Outline

1. Introduction

2. Project Background

3. Viable Business Models
   - Option 1: GELMAK Supply to BIPORAL
   - Option 2: BIPORAL Captive Power IPP
   - Option 3: Tri Parte Agreement – Gelmak, BIPORAL, Eko Disco
   - Option 4: Walk Away Option

4. Conclusion
Based on the review of Electric Power Supply Agreement (EPSA):

- Banana Island Property Owners and Residents Association (BIPORAL) has appointed Gelmak Power Solutions to provide electrical power to the island for a period of 15 years, via a signed EPSA which details the terms and conditions of power supply between both parties.

- BIPORAL has identified various issues of concern in the business model of the proposed project, and also various tenets of the signed Agreement, which it would like to analyze further, and amend if necessary.

- These issues include the lack of regulatory approvals for the project, as regulated by the Nigerian Electricity Regulatory Commission (NERC), commercial terms which are perceived to be skewed in favour of the provider, and other related licenses which are required for the successful operation of the project.

- BIPORAL has invited Lavayo Energy to engage in discussions in charting a path forward towards the successful implementation of the project. This could include provision of advisory and project development services.
Business Model Analysis

- Document current project model and current state of project. Show project gaps or outstanding requirements for successful completion of project.
- Define alternative business models and associated plans for each, that fits the operating criteria for project.
- Review Project documents and agreements to ensure the technical and commercial viability of project.

Business Plan Review

- Develop a business plan and analysis for identified business models. Key metrics of profitability, capex requirements, operations, and risks.
- Explore the requirements and costs for any Regulatory licenses required for generation and distribution of power.
- State recommendations for Project as defined or proposed alternative business model.

PROJECT APPROACH

Project documentation review, site visit and interviews
Business planning and review
Financial modelling and sensitivity analysis
Project Report including key findings, risks, mitigants and Next steps.

Project Management
Project Introduction
The major focus of this assignment is to assess the current power situation in Banana Island, and evaluate various business models that could be employed to augment power received by Eko Distribution Company (grid supply).

Introduction – Business Modeling

Does this IPP Project present a strong Business case and viable plan?

Is the Project Viable as structured (As Is)?
- Can the project be delivered as currently structured?
- Will the purported benefits to BIPORAL be realized?
- Are the costs efficient and reasonable?
- Are the regulatory requirements satisfied and legal ramifications covered?

What would be the ideal business model?
- Given the current power situation in the estate, what would be the ideal structure for an IPP or a power solution?
- What are the major tenets of the structure of such a model?
- What are the cost and financial implications for this model?

What other Business models can be considered?
- What other business models can be considered as a solution to augment the power supplied to the estate?
- Who are the parties in this model, and what relationship exists between the parties?
- What are the cost and financial implications for these models?
Banana Island Property Owners Residents Association
- Total land area of 1.63 MM square meters
- Mix of residential and commercial residents with a desire for high quality power supply
- Franchise owner for electricity distribution in Lagos Island and environs including Banana Island/Ikoyi
- Currently provide above average electricity coverage (~80%) to BIPORAL
- Long term viability of business is not clear

GELMAK
- Energy company with competencies in providing captive power, IPP development and power sales
- Solution for BIPORAL in conjunction with Cummins (Gas Division) in 3 x 2MW units

BIPORAL

EKO DISTRIBUTION COMPANY
- Franchise owner for electricity distribution in Lagos Island and environs including Banana Island/Ikoyi
- Currently provide above average electricity coverage (~80%) to BIPORAL
- Long term viability of business is not clear
Table below summarizes the various options analyzed and benchmarked against other option with defined metrics.

### SUMMARY - BENCHMARKING ASSESSMENT

<table>
<thead>
<tr>
<th></th>
<th>Capital Costs</th>
<th>Technical Complexity</th>
<th>Project Risks</th>
<th>Tariff Price</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1: As Is Model</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>High</td>
<td>High price of Tariff proposed and Capex costs, accompanied with technical complexities on service delivery.</td>
</tr>
<tr>
<td>Option 2: Ideal Model</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate and manageable risks from BIPORAL owning a backup power solution to augment grid supplied power.</td>
</tr>
<tr>
<td>Option 3 Tri Parte Model</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Model with moderate risks, which can be managed with a better priced tariff and renegotiated terms on service offerings.</td>
</tr>
<tr>
<td>Option 4: Walk Away</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Difficult option to assess and implement given the sunk costs already incurred. Signed service agreement also includes a termination clause with hefty fees associated.</td>
</tr>
</tbody>
</table>

### KEY

- **High**
- **Moderate**
- **Low**
Project Background
## General Data
- **Location**: Ikoyi, Lagos State
- **Developers**: Hi-Tech/Fed. Min of Works and Housing
- **Land Size**: 1.6 MM Sq. Meters
- **Unit Type**: Residential and Commercial

## System Data
- **Distribution Zone**: Eko Disco
- **33 kV (from Alagbon)**: 5 km
- **Substations (no)**: 1
  - 2 X 7.5 mva Transformers
  - 4 Ring Feeder Lines
  - 1 Direct Feeder Line (Ocean Parade)

## Distribution Data
- **RMU (no)**: 26
- **Prepaid Meters**: 606
- **Postpaid Meters**: 34
- **Average Billing (Mo)**: N65 MM
- **Transformers**
  - Biporal Transformers: 19
  - Resident Owned: 30
MYTO2 Methodology – Building Blocks

**INPUT**

- Control
  - Data / Assumptions
    - Generation, Transmission & Distribution/Load Forecast

**COMPUTATION**

- Load/Calculations
  - Generation New Entrant Model
    - Generation Wholesale Prices
      - Investor Module (IPP)
        - MYTO2 Methodology – Building Blocks
          - Control
            - Data / Assumptions
              - Generation, Transmission & Distribution/Load Forecast
  - Transmission Costs
    - Transmission Depreciation
      - Transmission Tariffs
        - Distribution Costs (11)
          - Distribution Depreciation
            - Distribution Tariffs (11)
              - Investor Module (DISCO)

**OUTPUT**

- Tariff Summary (End-user Tariff)
# MYTO 2.1 – Tariff Prices for EKO DISCO

## EKO Disco – Aggregate Technical Commercial and Collection Loss Projection

<table>
<thead>
<tr>
<th>Bid Basis</th>
<th>Verified Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>35%</td>
<td>29.40%</td>
<td>21.46%</td>
<td>15.88%</td>
<td>12.55%</td>
</tr>
</tbody>
</table>

## MYTO 2.1 TARIFF EKO DISCO (2015 – 2017)

### Fixed Charges (N/month)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 – 50kwh</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R2 – Single and 3 phase customers</td>
<td>750</td>
<td>900</td>
<td>1080</td>
</tr>
<tr>
<td>R3 – Low voltage max demand</td>
<td>31,898</td>
<td>38,278</td>
<td>45,933</td>
</tr>
</tbody>
</table>

### Energy Charge (N/kwh)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 – 50kwh</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>R2 – Single and 3 phase customers</td>
<td>19.12</td>
<td>18.26</td>
<td>17.61</td>
</tr>
<tr>
<td>R3 – Low voltage max demand</td>
<td>29.02</td>
<td>27.72</td>
<td>26.72</td>
</tr>
</tbody>
</table>
Generation License (for Captive and Embedded Projects)

NERC Licensing Requirements

Given the need for a Generation License for 6+MW Captive/Embedded use, a breakdown of Requirements and Costs are listed below.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>License Costs (Captive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 10 Year Business Plan</td>
<td>License for 1-10 MW plant</td>
</tr>
<tr>
<td>• PPA or Off-take Contract</td>
<td>• Processing Fee: N50k</td>
</tr>
<tr>
<td>• Connection Agreement</td>
<td>• License Fee: $10k</td>
</tr>
<tr>
<td>• Use of Distribution Service Agreement</td>
<td>• Operating Fee 1.5% /kWh</td>
</tr>
<tr>
<td>• Ancillary Service Agreement</td>
<td>• Validity 10 yrs.</td>
</tr>
<tr>
<td>• Effluent Management plan</td>
<td></td>
</tr>
<tr>
<td>• Fuel/Gas Supply Agreement</td>
<td></td>
</tr>
<tr>
<td>• Registered Title deed</td>
<td></td>
</tr>
</tbody>
</table>

Licensing Duration

• 1 – 3 months (fast track)
• Dependent on NERC processing (technical and legal review)
Fuel Analysis – Suppliers and Costs

COMPRESSED NATURAL GAS – SUPPLIERS

   Price of CNG N87 per SCM

2. Green Fuels – Located in Ota, Ogun. 
   Price of CNG N96 per SCM

3. NIPCO – Located in Apapa, Lagos.   
   Price of CNG N87 per SCM

Molecular Composition

<table>
<thead>
<tr>
<th>Hydrocarbon Components</th>
<th>(Mole%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane C1</td>
<td>82.0 to 94</td>
</tr>
<tr>
<td>Ethane C2</td>
<td>3.0 to 6.0</td>
</tr>
<tr>
<td>Propane</td>
<td>0.1 to 2.0</td>
</tr>
<tr>
<td>Butanes</td>
<td>0.1 to 0.7</td>
</tr>
<tr>
<td>Pentanes</td>
<td>0.1 to 0.2</td>
</tr>
<tr>
<td>Hexanes-plus C6+</td>
<td>0.0 to 0.2</td>
</tr>
</tbody>
</table>

Inert Gas, N2 – not more than 15 mole%; Carbon dioxide, CO2 – not more than 10 mole%; Oxygen - traces

Storage Space Requirement

Gas Consumption: 1,200 scm/hr.  
Daily Usage 28,800 scm  
Skid Capacity 8,000 scm

The CNG station site should be able to accommodate 6 CNG skids (minimum), in order to give the plant a 2 day buffer.

Alternatively, arrangements should be made to order larger capacity skids to allow for weekly supply of CNG vs. current projection of every other day.
## Fuel Analysis – Sample Pricing

<table>
<thead>
<tr>
<th><strong>Oando Gas – CNG</strong></th>
<th><strong>Contact:</strong> Misan Jekhine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skid Capacity</td>
<td>6,000 SCM (10 tubes)</td>
</tr>
<tr>
<td>Price</td>
<td>$7.34/kscf + N37/kscf (compression/storage charge)</td>
</tr>
<tr>
<td>Transport</td>
<td>N50k (flat fee for Lagos Island, Ikoyi and Victoria Island axis)</td>
</tr>
<tr>
<td>Space Required</td>
<td>40m x 40m (subject to site inspection)</td>
</tr>
<tr>
<td></td>
<td>Cost of compression station and pressure reduction unit are recovered over time through the compression charge.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Green Fuels – CNG</strong></th>
<th><strong>Contact:</strong> Mr. Chauhan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skid Capacity</td>
<td>8,000 SCM (8 tubes)</td>
</tr>
<tr>
<td>Price</td>
<td>N96/scm excluding tax</td>
</tr>
<tr>
<td>Space Required</td>
<td>30m x 30m (subject to site inspection)</td>
</tr>
<tr>
<td>Minimum 3 skids</td>
<td>required on site.</td>
</tr>
<tr>
<td>Cost of downloading</td>
<td></td>
</tr>
<tr>
<td>station is borne by</td>
<td>customer (approximately $200k).</td>
</tr>
</tbody>
</table>
Option 1:
Gelmak Supply to BIPORAL
## Option 1: Current Business Model

<table>
<thead>
<tr>
<th>Project Title</th>
<th>6 MW Captive Independent Power Plant (IPP) for Banana Island Residents to augment grid supply to the estate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Approximately $8 MM ++</td>
</tr>
<tr>
<td>Estimated Timeline</td>
<td>2 – 4 months</td>
</tr>
</tbody>
</table>

### Project Description and Requirements
- Develop a 6MW IPP to supply BIPORAL as an addition to the grid supplied power to the estate.
- BIPORAL would distribute this power and bill residents for power supplied
- Project includes a “take or pay” provision for a specified number of power generated per day. Also includes a fixed charge and a variable charge for fuel cost, operations and maintenance services.
- Fuel utilized would be Compressed natural gas, with an associated network of infrastructure developed for storage, and handling the fuel.
- Gas engines are currently mounted on site with gas pipeline connected to proposed CNG station site.

### Project Benefits
- Construction of the plant and its associated infrastructure is at an advanced stage, and IPP could be operation in a short time if contract provisions are satisfied.
  - Power tariff proposed is high.

### Issues
- Project is currently afoul of regulatory requirements for generation and transmission of power
- Project pricing for Capital expenditure and operating costs are too high. Overall tariff proposed is also high.
- Generation capacity of the plant is less than the peak load recorded for the estate
- No basis for fixed charge to be allocated to individual units. This should be a bulk fee charged to BIPORAL.
  - "Take or Pay" provision in the contract makes the project uneconomic given the high availability of grid supplied power

### Key Risks
- Successful outcome of a renegotiation of commercial terms
- Probability of payment default is high
BIPORAL IPP – 70% Completed

Status

- **Independent Power Plant**
  - Gas Engines are mounted on site
  - Auxiliaries have been connected
  - No gas connection or termination yet
  - Integrity of equipment will require validation after extended period without use

- **CNG Decompression Station**
  - CNG station site is approximately 1km from IPP site
  - Site preparatory works currently on hold
  - Gas infrastructure equipment including Pressure reduction unit (PRU) not yet delivered
## Cost and Pricing Model – Major Assumptions

<table>
<thead>
<tr>
<th>Metric</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>MW</td>
</tr>
<tr>
<td>Operating</td>
<td>Day</td>
</tr>
<tr>
<td>Hours</td>
<td>Hours</td>
</tr>
<tr>
<td>Utilization</td>
<td>Percent</td>
</tr>
</tbody>
</table>

### Pricing Approach

- **Model Simulation**
  - Simulated costs for a similar IPP
  - Some costs might vary due to differences in structure and competencies
  - Discount rate can vary widely depending on perception of risk
  - Model based on a 15 year term
  - Discount rate of 20% used for analysis

<table>
<thead>
<tr>
<th>Metric</th>
<th>Unit</th>
<th>Metric</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Efficiency</td>
<td>%</td>
<td>Capex/Loan</td>
<td>USD MM</td>
</tr>
<tr>
<td>Fuel Consumption</td>
<td>SCM/hour</td>
<td>1.68</td>
<td>Naira BN</td>
</tr>
<tr>
<td>Gas Price</td>
<td>N/SCM</td>
<td>Tenor</td>
<td>Months</td>
</tr>
<tr>
<td>Salaries</td>
<td>N (Yr. 1)</td>
<td>Rate</td>
<td>Percent</td>
</tr>
<tr>
<td>Variable O&amp;M</td>
<td>N (Yr. 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Charge</td>
<td>N/hour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Generation Tariff (alone) for an IPP of this size should not be higher than N21 per kWh. Fuel (CNG) price and debt expense are the two major cost variables.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel Costs</strong></td>
<td>679,495,680</td>
<td>699,880,550.40</td>
<td>720,876,966.91</td>
<td>742,503,275.92</td>
<td>764,778,374.20</td>
<td>787,721,725.42</td>
</tr>
<tr>
<td><strong>Salaries/Wages</strong></td>
<td>20,000,000</td>
<td>20,600,000</td>
<td>21,218,000</td>
<td>21,854,540</td>
<td>22,510,176</td>
<td>23,185,481</td>
</tr>
<tr>
<td><strong>Variable O&amp;M</strong></td>
<td>10,350,000</td>
<td>10,660,500.00</td>
<td>10,980,315</td>
<td>11,309,724.45</td>
<td>11,649,016</td>
<td>11,998,486.67</td>
</tr>
<tr>
<td><strong>Engine O&amp;M Charge</strong></td>
<td>58,131,360</td>
<td>59,875,301</td>
<td>61,671,560</td>
<td>63,521,707</td>
<td>65,427,358</td>
<td>67,390,179</td>
</tr>
<tr>
<td><strong>Interest Expense</strong></td>
<td>0</td>
<td>316,208,219</td>
<td>283,068,493</td>
<td>249,928,767</td>
<td>216,789,041</td>
<td>183,649,315</td>
</tr>
<tr>
<td><strong>Principal Repayment</strong></td>
<td>0</td>
<td>168,000,000</td>
<td>168,000,000</td>
<td>168,000,000</td>
<td>168,000,000</td>
<td>168,000,000</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>767,977,040</td>
<td>1,275,224,570</td>
<td>1,265,815,335</td>
<td>1,257,118,014</td>
<td>1,249,153,965</td>
<td>1,241,945,187</td>
</tr>
<tr>
<td><strong>Cost Kwh</strong></td>
<td>14.61</td>
<td>24</td>
<td>24.08</td>
<td>24</td>
<td>23.77</td>
<td>24</td>
</tr>
</tbody>
</table>
Major Issues – Current Business Model

• **Equipment Price**
  - Project cost of $8 mm USD for 3 x 2MW gas engines, CNG station and connecting pipeline seems high. Cost verification exercise might be required to validate costs.
  - Financing terms including interest rate and tenor also require validation

• **Take or Pay Provision**
  - Given the high availability of grid supplied power (~80%), the “take or pay” provision would substantially increase the overall tariff, and render the project uneconomic.
  - With a reduced tariff, potential exists to run the plant longer (hours) and partially disconnect from the grid for longer hours. This could be complicated by any load growth given the plant capacity is marginally less than peak load (electric power).

• **Fixed Charge**
  - The Fixed Charge proposed as a unit cost per resident is detached from the fixed cost of running the plant. Given the distribution of power is unrelated to power generation, the fixed charge should be charged to BIPORAL, which would in turn allocate costs per resident.
  - With ~720 residents, current pricing would indicate a fixed charge collection of approximately N 7.2 MM
### Benchmarking – Sample Original Equipment Manufacturer’s (OEM) Costs

Costs for a 6 MW plant range from $1.5 MM (Diesel only) to $6.6 MW for a Dual fuel engine

<table>
<thead>
<tr>
<th></th>
<th>GE – Jenbacher</th>
<th>Wartsila</th>
<th>Cummins Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price (USD) per unit</strong></td>
<td>3.3 MM</td>
<td>2.2 MM</td>
<td>500 K</td>
</tr>
<tr>
<td><strong>Configuration</strong></td>
<td>2 x 3 MW</td>
<td>2 x 4 MW</td>
<td>3 x 2 MW</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>Dual</td>
<td>Dual</td>
<td>Diesel</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>43.6%</td>
<td>41.5%</td>
<td>37%</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>6.2 MW</td>
<td>8 MW</td>
<td>6 MW</td>
</tr>
<tr>
<td><strong>O&amp;M</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Lifespan</strong></td>
<td>25 yrs.</td>
<td>25 yrs.</td>
<td>18,000 hrs. *</td>
</tr>
</tbody>
</table>

* Before Major overhaul
Option 2:
BIPORAL Captive Power IPP
**Project Description and Requirements**

- **BIPORAL** would own and develop a 6 – 8 MW IPP to supply BIPORAL as an addition to the grid supply. Engines could be dual fired and run on diesel, natural gas, or compressed natural gas.
- Plant would run strictly as a backup to grid power supply, and BIPORAL would issue one power bill to residents that includes both sources of supply.
- Plant would be treated as captive generation, and an applicable license for such would be obtained.
- Plant will also be scalable, and additional generation could be added to address load growth.

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**Project Benefits**

- Ownership of the plant if structured efficiently, would reduce the 3rd party financing costs of the project.
- BIPORAL can effectively plan and manage the load growth projected for the estate and eliminate the inefficiency of a “take or pay” arrangement.
- Model assumes that the plant will only run 20% (2000 hours) per year, given the high availability of grid supplied power.
- Plant could run on diesel which is a readily available fuel with much less storage costs, and less technical complexities.
- Liquid fuel (diesel) only engines are also much cheaper cost but with higher maintenance costs.

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**Issues**

- Initial capital costs needs to be raised, or financing structures put in place.
- Competencies to operate and manage the project need to be developed, or a contractor hired to assist with its management.
- Project would take 3-6 months to develop, and this could increase with delays in the procurement process.

---

<table>
<thead>
<tr>
<th><strong>Project Title</strong></th>
<th>6 – 8 MW Captive Independent Power Plant (IPP) for Banana Island Residents to augment grid supply to the estate.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>TBD (Estimated $1.5 MM)</td>
</tr>
<tr>
<td><strong>Estimated Timeline</strong></td>
<td>3 – 6 months</td>
</tr>
</tbody>
</table>
Major Issues – Captive IPP for BIPORAL

- **Acquisition and Financing Cost**
  - Estimated costs range from $1.5 MM for liquid fuel only engines, to approximately $4 MM for gas engines.
  - Finding a creative way to raise this equipment acquisition cost is key to eliminating the high cost of financing through debt from local banking institutions.
  - Potential options for financing include estate taxes or levies, bank financing or benevolent donor.

- **License Application**
  - A generation license would be required, and this could potentially delay the commercial operations of the plant by a few months.
  - Key requirements for a license with long lead times include a Titled deed, Environmental report and Commercial agreements (Distribution system, connection and ancillary services)
Option 3:
Tri Parte Agreement
Gelmak Supply to EKEDC for BIPORAL
**Option 3: Tri-Parte Agreement**

<table>
<thead>
<tr>
<th><strong>Project Title</strong></th>
<th>Develop a 6 MW Embedded Generation Power Plant for Banana Island</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Estimated Timeline</strong></td>
<td>2 – 4 months</td>
</tr>
</tbody>
</table>

**Project Description and Requirements**
- Develop a project that would supply 6MW to Eko Disco thru an embedded plant, and Eko Disco in return would guarantee a minimum level of power availability to BIPORAL for distribution to the estate.
- Key provisions to be considered include the tariff at which Eko Disco would be supplied power from the embedded plant, and the tariff Eko Disco would supply BIPORAL electricity.
- Potential to utilize existing plant in a revised structure to benefit all parties.

**Project Benefits**
- Potential to utilize existing plant in a revised structure to benefit all parties.
- BIPORAL project risk and financial exposure from the ownership of the plant would be significantly reduced.
- With an acceptable tariff, all parties would “win” in this business model.

**Issues**
- Project success is dependent on ability of 3 parties to agree and adhere to technical negotiation and provisions.
- Changes in ability or structure of any of the parties to adhere to contract provisions could adversely affect service offerings. In particular, the business sustainability of Eko Disco would be of concern. Any change in ownership could adversely affect the project.
- Extensive due diligence of project metrics would be critical to the development of an fair tariff to be employed for the project.
- Changes in government regulations for Electric Distribution tariff of gas pricing could negatively affect the economics of the project.
Major Issues – Tri Parte Agreement

- **Tariff Price**
  - Tariff price to BIPORAL cannot exceed MYTO 2.1 listed price for R3 customers. This could potentially be an issue as the cost of generation might make it commercially unviable to supply BIPORAL as MYTO price.

- **Separation of Liabilities**
  - This business model is predicated on Gelmak supplying power to Eko Disco via an Embedded Generation platform, and Eko Disco supplying power to BIPORAL via grid connection.
  - Both of these commercial arrangements can be viewed as separate.

- **Non Eligible Customer**
  - NERC stipulates that all commercial agreements shall be guided by the provisions of the tariff methodology in force, which prevents a Distribution Licensee (Eko Disco in this instance) from charging arbitrarily.
  - As the MYTO defined tariff reduces over time, high probability for the generator costs to be “underwater” (higher than the distribution tariff).
### MYTO 2.1 TARIFF EKO DISCO (2015 – 2017)

<table>
<thead>
<tr>
<th>Fixed Charges (N/month)</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 – 50kwh</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R2 – Single and 3 phase customers</td>
<td>750</td>
<td>900</td>
<td>1080</td>
</tr>
<tr>
<td>R3 – Low voltage max demand</td>
<td>31,898</td>
<td>38,278</td>
<td>45,933</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy Charge (N/kwh)</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 – 50kwh</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>R2 – Single and 3 phase customers</td>
<td>19.12</td>
<td>18.26</td>
<td>17.61</td>
</tr>
<tr>
<td>R3 – Low voltage max demand</td>
<td>29.02</td>
<td>27.72</td>
<td>26.72</td>
</tr>
</tbody>
</table>

The Generation Cost must be less than N25 per kwh over the next 3 years, and would have to be even lower in 2018-2020.
## Embedded Generation Regulations

### Embedded Generation

This is when a generator is connected to a distribution network operated by the Distribution Company licensed by the commission (NERC).

<table>
<thead>
<tr>
<th>Key Regulations</th>
<th>Eligible Customers</th>
<th>Contracts of Note</th>
</tr>
</thead>
</table>
| • EPSR Act 2005 S.62  
Any entity engaging in the business of electricity generation of 1 MW and above, requires a license be issued by NERC. | • The Embedded Generator may enter into agreements with eligible customers (not covered by MYTO).  
• The Distribution Use of System Charge shall be guided by the provisions of the tariff methodology in force. | • Connection or Interface Agreement  
• Use of Network Agreement  
• Ancillary Services Agreement |
| • Market Rules Section 22.4.1  
This permits the Distribution Company licensed by NERC to purchase embedded generation under certain conditions. | | |

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*Image Source: Lavayo Energy*
Option 4: Cancel IPP Project
## Option 4: Decline Option and Walk Away

<table>
<thead>
<tr>
<th><strong>Project Title</strong></th>
<th>Cancel the current 6 MW Captive Independent Power Plant (IPP) for Banana Island and revert to Grid supply only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Estimated Timeline</strong></td>
<td>2 – 12 months</td>
</tr>
</tbody>
</table>

### Project Description and Requirements
- Cancel the provision of augmented power to Banana Island Estate and revert to only grid supply
- Given the high availability (average 80%) of grid supply to the estate, BIPORAL can explore options to entice Eko Disco to further increase power to the estate
- BIPORAL could evoke the termination clause or other provision for cancellation, given that the purported service contract has not formally been executed.

### Project Benefits
- Strong savings from financing and capital costs of proposed IPP and associated project costs
- Risk averse approach to minimize exposure to untested and unproven management of complex project that could be a financial mine field.
- Current high availability of power coupled with projected reduction in electric tariff could result in a winning scenario.

### Issues
- Potential financial exposure given termination clause in previously signed contract
- Purchased equipment and existing infrastructure for proposed project are sunk costs that have to be addressed
- Potential to convert the project into an embedded generation IPP for Eko Disco with minimal exposure or liability to BIPORAL.
- Strong legal opinion would be required to protect BIPORAL from potential litigation, and also to represent BIPORAL at project negotiations.
Conclusion
## Conclusion

### Recommendation

- BIPORAL ultimately has to consider the merits and risks of each of the listed potential business models. What amount of risk tolerance it is willing to accept would be a key criteria in its decision making.
- A huge consideration has to be given to the existing equipment that has been delivered and connected awaiting gas supply.
- This project is on the leading edge of Electric Power regulations in Nigeria, as such, a lot of the rules and regulations can be considered “grey”.
- **Recommendation: Explore the Tri – Parte Agreement option**
  - Request full financial model and project costing
  - Negotiate to lower generation and proposed distribution tariff
  - Create multi discipline project negotiation team (including legal personnel)

### Risk Averse Approach

1. Own Captive Plant
2. Walk Away

### Risk Tolerant Approach

1. Tri Parte Agreement
2. Gelmak Captive IPP