular like structure, allowing for scalability to adapt to future capacity demands without compromising operational integrity or environmental standards.



Inspired by the movement of energy and fuel, the terminal's design would prioritize seamless movement between storage, transfer, and distribution points. This efficiency would be demonstrated in the streamlined layout that **minimizes loading and unloading times**, reduces transit paths, and enhances the safety and speed of operations.

Sustainability is integral to this project. The terminal will incorporate renewable energy sources, such as **solar**, to supplement its power needs and reduce reliance on the grid. Additionally, high-performance materials, advanced insulation, and rainwater harvesting systems would contribute to a sustainable operational goal. Resilient design features, such as elevated structures and flood-resistant materials would ensure **longevity** in the face of climate uncertainties.



Recognizing the importance of a safe, ergonomic, and efficient environment for workers, the terminal is to incorporate human-centered facilities, from controlled-temperature working zones to strategically placed resting areas with direct access to daylight and views. Safety features are to be embedded throughout, including smart surveillance, automated safety alerts, and clear wayfinding systems.

Respect for the surrounding ecosystem would shape the design. Native vegetation is to be preserved and even enhanced around the site, creating natural barriers for sound and reducing soil erosion. Water- sensitive landscaping and bioretention basins to manage runoff and filter pollutants, aligning the terminal's operation with local environmental priorities.



Design Direction

Architectural Form and Materiality:

The proposed architectural form is low-profile, with **sweeping lines** that evoke the flow of energy. Materials will be chosen for durability, recyclability, and **low environmental impact**, such as prefabricated steel for structural components and locally sourced wood for certain interior finishes. The facade will also integrate energy-generating glass panels, adding a layer of efficiency and **contemporary aesthetic appeal**.

Energy-Efficient Technologies:

The terminal is to leverages passive design strategies, including optimal solar orientation, shading devices, and natural ventilation systems that **reduce energy loads**. High-efficiency LED lighting and sensor-based controls manage the lighting in different zones, while an advanced Building Management System (BMS) monitors and adjusts the facility's energy use in real time.

Design Direction

Landscape Integration

Surrounding the terminal is a landscape that supports local biodiversity and enhances the site's microclimate. Planted with native flora, the green spaces create visual and acoustic buffers that separate the terminal's operational areas from neighboring communities. These landscaped areas also serve as carbon sinks, enhancing the terminal's environmental footprint.

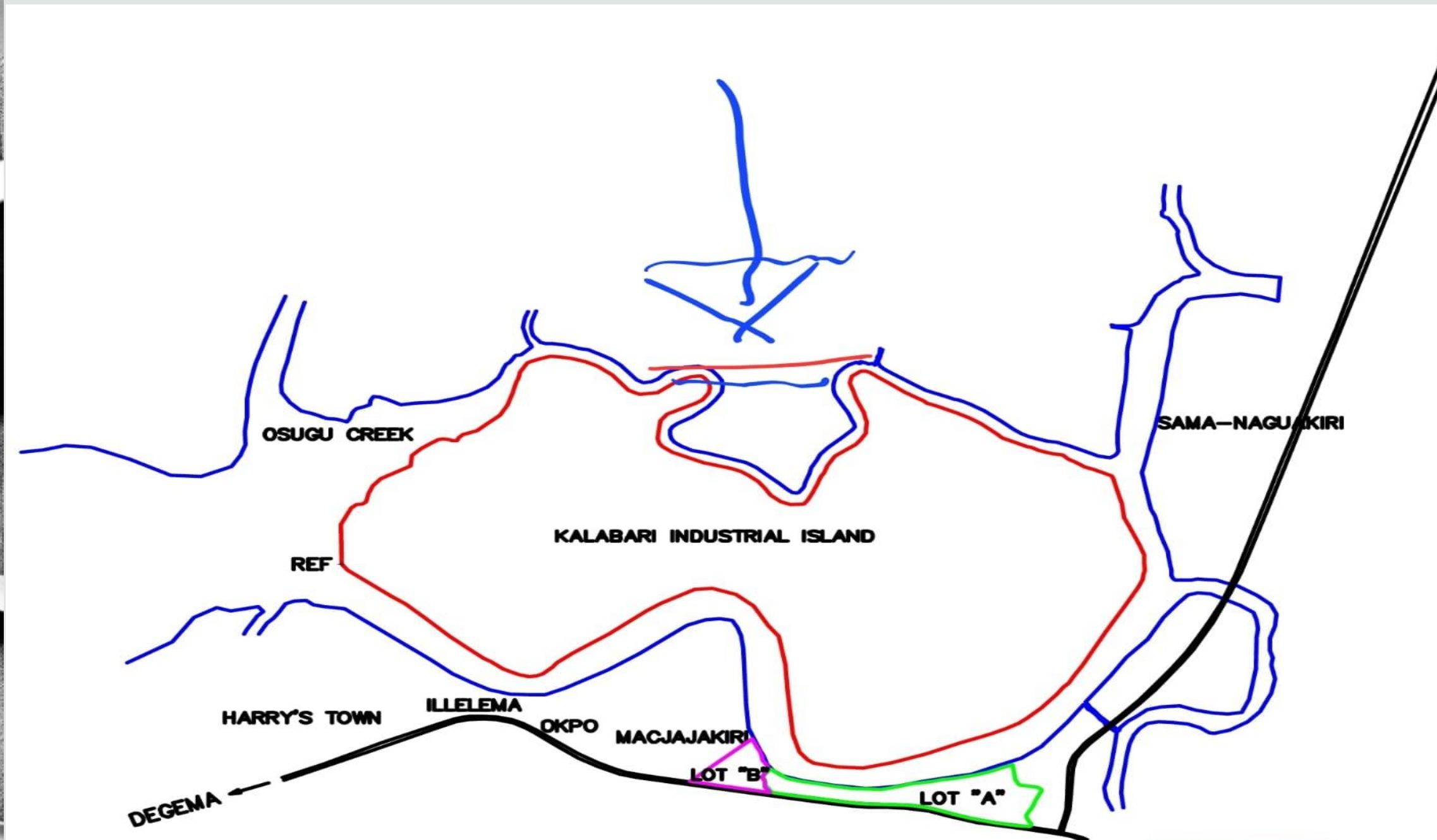
Future Adaptability:

Recognizing the rapidly evolving nature of the energy sector, the design supports future adaptability. **Modular** structural components enable

Next Steps

To facilitate the design process, we have sent you the **latest land survey document**.

With this information in hand, we can proceed efficiently with the design



REFINERY PROJECT SUMMARY

Setting up a 500,000 Barrels Per Day Oil Refinery in Nigeria – A Full – Scale Industrial Blueprint

Establishing a 500,000 barrels per day (BPD) crude oil refinery in Nigeria is a monumental industrial project with vast financial, technical, regulatory, and geopolitical implications. It ranks among Africa’ s most ambitious undertakings comparable in scale to the Dangote Refinery and demands years of meticulous planning, billions in capital investment, and strategic collaboration across both public and private sectors.

At full capacity, the refinery would produce a wide range of petroleum derivatives including premium motor spirit (PMS), diesel (AGO), liquefied petroleum gas (LPG), aviation fuel (Jet A1), fuel oil, bitumen, naphtha, and petroleum coke. The estimated total cost for such a refinery stands between \$5 and \$6 billion (1st phase), with an expected development timeline of 33 months. This includes planning, licensing, detailed engineering, financing, construction, and eventual commissioning. The required landmass is substantial 4,000 hectares ideally located in energy – accessible and logistically strategic areas such as oil – producing states like Rivers and Delta State, where we are siting our refineries.

Capital Requirements and Cost Structure for Astral Refinery

The capital expenditure (CAPEX) profile reflects the refinery’ s scale and complexity. Engineering, procurement, and construction (EPC) alone could consume \$5 billion. The main processing units including the crude distillation unit (CDU), vacuum distillation unit (VDU), and fluid catalytic cracker (FCC) are expected to cost around \$3 to \$4 billion. Off – site utilities such as power generation and water treatment facilities could require another \$1.5 to \$2 billion.

- A \$5 billion CAPEX for a 250,000 bpd refinery in Nigeria would be at the lower end of current global costs and we have:
- Existing infrastructure support (access to port and good roads network)
 - Major petrochemical integration in Delta State
 - Efficient EPC execution
 - Moderate complexity configuration

Our reasonable CAPEX allocation could look like this:

Area	% of CAPEX	Cost (USD Million)
Crude Distillation Unit (CDU)	10%	500
Vacuum Distillation Unit (VDU)	4%	200
Fluid Catalytic Cracker (FCC) /	12%	600
Hydrocracker Diesel Hydrotreaters	6%	300
Naphtha Hydrotreater & Reformer	8%	400
LPG Recovery & Gas Plant	2%	100

Sulfur Recovery Units	2%	100
Hydrogen Plant	4%	200
Utilities & Offsites	12%	600
Tank Farm & Storage	8%	400
Marine Terminal / Jetty	6%	300
Power Generation Facilities	5%	250
Water Treatment & Effluent Systems	3%	150
Buildings, Control Room & Safety Systems	3%	150
Pipelines & Loading Facilities	4%	200
Engineering, Procurement & Construction	7%	350
Management		
Contingency	4%	200
Total	100%	5,000

Simplified Breakdown by Major Category

Category	Cost (USD Billion)
Process Units	2.40
Storage & Export	0.70
Facilities Utilities &	1.00
Infrastructure EPC	0.35
Management Contingency	0.20
Other Facilities	0.35
Total	5.00

Specific Infrastructure Considerations

Astral refinery project is a greenfield site in Rivers State and Delta State, coastal states has additionally requirements:

- Dredging and marine works
- Flood protection and ground improvement
- Staff housing and logistics facilities
- Dedicated gas pipeline connection
- Security infrastructure

These \$300 - 800 million has been already captured in the CAPEX.

Construction Workforce

Peak construction manpower for the Astral 250,000 bpd refinery:

Phase	Personnel
Early Works	1,000 700
Civil & Structural Peak	600 1,500
Mechanical/Electrical Peak	
Commissioning	

Peak workforce can exceed 15,000 workers on site.

Phase	Duration
FEED & Permitting	12 months
EPC	15 months
Commissioning	6 months
Total	2 years and 7 months

The Astral refinery shall be well – executed, producing roughly 95,000 bpd gasoline, 70,000 bpd diesel, and 25,000 bpd jet fuel and could generate annual revenues in the range of \$7 billion, with refining margins ultimately determining profitability. Depending on margin assumptions, payback could range from about 6 – 12 years.

Additional infrastructure like storage tanks for crude and refined products, pipelines for intake and evacuation, marine jetties, internal roads, a gas – powered or cogeneration power plant (200MW), civil works and infrastructure, licensing fees, technology transfer, project management, environmental mitigation, and contingency buffers account is considered as the project opex.

- **Refinery Configuration and Technical Components**

Our project team are aware that to handle Nigerian crude efficiently and produce a comprehensive product range, the refinery must be configured with a high Nelson Complexity Index (typically 10). This means incorporating several sophisticated units including crude and vacuum distillation units, FCC, hydrocracker, naphtha and diesel hydrotreaters, a delayed coker, isomerization and reforming units, an alkylation unit, a hydrogen plant, and a sulfur recovery unit. Supporting infrastructure such as water treatment plants, air separation units, control rooms (SCADA/DCS), and comprehensive fire and safety systems are indispensable.¹⁷

- **Licensing and Regulatory Framework**

We are accelerating a comprehensive regulatory compliance procedure for the refinery, gas plant and petrochemical project, and we have made major inroads. The licensing process could be rigorous and multi – layered. It begins with obtaining a License to Establish (LTE) from the Nigerian Upstream Petroleum Regulatory Commission (NUPRC). This is followed by a License to Construct (LTC), and finally a License to Operate (LTO) upon project completion. Other regulatory clearances include an Environmental Impact Assessment (EIA) Certificate, a Community Development Agreement (CDA), and tax – related exemptions such as pioneer status or gas utilization incentives through the Federal Inland Revenue Service (FIRS) and the Central Bank of Nigeria (CBN).

Key regulatory agencies involved include NUPRC, the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), NESREA, the Federal Ministry of Environment, and state-level environmental and development bodies.

- **Site Selection Criteria**

Choosing the right location is crucial. Therefore we did a site advisory study and came up with the best site in Rivers State and Delta State, ideal sites should offer access to crude oil pipelines or Floating Production Storage and Offloading units (FPSOs), proximity to a deep seaport, gas infrastructure for power generation, and relatively flat, non-swampy terrain. Above all, community buy-in and security assurances from the host region are critical for project stability.

- **Human Capital and Employment Impact**

The refinery's construction phase is expected to generate between 20,000 and 30,000 jobs, spanning engineering, civil works, logistics, and plant fabrication. Once operational, the facility will employ 2,000 to 5,000 permanent staff. Training programs for technical, process, and safety personnel will be necessary to ensure world-class standards are met.

- **Power and Infrastructure Requirements**

Massive energy and utility infrastructure will be needed. Power demand could range between 150 to 200 megawatts, supplied through gas turbines or compressed natural gas systems. Daily water requirements are estimated at 15,000 cubic meters, necessitating large-scale water intake, treatment, and recycling systems. Roads, logistics hubs, wastewater treatment facilities, and multi-modal evacuation systems (pipeline, rail, marine, and trucking) are essential for seamless operations.

- **Crude Feedstock and Supply Chain**

A key determinant of success lies in securing stable and long-term crude supply contracts, reason why the Astral Energy investment team is collaborating with AstralEnergies Ltd for development of 2 major oil blocks and the purchase of WTI crude oil from USA and Merrey 16 from Venezuela as feedstock for the entire 500,000bpd nameplate. This could involve joint ventures with NNPC Limited, marginal field operators, or offshore suppliers. The Astral refinery will have sufficient crude storage capacity to cover at least 60 days of full operations equivalent to nearly 10 million barrels. For distribution, a robust product marketing and logistics network comprising inland depots, pipelines, and export terminals is required.

- **Financing Models and Capital Structure**

A refinery of this magnitude demands a blended financing model. Equity investors whether institutional, strategic, or sovereign would typically contribute 70 percent of the capital (roughly \$3.6 billion). The remaining 30 percent would be raised via long-term debt instruments sourced from multilateral institutions such as the African Development Bank (AfDB), Afreximbank.

- **Timeline and Development Phases**

The Astral project development process unfolds over several overlapping phases. Initial feasibility studies typically last six to twelve months, followed by regulatory licensing and environmental approvals which may take another six to eighteen months. Front-End Engineering Design (FEED) and detailed engineering is six months, while financial closure took us about 2 years. The actual construction phase via EPC contractors is 15 months, with commissioning and start-up activities taking another six months. In total, the full project lifecycle spans 2 years and 7 months.

- **Strategic Risks and Mitigation Plans**

Several risks could derail or delay the project ranging from Niger Delta militancy, political instability, FX volatility, crude supply disruptions, regulatory bottlenecks, and skilled labor shortages. The Astral project team came up with a comprehensive risk mitigation strategies include government-backed Memorandums of Understanding (MoUs), comprehensive insurance (political, terrorism, construction all-risk), phased refinery execution, and partnerships with reputable global EPC and operations firms.

- **Potential Strategic Partners**

We have secured collaboration with NNPC Limited which is essential, not only for crude access but also for regulatory alignment. We have technical partnerships with global EPC giants. Knowledge sharing or benchmarking could also be pursued with the Dangote Group. Oil majors like Chevron, Shell, or ExxonMobil may serve as both crude suppliers and investors in strategic JV structures.

The Astral 500,000 BPD refinery is more than just an industrial asset, it's a national economic game-changer. It has the potential to significantly deepen Nigeria's energy security, slash petroleum imports, save billions in foreign exchange, and create tens of thousands of direct and indirect jobs. Beyond energy, it will stimulate growth in construction, manufacturing, logistics, and local enterprise development.

To succeed, we are building the project on the foundation of sound technical and financial planning, credible and experienced partners, strong government support, and an ironclad crude supply and offtake framework. If well-executed, this refinery can become a flagship symbol of Nigeria's industrial resurgence and global energy relevance.

We are building a 250,000 bpd with the capability of expansion and deep-conversion similar to what would be considered a modern export-oriented refinery processing mostly light-to-medium crude.

Assumptions

- Crude throughput: 250,000 bpd (1st phase)
- Utilization: 95%
- Operating days: 347 days/year equivalent
- High conversion units (FCC, hydrocracker, delayed coker)
- Focus on gasoline, diesel, jet fuel, naphtha and PMS

Daily Product Slate

Product	Yield %	Volume (bpd)
LPG	5%	12,500
Naphtha	10%	25,000
Gasoline (PMS)	38%	95,000

Jet Fuel	10%	25,000
Diesel (AGO)	28%	70,000
Fuel Oil/Marine Fuel	4%	10,000
Bitumen	1%	2,500
Sulfur, Coke & Others	4%	10,000
Total	100%	250,000

Annual Production

At 95% utilization:

Effective throughput:

$250,000 \times 365 \times 95\% = 86.69 \text{ million barrels/year}$

Product	Annual Barrels
LPG	4.33 million
Naphtha	8.67 million
PMS Jet	32.94 million
Fuel	8.67 million
Diesel	24.27 million
Fuel Oil	3.47 million
Bitumen	0.87 million

Indicative Revenue Model

Product	Price (\$/bbl)
LPG	70
Naphtha	75
PMS Jet	95
Fuel	100
Diesel	105
Fuel Oil	65
Bitumen	60

Annual Revenues:

Product	Revenue (\$ billion/year)
LPG	0.30
Naphtha	0.65
PMS Jet	3.13
Fuel	0.87
Diesel	2.55
Fuel Oil	0.23
Bitumen	0.05
Total	≈ 7.8 billion

Storage Requirements

Typical storage targets:

Product	Days Storage	Tankage Needed
PMS	20	1.9 million bbl
Diesel	20	1.4 million bbl
Jet Fuel	15	375,000 bbl
LPG	10	125,000 bbl
Naphtha	15	375,000 bbl

Total product storage would be roughly 4 – 5 million barrels.

Utilities Demand

A refinery of this size typically requires:

- Power: 200 MW
- Water intake: 25,000 m³ /day
- Hydrogen production: 80 MMSCFD
- Steam generation: 2,000 tonnes/hour



PROPOSED DIAGRAM OF ASTRAL ENERGY TERMINAL