

Integration of Power Generation Projects with Modular Refineries and Mini-Grids Network

Locations – [SCALPED]

1. Modular Refineries:

Modular refineries will likely be located near existing crude oil extraction sites and areas where transportation and logistics make energy generation cost-effective. These regions will have access to crude oil pipelines, existing refinery infrastructure, and proximity to major power-consuming industries.

1. Niger Delta Region (South-South Nigeria):

- **States:** Rivers, Bayelsa, Delta, Akwa Ibom, Cross River, Edo
- **Site Areas:** Near existing oilfields and refineries in Port Harcourt, Warri, and Uyo.
- **Rationale:** This region is rich in oil resources and hosts much of Nigeria's existing oil refining capacity. Modular refineries here can benefit from easy access to crude oil and gas for combined power generation.

2. Ondo and Lagos States (South-West Nigeria):

- **Site Areas:** Ondo State (near Ilaje and Okitipupa) and Lagos (near Lekki Free Trade Zone).
- **Rationale:** Proximity to existing oil exploration activities, key industrial centers, and ports in Lagos makes these areas ideal for setting up modular refineries. The Lekki Free Trade Zone also offers economic incentives for such projects.

3. Northern Nigeria (Kano and Kaduna States):

- **Site Areas:** Near Kaduna Refinery and other industrial zones.
- **Rationale:** Northern Nigeria lacks sufficient refining capacity despite demand for petroleum products and energy. Setting up modular refineries here can meet local energy needs and serve nearby industries.

2. Mini-Grids for Off-Grid and Rural Electrification:

Mini-grids will be deployed in regions with limited or no access to the national grid, targeting rural and underserved communities. These regions have potential for renewable energy development, such as solar, wind, and small hydroelectric plants.

1. North-East Nigeria (Borno, Yobe, Adamawa States):

- **Site Areas:** Remote communities and rural areas within the North-East, especially conflict-affected regions.
- **Rationale:** These states have some of the lowest electrification rates in Nigeria. Mini-grids can provide decentralized energy solutions in remote areas, particularly using solar and wind resources.

2. North-West Nigeria (Kano, Katsina, Sokoto States):

- **Site Areas:** Rural areas and industrial hubs near Kano and Sokoto.
 - **Rationale:** With significant solar energy potential, these states are prime candidates for solar mini-grid deployment to power rural communities and small industries.
3. **North-Central Nigeria (Niger, Benue, Plateau States):**
- **Site Areas:** Communities near the Niger River and Plateau's rural settlements.
 - **Rationale:** These regions have both hydroelectric and solar potential, with the Niger River offering opportunities for small-scale hydroelectric mini-grids.
4. **South-East Nigeria (Enugu, Anambra, Abia States):**
- **Site Areas:** Remote villages and industrial zones.
 - **Rationale:** The South-East has many rural areas with limited access to electricity. Solar mini-grids can be deployed to power small businesses and local communities.
5. **South-West Nigeria (Oyo, Ogun, Ekiti States):**
- **Site Areas:** Off-grid villages and peri-urban areas.
 - **Rationale:** South-West states like Oyo and Ekiti offer significant opportunities for solar and wind mini-grids, especially in areas with limited grid access but growing population density.
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3. Grid Infrastructure Upgrades:

Upgrading the national transmission and distribution grid will focus on areas with high industrial demand and regions that are critical for cross-border energy transmission.

1. **Lagos and Ogun States (South-West Nigeria):**
- **Site Areas:** Lagos and nearby Ogun industrial areas.
 - **Rationale:** Lagos is Nigeria's economic hub, with significant energy demand. Upgrading grid infrastructure here will support large-scale industries and urban electrification.
2. **Abuja (Federal Capital Territory) and Surrounding Areas:**
- **Site Areas:** Federal Capital Territory (FCT) and nearby states such as Nasarawa and Kogi.
 - **Rationale:** As Nigeria's administrative center, Abuja requires reliable power. Grid upgrades will support government functions, businesses, and expanding urban settlements.
3. **Port Harcourt and Warri (Niger Delta Region):**
- **Site Areas:** Major urban centers and industrial zones in Port Harcourt (Rivers) and Warri (Delta).
 - **Rationale:** These oil-producing cities are crucial for energy-intensive industries, necessitating grid upgrades to ensure stable power supply and integration with modular refineries.
4. **Kano and Kaduna (Northern Nigeria):**
- **Site Areas:** Key industrial areas in Kano and Kaduna.

- **Rationale:** Northern Nigeria is underserved by the national grid, but these cities are key industrial hubs. Upgraded infrastructure here will provide more reliable power for factories and businesses.
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4. Cross-Border Power Export Locations:

Power export infrastructure will be constructed near Nigeria's borders with neighboring countries, connecting to the West African Power Pool (WAPP) and facilitating energy exports to the region.

1. Benin Republic (West Nigeria – Ogun, Oyo, Kwara States):

- **Site Areas:** Border areas near Seme (Lagos State) and Idiroko (Ogun State).
- **Rationale:** These locations are close to the border with Benin Republic, offering convenient points for power export through existing and upgraded transmission infrastructure.

2. Niger Republic (North Nigeria – Katsina, Sokoto States):

- **Site Areas:** Border areas near Katsina and Sokoto.
- **Rationale:** Northern Nigeria shares a long border with Niger Republic, making this region ideal for exporting surplus power to Niger and the broader Sahel region.

3. Cameroon (East Nigeria – Taraba and Cross River States):

- **Site Areas:** Border regions near Taraba, Cross River, and Adamawa States.
- **Rationale:** Eastern Nigeria shares borders with Cameroon, allowing for energy exports via cross-border transmission infrastructure.

4. Chad (North-East Nigeria – Borno, Yobe States):

- **Site Areas:** Border regions near Maiduguri (Borno) and Geidam (Yobe).
 - **Rationale:** Chad is a neighboring country with energy deficits. These locations in North-East Nigeria offer potential for exporting power to Chad via cross-border transmission lines.
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5. Renewable Energy Generation Locations (Solar, Wind, Hydro):

These regions are selected for their potential to generate renewable energy (solar, wind, or hydroelectric) to feed mini-grids and support the overall energy infrastructure.

1. Northern Nigeria (Kano, Katsina, Sokoto States) – Solar Energy:

- **Rationale:** Northern Nigeria receives high levels of solar irradiance, making it ideal for solar energy projects. These regions can serve as solar hubs, powering mini-grids and feeding the national grid.

2. Central Nigeria (Niger, Kogi, Benue States) – Hydroelectric Power:

- **Rationale:** The Niger River and its tributaries provide significant hydroelectric potential. This region can host small-scale hydroelectric plants connected to mini-grids.

3. South-West Nigeria (Ondo, Ekiti, Oyo States) – Wind Energy:

- **Rationale:** Ondo State and surrounding areas have wind energy potential that can support mini-grid projects for rural electrification and industrial use.
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Summary of Key Geographical Regions:

- **South-South Nigeria:** Modular refineries in oil-rich states (Rivers, Bayelsa, Delta), supporting industrial energy needs.
- **North-East Nigeria:** Mini-grids and solar projects for conflict-affected, off-grid communities.
- **North-West Nigeria:** Solar energy hubs and mini-grids to power rural areas and local industries.
- **North-Central Nigeria:** Hydroelectric mini-grids along the Niger River and grid upgrades for urban centers.
- **South-West Nigeria:** Wind and solar mini-grids to complement grid upgrades for Lagos and nearby areas.
- **Cross-Border Locations:** Transmission infrastructure for power export to Benin, Niger, Cameroon, and Chad.