Financing and Structuring Power Projects In Nigeria

Key financial and commercial factors in developing bankable power projects

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Challenges & Financing Issues
## Financing Issues – Key Features of Power Financing

<table>
<thead>
<tr>
<th>Feature</th>
<th>Comment</th>
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</table>
| **Long Tenor**   | - Debt term varies from project to project and also on the plant type and location:  
                   - Power: 8 - 30 year debt term  
                   - Bridge funding available where required – *but avoid if possible unless take-out is 100% certain* |
| **High Leverage**| - Amount of leverage is determined by what the project’s cashflows can support  
                   - Debt tends to be c. 60 to 90% of total project cost |
| **Multi-source** | - Local and international banks  
                   - Export Credit Agencies  
                   - Bilateral and multi-lateral DFIs |
| **Multi-currency**| - Naira / USD mix recommended  
                  - Foreign exchange risks must be addressed |
| **Security**     | - Credit supports include guarantees, warranties and other covenants from the sponsor, its affiliates and other third parties, completion guarantees  
                  - Strength of guarantee ensures transaction achieves optimal debt pricing and tenor and demonstrates commitment from the Sponsor |
### Financing Issues – Funding Sources

**DEBT**
- Local Banks
- International Banks
- Regional Banks and DFI's
- ECAs
- Capital Markets
- Islamic Finance
- Pension funds

**EQUITY**
- Government
- Foreign and Local Partners
- Local Private Sector
- Local Stock Market
- Pension funds

*Recent entries since 2001 = Infrastructure Funds, Sovereign Wealth Funds, Private Equity…*

*Up to 90% can be achieved for strong power plant economics ….*
Financing Issues – Potential Sources of Term Debt Finance

DFI’s
- FMO
- DEG
- PROPARCO
- DBSA
- IDC
- SIDA
- OTHERS

MLA’s
- EIB
- AfDB
- OTHERS

World Bank Group
- IFC
- IBRD

Commercial Sources
- Commercial Lending without PRI
  - NIGERIAN BANKS
- Commercial Lending with PRI (e.g. WB PRG)
  - INTERNATIONAL BANKS
- Sovereign Policy Lending
  - CDB
  - CHINA EXIM
  - JBIC
  - KEXIM

DCM and Others
- Export Credit Agencies
  - COFACE
  - HERMES
  - JBIC
  - KEXIM
  - SINOSURE
  - U.S. EXIM
The PRG is a tool used by the World Bank to catalyse private debt finance in support of host governments' developmental objectives.

The PRG has been used successfully in a number of developing markets such as:
- Philippines (Leyte)
- Pakistan (Uch Power / Hub Power)
- Morocco (Jorf Lasfar)
- Nigeria – (Power Holding Company of Nigeria)
- Bangladesh (Haripur Power Project)
- Vietnam (Phy My 2 Phase 2 Power Project)
- Uganda (Bujagali Hydro Power Project)
- Kenya (Kenya Power and Lighting Company Ltd., and Nairobi Toll Road (under negotiation))
- Mozambique – Sasol Natural Gas Pipeline project

The PRG has rarely if ever been called on. This can be attributed to:
- The World Bank's influence and intervention, prior to an actual default and potential claim under the PRG, to help resolve the issues that have arisen
- The importance of the PRG to the governments of developing countries:
Typically, the IDA will provide coverage to commercial lenders for loan default by the borrower (often an SPV) resulting from a government's failure to meet its payment obligations under:

- Concessions or Investment Agreements
- Power Purchase Agreements
- Gas Sales Agreements
- Water Supply Agreements, etc.

Obligations covered include both periodic payments and termination amounts. Allows for the extension of debt maturities, reduction in spreads, and increased debt capacity;

Commercial risks such as completion and operational risks and natural force majeure risks are **typically not covered** by the PRG. These should be mitigated through the normal contractual arrangements

Guarantee support is documented in a Guarantee Agreement, which outlines the scope of risk coverage and defines the trigger mechanisms of the Guarantee;

Charges fees of approximately 75 bps per annum on outstanding principal amounts of the guaranteed loan (comprised of Guarantee Fees, Stand-by fees, Initiation Fees and Processing Fees);

In parallel, WB has an Indemnity Agreement with the host government, under which the government has counter-guaranteed WB for any payments made under the Guarantee Agreement;
Power Financing Typical Challenges

**Capital costs**
- Higher raw material prices
- Constrained contracting capacity
- Constrained sub-contractor and vendor capacity
- Higher profit margins for contractors and suppliers

**Constrained economies**
- Governments keen to extract value from natural resources
- Higher input costs impact cash flows
- Higher capital costs mean that cash flows are more thinly stretched
- Combined with limited debt capacity….ability to leverage has fallen

**Financing costs and capacity**
- Larger investments mean all funding sources now more important
- Local commercial banks’ liquidity insufficient for many projects
- ECA and Regional Development Institutions critical – pace of due diligence sometimes not aligned with sponsors timetable
- Increasing reliance on international debt capital

**Others**
- Maturities getting longer
- Demand for US$ borrowings
- Eroding Government support over time
Due Diligence Issues
<table>
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<th>Due Diligence Issues</th>
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<tbody>
<tr>
<td><strong>CONSTRUCTION COSTS</strong></td>
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<tr>
<td>- Grand total costs might be understated – though not deliberately but due to absence of independent verification;</td>
</tr>
<tr>
<td>- Costs might escalate – not as a result of any external inflationary pressure, but due to in-experienced construction managers and poor project execution;</td>
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<tr>
<td>- Variations and change orders;</td>
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<tr>
<td>- Poor planning construction activities against other critical path items / key dependencies;</td>
</tr>
<tr>
<td><strong>EPC CONTRACTOR</strong></td>
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<tr>
<td>- EPC contractor might not have the requisite skills for project of such type and or magnitude which could lead to construction delay;</td>
</tr>
<tr>
<td>- EPC contractor might not have the financial muscle to adhere to its terms of the contract;</td>
</tr>
<tr>
<td><strong>O &amp; M CONTRACTOR</strong></td>
</tr>
<tr>
<td>- O&amp;M contractor might not have extensive power plant experience which could lead to escalating O&amp;M costs over and above those budgeted in the financial model;</td>
</tr>
<tr>
<td>- O&amp;M contractor might not have the financial muscle to adhere to its terms of the O&amp;M contract – i.e. compensating the borrower for any shortfalls in agreed POWER PLANT performance;</td>
</tr>
</tbody>
</table>
Due Diligence Issues

INTEREST RATES

- Interest rates may increase substantially over and above what was assumed in the financial model – this will jeopardize the borrower's ability to meet its debt service and other obligations;
- Therefore need to stress tests “pinch points” and how these can be covered via some hedging arrangement or sponsor support / top-up;

EXCHANGE RATES

- This is a major risk factor for power plants projects that have costs and revenues that are not matched in the same currency - exchange rates may increase substantially over and above what was assumed in the financial model – this will jeopardize the borrower's ability to meet its debt service and other obligations;
  - *Structuring phase must include an exchange rate stress test to assess the impact of a deteriorating exchange rate and structure protections into the overall financing plan to protect the power plant and also debt service*;

RIGHT OF WAY

*Power plants not always ring fenced*...

- The risk that the Right of Way (“RoW”) may not be available in its entirety, leading to completion delay;
- Promoters must ensure the RoW has been fully obtained and secured and that this is documented;
- In certain projects, although a “sign-off” meeting may be held with the State and or local government(s), it is now generally very common to also have “sign-off” meetings with the various stakeholders chiefs through who’s land the RoW runs;
- The cost impact of this risk can be quite sizeable, bringing projects to a complete halt and furthermore if not suitably managed can remain unresolved for months;
Due Diligence Issues

- No amount of financial structuring can mitigate such risks;

- The approach to be taken is as follows:
  - Ensure project company takes out the requisite insurances – but note that certain policies are prohibitively expensive and not even available;
  - Involve a collection of local, international and regional lenders, all of which can put pressure on the host Government / Sponsor to seek a lasting solution;
  - Project Company (from the outset) must be seen to be sensitive to the needs of the local community. In a number of cases, key members of the local community are placed on the project company’s payroll – this way they have a vested interest to protect the project assets;

- The project however should not be embarked upon where there is a general view by the experts that the project will (i) attract sabotage and terrorism and (ii) be exposed to substantial loss given the nature of the project assets – i.e. exposed oil / gas pipelines traversing terrain which are susceptible to sabotage and or terrorism;

- Risk that either (i) power demand projections are below base case due to optimistic assumptions or (iii) assumptions are correct but competition reduces expected demand;

- Because independent assessments are never 100% correct (but necessary) the base case must include substantial allowance for reduced power demand risk to ensure debt service is protected;

- In certain power projects, the host government / sponsor will provide demand guarantees so as to ensure the project remains attractive to debt and or equity providers;

- Independent demand and or market consultants are generally retained to provide advice in these matters;

- Less of a risk where PPA is based on a minimum demand threshold and “take or pay”
**Due Diligence Issues**

**OFFTAKER CREDIT STRENGTH**

- Payment record of Offtaker will need to be acceptable;
- Offtaker may need to provide a guarantee in certain cases in the event it is not able to meet its periodic payments;

**BUSINESS INTERRUPTION RISK**

- It is common practice to engage an Insurance Consultant to advise the sponsors on the pre-completion as well as post-completion aspects of insurance;
- In addition, lenders will need to retain their own Insurance Consultant to provide a review of the adequacy of the insurance arrangements proposed by the sponsors;
- The Insurance Consultant will comment on the market standards for similar projects and the current state of the insurance market for the cover sought by the sponsors;
- Nature of likely interruption events will need to be opined on by the consultant and also whether such policies will cover such events;
Due Diligence Issues

**FEEDSTOCK SUPPLY**
- Feedstock source;
- Dual or single fired;
- Feedstock availability, price, escalation;
- Who carries risk for non-supply and compensation regime;

**TARIFF / PRICES**
- Tariff will be set out in the PPA – this must be captured in the financial model;
- Question is what risks are there for possible changes (i.e. reductions) in tariffs;
- A historical view of tariffs will need to be “married” against the plant’s future tariff regime to determine its likely acceptability once the plant is up and running – of course this will not hold if an agreed PPA is already in place;

**UTILITY SUPPLY**
- Power plants require uninterrupted utility supply so due diligence will need to ensure robust contracts are in place for the supply of utilities which will be critical for its operations;
- Certain projects enter into various individual utility supply agreements;
Due Diligence Issues

<table>
<thead>
<tr>
<th>CONSENTS, PERMITS &amp; APPROVALS</th>
<th>Are these one-off or based on a renewals regime;</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRID ACCESS &amp; DISCHARGE</td>
<td>Is this already in place; Does total project costs include grid connect (infrastructure) costs</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td>Technology MUST be proven; Power plant projects must not be used as a “test bed”; Ensure comfort is obtained from other similar plants in operations across the globe and what their average operating rates are;</td>
</tr>
</tbody>
</table>
Due Diligence Issues

**ENVIRONMENTAL**
- Plant needs to comply with stringent requirements regarding noise and other hazardous emissions;
- Construction and ongoing operations of the plant must ensure it does not cause environmental damage;

**OTHERS**
- Basis of bid award;
- Post handover management plan;
- Evaluate the entire value chain;
- Government credit support;
- Composition and capacity of consortium members;
- Contractor support – performance bond, warranties, etc
- PMC – Lenders LTA would generally double up as the PMC;
- Nature of commissioning, testing and handover – lenders reliability test regime;
Due Diligence Issues – Coal to Power

Project development should be coordinated and seamless....

1. Coal mined and extracted
2. Coal transported via overland conveyors to processing plant for separation and washing, i.e. plant must be located near to mine
3. Separated and washed coal transported via overland conveyors to Power Plant
4. Coal milled pulverized and fed to the boiler to generate steam
5. MW supplied to the grid – terms stipulated within the PPA
Due Diligence Issues – Gas to Power

1. Gas extracted with other hydrocarbons, and processed to remove impurities

2. Issues include: Adequacy of supply; security of supply; priority of resources; pricing policy and transportation logistics

3. Gas transported via pipeline to Power Plant

4. Plant does not have to be located near gas source. **Choice is whether to transport gas or power**

5. 750MW supplied to the grid – terms stipulated within the PPA.
Due Diligence & Financiers’ View – Fuel Supply Risk

- Available Fuels

  The key determining factor. Influences plant technology, output, efficiency, capital and operating costs, water / sorbent consumption, by-product disposal, asset life, emissions among others. Essentially, the generation investment hinges on the types of fuel that are available at the potential generation location.

- Location and Proximity

  Typically, **substantially cheaper to transport power than fuel.** Conventional wisdom for coal is to build plant adjacent to fuel source, given complexities/costs of long distance road / rail transport (e.g. cost, social impact, servitude risks). There is more flexibility for gas transportation (especially) and oil / diesel-fired generation given lower transportation costs.

- Quality and Emissions

  I. Coal will lead to higher \( \text{SO}_2 \) and \( \text{CO}_2 \) emissions than comparators. (e.g. natural gas)

  II. Coal uses significant volumes of water (even if plant is air-cooled)

  III. Equator Principles imposes a high financing hurdle and entails the need for a robust ESIA process

  IV. Certain fuels (e.g. coal) produce huge by-products (ash) which may impact on ground water quality
Contractual Structure

I. Is the fuel supplier just a supplier or are they tied into the deal/ company? Co-shareholder?

II. Long-term contracting usually better than short-term but not without risks (e.g. cost indexation due to inputs outside of utility’s control)

III. Where does the risk allocation lie? Held with the Generator or by the Fuel Supplier?

Price

I. Benchmarked to an international index? Implications for transparency

II. Are base and variable fuel prices passed through to tariffs and a cost recovery enabled?

III. What is the mode of contracting (e.g. fixed price, cost-plus or otherwise)?
Underlying Hydrology

I. The key determining factor. The projected water balance influences the underlying risk profile, the selected plant technology, concerns as to consumption, impacts on flora, fauna and nature (e.g. wetlands). Can the water be extracted and, if so, at what cost (economic and environmental)?

II. Can the asset produce for the designated asset life? Is there the water balance to ensure this (with a suitable reserve margin)?

Underlying Technology

I. Wet cooling requires constant supplies of water, for coal-fired and solar technologies. Dry cooling (currently required in South Africa for new build coal-fired plants), requires less water (albeit significant compared to many other water uses), although increases generation costs and commonly reduce efficiency.

II. Relatively low concerns regarding hydrological impact of oil or gas-fired technology
Responsibilities for Performance

I. Does the utility (or a third party) have to build new water transmission infrastructure (e.g. dams, pipelines) to supply the plant? and/or pay for it? How is this assessed within the initial investment decision?

II. Who takes the risk of non-supply of water during the plant life? Utility or Consumers?

III. Who takes the responsibility for securing of permits (e.g. water usage risks) and servitudes?

IV. Financiers will extend the Equator Principles to the associated water delivery mechanisms

Contractual Structure

I. Is the water supplier just a supplier or are they tied into the deal/company?

II. Water suppliers are typically a State owned entity so often a greater alignment with the incumbent utility than regarding fuel suppliers

III. Long-term contracting almost certainly the only method on offer

IV. Are private parties asked to take construction risks on State owned water suppliers? This is unlikely to be a bankable risk
Due Diligence Issues – Environmental Implications

Potential negative impact on the surrounding environment will require an Environmental & Social Impact Assessment Plan which is in compliance with the World Bank’s Equator Principles (which all major financiers are signatories of).

- Compliance with World Bank Equator Principles
- Kyoto Protocol
- Future Carbon Taxes?
- CO₂ / SO₂ Emissions
- Water Consumption
- Resettlement of population
- Coal mine concession & licenses / gas transportation pipeline / new power transmission lines
- Thorough due diligence in selection and application process
- Coal fired plants generate higher CO₂, SO₂ and use more water than gas-fired plants.
The critical first choice is to determine the **Project Site** and **Fuel / Technology**. All project issues flow from this choice.

Therefore, the main issues pertaining to the development of power plants are as follows:

- Determine Site, Fuel / Technology
- Frame **Capacity (MW)** by reference to what is ultimately financeable as a single transaction within the target timeframe
- Develop the Project commercial concept based on the above parameters, and including issues such as **interconnections**, **associated infrastructure** and **transmission**
- Develop **Project Agreements**, focusing upon (1) PPA and (2) Fuel Supply Agreements as the key priority
- Identify critical financiers in parallel with the Project concept determination
- Identify **equipment suppliers** and **contractors**, partly based upon their ability to fund the project. A project is not a project unless it can secure funding
Key Documents / Agreements
The PPA grants the concession and sets the tariff. It is the primary document all should focus on. To some extent all the others are secondary.

- Grants the concession
- Sale and purchase of capacity (on an Availability basis) and energy
- Indexation (of FX / Inflation / Energy price movements)

**Performance criteria**
- Plant specifications and performance standards
- Revenue write down provisions for Plant under / non-performance
- Delays LDs for late commissioning

**Third party responsibilities**
- Fuel, Water and power transmission interconnections
- Supply of gas / coal / fuel
- Permits and Licences

**Force majeure**
- Natural / Political Force Majeure (e.g. Change in Law)
- Implications for mitigation of risks
Termination

- Default and Termination provisions
- Credit quality of Offtaker / credit support for PPA payment obligations (Invoice and / or Termination payments?)

Key Decisions:

- Whether fuel supply obligations (for gas-fired plant) should be contained in a Separate Fuel Supply Agreement or also included in the PPA

- If the former, need to identify the counterparty and structure the FSA so it is aligned with the PPA. This may be difficult if a private company is the fuel supplier (e.g. an IOC)

- If the latter, or if the fuel supplier is State owned, potential for the IPP to be “Tolled”, which is a globally proven IPP risk structure. This may assist bankability, especially if the Ministry of Finance guarantees PPA payments

- This issue will not arise for coal-fired plants (given they will be mine mouth)
**Other Key Project Agreements**

Excluding the Fuel Supply Agreement, the other documents would largely be the responsibility of the power plant developers to draft and execute.

<table>
<thead>
<tr>
<th>Shareholder Agreement</th>
<th>EPC Contract</th>
<th>Operation and Maintenance Agreement</th>
<th>Finance Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Financing Commitments</td>
<td>Engineering, Procurement, and Construction</td>
<td>Allocates plant operational risks</td>
<td>Loan Agreements, Common Terms Agreements, Inter Creditors</td>
</tr>
<tr>
<td>Formation and Control of IPP Project Company</td>
<td>Liquidated damages - delays and performance</td>
<td>Balance between incentives and penalties</td>
<td>Security documents - mortgages, charges, assignments</td>
</tr>
<tr>
<td>Share Transfer Restrictions</td>
<td>Right of rejection</td>
<td>Fixed price v cost plus</td>
<td>Direct Agreements with Lenders</td>
</tr>
<tr>
<td>Deadlock and dispute resolution</td>
<td>Testing regime</td>
<td>Operator must be bankable - experienced, creditworthy</td>
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<td></td>
<td>Lump sum turnkey</td>
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Other Key Project Agreements (Nigeria)

The following have emerged as some of the key documents which will need to be in place for power sector financings in Nigeria.

- Ancillary Services Agreement;
- Bulk Trader Credit Support;
- Deed of Assignment of Pre-Completion Receivables;
- Gas Sale and Aggregation Agreement;
- Gas Transportation Agreement;
- Grid Connection Agreement;
- O&M Agreement;
- Power Purchase Agreement; and
- Pre-Completion Liabilities Transfer Agreement.
### Non-documentation Commercial Issues

<table>
<thead>
<tr>
<th>Other risks</th>
<th>Adequacy and Security of Fuel Supply</th>
<th>Volatility of Price</th>
<th>Technical Specification Risk</th>
<th>Efficiency of Fuel Utilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel</strong></td>
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<tr>
<td><strong>Environmental</strong></td>
<td>Environmental &amp; Social Impact Assessment</td>
<td>Environmental Management Plan</td>
<td>Equator Principles</td>
<td>Permitting</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Flue Gas Desulphurisation (coal-fired)</td>
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<td></td>
<td></td>
<td>Compliance costs</td>
</tr>
<tr>
<td><strong>Localisation</strong></td>
<td>Disincentives to international bidders if overly onerous obligations</td>
<td>Compliance</td>
<td>Change in law provisions re future legislative changes</td>
<td></td>
</tr>
<tr>
<td><strong>Project-on-Project Risk</strong></td>
<td>Interdependence on other projects - Fatal Flaws</td>
<td>Potentially an issue for gas-fired plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Macroeconomic Risks</strong></td>
<td>Interest Rate risks</td>
<td>Foreign Exchange risk</td>
<td>Inflation risk</td>
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</tbody>
</table>

**Fuel Supply Agreement**

**FSA / PPA**

**PPA**
Structuring Issues & Considerations
Structuring Issues & Considerations

- Project funding…who carried initial risk;
- Structure your funding accordingly…Prorata, Front Loaded or Back Ended…
Structuring Issues & Considerations
Structuring Issues & Considerations

The diagram illustrates the distribution of equity and debt across different categories or time periods, labeled from 1 to 10. The vertical axis represents the percentage range from 0.00 to 70.00.

- Category 1 and 2 show a significant increase in equity, with a notable decrease in debt.
- Categories 3 to 10 display a more uniform distribution of equity and debt, with each category having a smaller equity percentage compared to the initial categories.

This visual representation helps in understanding the balance and allocation of financial resources across different segments or stages.
Structuring Issues & Considerations

Financing structure should mitigate (i) exposure to each cash flow line item and (ii) pass other contractual risks as distant as possible from the lenders.

- DSRA – quantum and timing;
- MMRA – quantum, timing and input of LTA;
- Liquidated Damages;
- Gearing;
- Debt Sculpting – *no balloons please*;
- Debt sizing – *are all costs captured – LTA input critical*;
- Equity injection – quantum and timing;
- Cash Waterfall;
- Dividend lock-up restrictions;
Structuring Issues & Considerations

- Early generation revenues – *are these 100% certain and caught in the debt sizing computations?*

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**SPV (i.e. BORROWER) OPERATING ACCOUNT**

**PAYMENTS IN THE FOLLOWING ORDER OF PRIORITY**

1. Operating Costs
2. Debt Service Reserve Account top up, if required
3. Dividend Reserve Account top ups, if required
4. Major Maintenance Reserve Account top up, if required
5. Any other costs
6. Partial debt pre payment equal to Dividend (if required)
7. Shareholder distributions subject the Facility Agreement

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**INFLOWS FROM TARGET / OP CO**

**ICA 1**

**ICA 2**

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**DISTRIBUTIONS ACCOUNT**

**Debt Service Reserve Account**

*(6 months debt service)*

**Dividend Reserve Account**

**Major Maintenance Reserve Account**

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**LENDING BANKS**

*Red boxes represent lenders secured accounts...*
The Power Project Financial Model
(snapshot only)
Power project financial models must be as comprehensive as possible to capture all the revenue and cost items, ideally on a line-line or input-by-input basis;

Sufficient time must be spent developing the model so as to adequately assess the project’s debt capacity and sensitivity to a range of events;

- The starting point is essentially gathering data from the feasibility study (i.e. if one has already been prepared);
- In a number of cases, the project sponsors may already have an in-house model developed which will be made available to their lead arranger or financial adviser;
- Other key sources of data will include the results / outputs from the various independent consultant reports;

- Review overall outputs to identify “pinch points” and areas that will require detailed financial structuring:
  - Are ratios above acceptable levels;
  - Is desired initial equity sufficient;
  - Is debt tenor likely to be acceptable to potential lenders;
  - Feed in escalation of inflation rates;
- Undertake initial stress test to determine sensitivity of model to a range of likely scenarios;
Financial Modeling – Key Issues for Power Financing

**DATA VALIDATION**
- Validate / update all information in the financial model with final outputs from the following:
  - EPC contract;
  - Lenders Independent Technical consultant’s report;
  - Lenders Independent Market consultant’s report;
  - Lenders Independent Insurance consultant’s report;
  - O&M contract;
  - Updated rates for LIBOR / NIBOR as appropriate;
- Assess impact of all the above on overall project economics;

**STRESS TESTS / SENSITIVITIES**
- Undertake stress tests on the model to determine the following:
  - Is equity injection sufficient;
  - Can the project accommodate existing repayment profile and maturity;
  - How much delay can project withstand;
  - How sensitive are the ratios to given changes in key variables (i.e. interest rates, exchange rates, changes in capital costs, construction costs, etc);
- Derive “bankers expected case” which will accommodate all the above perceived risks – you will have two scenarios built into this “bankers expected case” (i) showing the pinch points and (ii) showing what changes need to be made to the overall financing structure to enable you move from a “bankers expected case” to a “banking base case”
Engage with client / sponsors to achieve the following changes:

- Injection of additional equity;
- Agreement to inject standby equity to accommodate likely completion delay;
- To obtain additional liquidated damages from the EPC contractor to accommodate likely construction cost increase;
- To obtain additional liquidated damages from the O&M contractor to accommodate likely reductions in plant performance;
- Building an interest rate and or exchange rate hedge into the financing plan;

Ensure client is “hand held” / directed in the right direction;
Engage jointly with client / sponsors and lenders to achieve the following changes:

- Increase in debt tenor;
- Ideal repayment profiles which the project can accommodate;
- Agreement to inject standby debt to accommodate likely completion delay;
- Finalize any impact of debt pricing and fees;
- Timing for funding of reserve accounts and quantum they will be satisfied with – the LTA will also be involved in agreeing quantum for the maintenance accounts;

Ensure the financial model is constantly being updated and re-run to ensure the desired ratios are being achieved / moving towards what will be accepted as all the above changes and negotiations are taking place;

It is your responsibility as the financial modeler to raise any alarms / red flags if it is clear that the direction of negotiations / changes will not achieve the desired result / ratios / financing structure;
THE BASE CASE

- You only have a Base Case once all the issues discussed on the preceding pages have been made and your ratios are at or above the minimum thresholds;

MODEL DOCUMENTATION

- Documentation is important and therefore the changes made over time should be logged in the audit trail worksheet;
- The actual key assumptions and use of the model should be set out in a “User Manual / Data Book of Assumptions”;
- Both of the above will be a useful reference for all parties – potential lenders, the client, the lenders independent consultants who will be expected to provide sign-off of their individual sections of the model and also the model audit consultant;

MODEL AUDIT

- The model audit is undertaken to provide all parties (particularly the lending banks) with the assurance that:
  - All algorithms used in the model are correct;
  - The tax and accounting assumptions are correct and have been computed correctly;
  - The model produces the desired results after all the various sensitivity changes have been undertaken;
- The model auditor will be expected to give a 1 / 2 page report on the model;
- Finally, the audited Base Case should be saved as the VERY FINAL version which will be the reference version for any changes to be made post financial close;
Financial Modelling - key issues for power financing

ASSESSING THE CASHFLOWS:

- Capital / Construction costs;
- Revenue line item 1:
  - Normal contract hours;
  - Turbine availability factor;
  - Power plant hours of operation;
- Revenue line item 2:
  - Nominal Power Capacity (MW);
  - Energy Declared Available;
- Revenue line item 3:
  - Feedgas Energy;
  - Daily Gas Throughput;
- Operating Costs;
- Debt Service;
- Reserves;
- Working Capital
- Tax;
## Financial Modeling – Key Issues for Power Financing

<table>
<thead>
<tr>
<th>REVENUE LINE ITEM</th>
<th>UNIT</th>
<th>TRACK</th>
<th>RESULT</th>
<th>FORMULA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generating Plants Operating Hours</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Normal Contract Hours - Power Plant</td>
<td>hours</td>
<td>A</td>
<td>2,160 hrs</td>
<td>Days in period x number of hours</td>
</tr>
<tr>
<td>- Turbine Availability Factor</td>
<td></td>
<td>B</td>
<td>80.0%</td>
<td>Input Data</td>
</tr>
<tr>
<td>- Hours of operation - Power Plant</td>
<td>Hours</td>
<td>C</td>
<td>1,728 hrs</td>
<td>A x B</td>
</tr>
<tr>
<td><strong>Key Inputs for Power Generation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nominal Power Capacity</td>
<td>MW</td>
<td>D</td>
<td>120.0 MW</td>
<td>Input Data</td>
</tr>
<tr>
<td>- Energy Declared Available</td>
<td>GWh</td>
<td>E</td>
<td>207 GW hrs</td>
<td>C x D / 1,000</td>
</tr>
<tr>
<td>- Actual Energy Dispatched</td>
<td>GWh</td>
<td>F</td>
<td>197 GW hrs</td>
<td>E x Dispatch Rate of 95%</td>
</tr>
<tr>
<td><strong>Power Plant Feedgas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Feedgas energy from GSU</td>
<td>Tbtu</td>
<td>G</td>
<td>1.86 T btu</td>
<td>(Heat Con Rate x C x D) x (1+Degradation)</td>
</tr>
<tr>
<td>- Daily Gas Throughput</td>
<td>MMScfd</td>
<td>H</td>
<td>20.3 MMScfd</td>
<td>(G / Feedgas Energy Content)</td>
</tr>
<tr>
<td>- Feedgas Charge based on GMP including gas transmission cost</td>
<td>MMBTU</td>
<td>I</td>
<td>289.9 MMBtu</td>
<td>Gas Cost</td>
</tr>
<tr>
<td>- Feedgas Tariff based on GMP</td>
<td>KW hour</td>
<td>J</td>
<td>3.5 KW hr</td>
<td>(I x Plant Heat Con Rate)</td>
</tr>
</tbody>
</table>
### Financial Modelling - key issues for power financing

<table>
<thead>
<tr>
<th>Financial Component</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity charge</td>
<td>Capacity charge $\times$ number of days $\times$ MW $\times$ MYTO;</td>
</tr>
<tr>
<td>Fixed O&amp;M charge</td>
<td>Fixed O&amp;M charge $\times$ number of days $\times$ MW $\times$ MYTO;</td>
</tr>
<tr>
<td>Variable Payment</td>
<td>Variable Payment $\times$ number of days $\times$ MW $\times$ MYTO;</td>
</tr>
<tr>
<td>Energy Payment</td>
<td>Energy Dispatched $\times$ Feedgas</td>
</tr>
</tbody>
</table>
Financial Modeling – Key Issues for Power Financing

So what have you modelled?

Typical power plant cashflows:.................

- All Bank Debt Drawn
- Project Loan Drawn
- Equity subscribed
- Senior Debt Service
- Zakat
- Opex
- Capex
- Dividends
So what have you modelled?

Typical power oil & gas cashflows:

- Year 1: Negative Cash - 500.0
- Year 2: Revenues - 1,000.0
- Year 3: All Bank Debt Drawn - 1,500.0
- Year 4: Project Loan Drawn - 2,000.0
- Year 5: Equity subscribed - 2,500.0

Other cashflows include:
- Year 1: Senior Debt Service - (500.0)
- Year 2: Zakat - (1,000.0)
- Year 3: Opex - (1,500.0)
- Year 4: Capex - (2,000.0)
- Year 5: Dividends - (2,500.0)
Modelling – monthly / quarterly build up

**Advantages:**
- Captures timing differences in cash flows (overdraft / working capital requirement?);
- Enables quarterly repayment profile if required – to match cash flows;
- Tracks seasonality where revenues in model are driven by cyclical demand / volume;
- Captures turbine / plant downtime
- Timing of capital expenditure and funding requirement;
- More flexible and easier to sensitize.

**Drawbacks:**
- Spreadsheet end up larger in size;
- Much more time consuming to build;
- Appears unusually complex but not necessarily the case.
## Modelling – key banking ratios

<table>
<thead>
<tr>
<th>1 - DSCR</th>
<th>Cash flow available for debt service in period</th>
<th>Principal and interest installments for the period</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - ICR</td>
<td>Cash flow available for debt service in period</td>
<td>Interest payment due for the period</td>
</tr>
<tr>
<td>3 - LLCR</td>
<td>NPV of future cash flow to service debt over loan life</td>
<td>Principal and interest outstanding for the period</td>
</tr>
<tr>
<td>3 - PLCR</td>
<td>NPV of future cash flow to service debt over project life</td>
<td>Principal and interest outstanding for the period</td>
</tr>
</tbody>
</table>

Above represent only a select few ratios looked at for assessing project economics but financing term sheet will include others such as balance sheet ratios.....
SUMMARY & CLOSING REMARKS
Summary and Closing Remarks

- Evaluate the entire value chain;

- Value chain must be contractually linked - obligations must be replicated in the model, project agreements and financing documents;

- Track record is critical;

- Build-in cushions across the entire value chain;

- Seek independent expert opinion;

- The financial model is fundamental, start early - *do not rely on the sponsors projections*;

- Sensitize each cash flow line;

- Documentation
Q & A
Appendices
About The Presenter
About the presenter

Patrick joined FBN Capital in December 2011 having spent 3 years heading the project financing department at Stanbic IBTC Bank. He joins FBN Capital with over 20 years banking experience of which 17 years has been dedicated primarily towards financial advisory, structuring, debt arranging / lending and closing of big-ticket project finance transactions in the UK, Portugal, Saudi Arabia, Qatar, Oman, U.A.E. and other GCC countries. He has worked on project financings in excess of US$67 billion since 1996. As head of FBN Capital’s project and structured finance division, he is responsible for leading the deal team involved in originating, structuring, executing and closing of all the firm’s project and structured finance business.

Patrick’s project financing career commenced as a financial modeller at London Underground Limited’s (“LUL”) project finance advisory group as an executive member of the deal-team developing complex financial models, business cases, payment mechanisms and financing options where he advised and negotiated on various projects being implemented by London Transport utilizing the UK Government’s Private Finance Initiative (“PFI”) at that time. His career further developed at the London branch of Bayerische Landesbank’s (“BLB”) structured finance group where he undertook various project finance (PFI / BOT / PPP) duties, and subsequently as Assistant Manager, Project & Trade Finance Department, GCC Group, at Arab Petroleum Investments Corporation (“APICORP”) Saudi Arabia where he was actively involved in a varied number of power, petrochemical, oil & gas and shipping transactions both in the execution, advisory, lending and syndication of facilities. He was subsequently appointed Senior Corporate Banker and acting Head of project finance at The National Commercial Bank (“NCB”), Saudi Arabia with prime responsibility for managing the banks project finance lending and advisory activities. At NCB Patrick led the deal team advising the Kingdom of Saudi Arabia on the US$11 billion plus Saudi Railway expansion Projects.

Patrick has been involved in structuring and closing power project financing transactions in the UK and the Middle East since 1996. He has worked on power transactions in excess of US$3.8 billion (UK and Middle East combined) and was involved in financing the first wave of independent power projects (“IPP”) launched in the Middle East from 2001 through to 2006. Prior to returning to Nigeria in 2008 he was Managing Director and Head of Project and Corporate Finance at Bahrain based Gulf One Investment Bank, Bahrain. His notable achievement at Gulf One was setting up the bank’s project and corporate finance division and leading the deal team responsible for funding the King Abdulaziz International Airport (Hajj Terminal) – the first ever project financing for an airport in the GCC on a 100% Islamic finance basis.

Patrick Mgbenwelu is a regular industry speaker and panelist and writes case studies / articles in various PPP / project finance publications – i.e. Infrastructure Journal, Project Finance Magazine and Project Finance International. He is an Associate of the Chartered Institute of Bankers (“ACIB”) London, holds an M.Sc. Finance & Investment (London), and an MBA (London).
Case Study
Case Study 1: Shuaibah IWPP, Saudi Arabia

- The first IWPP (Independent Water & Power Project) development in Saudi Arabia, which laid out the framework for other IWPP transactions in the Kingdom of Saudi Arabia
  - framework mirrors that in UAE, Qatar and Oman
- PPP: Build, Own and Operate (“BOO”)
- 20 year Power & Water Purchase Agreement (“PWPA”)
- 36.5 months construction schedule
- Desalinated Water production (880k cm per day, using 12 units of Multi Stage Flash technology)
- Power generation (900 MW 3 units, light crude oil fired burners, back pressure steam turbines)
- 100% of water and power capacity and output sold to Government-owned entity for 20 years
- Main project parties are Saudi & Malaysian sponsors (60%) and Kingdom of Saudi Arabia (40%)

Project Summary

Project: Shuaibah IWPP
Sector: Power & Water
Total cost: US$2.45 billion
Debt term: 20 years

Groundbreaking IWPP in Saudi Arabia laying down the framework for future IWPP projects in the country.
Case Study 1: Shuaibah IWPP, Saudi Arabia — Finance Plan

**Finance Plan**

<table>
<thead>
<tr>
<th>Source</th>
<th>Drawdowns (US$m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HERMES</td>
<td>400</td>
</tr>
<tr>
<td>Islamic Tranche</td>
<td>225</td>
</tr>
<tr>
<td>KEXIM</td>
<td>418</td>
</tr>
<tr>
<td>Bank Debt</td>
<td>875</td>
</tr>
<tr>
<td>Pre-completion Revenues</td>
<td>233</td>
</tr>
<tr>
<td>Equity</td>
<td>496</td>
</tr>
</tbody>
</table>
Case Study 1: Ownership Structure

PRIVATE SECTOR ENTITIES
- Saudi Sponsors
- Malaysia Sponsors
  - 50%

GOVERNMENT OWNED ENTITIES
- Public Investment Fund
  - 32%
- Saudi Electricity Company
  - 8%

Saudi Malaysia Water & Electricity Co Ltd
(Project developer / Bidder)
- 60%

SHUAIBAH Water & Electricity Company
(Project Company / Borrower)

- PIF 32%
- ACWA Power Projects 12%
- Khazanah 12%
- Malakoff 12%
- SEC 8%
- Tenega Nasional Berhad 6%
- SHUAIBAH 6%
- Saudi Sponsors 8%
### Case Study 1: Bankability Issues

#### Completion Risk
- LSTK price and date certain EPC contract
- Joint Venture between Doosan & Siemens (i.e. experienced EPC Contractors)
- Significant LD’s for project delay
- Comprehensive construction period insurances plus extended Warranty period

#### Technical Risk
- Black & Veatch as lenders Technical Adviser
- EPC contractor tests prior to handover
- PWPA sets minimum guaranteed capacities & performance levels
- Plant based on current but proven steam turbine technology

#### Fuel Supply Risk
- Saudi Aramco (National Oil Company) is supplier of light crude (tolling structure)
- Plant site has reasonable fuel supply storage facilities
- Incremental cost for back-up fuel passed to Government

#### Operating Risk
- Lenders Technical Consultant signs off on O&M arrangements
- Technical sponsor locked-in for 10 years post PCOD
- Sponsor equity backed by LC from institution acceptable to the lenders
- Robust operating period insurances
- Tariff structure covers debt service, fixed O&M, back-up fuel and other variable O&M

#### Other Risks
- Tariff & Termination Payments guaranteed by MOF
- 100% construction period interest rate hedge and 75% 5-years pre maturity
- English law PWPA and Bahrain law for arbitration
Indicative Contractual Structure

**Example Debt Funding:**
- World Bank / Africa Development Bank Facility

**Equity Funding:**
- Private Sector Sponsor SPV
- MoF/ Fed. Govt. State Govt

**IPP Company**

**Contractors/ Service Providers:**
- EPC Contractor
  - Fixed Price Lump Sum Turnkey Contract
  - Performance Guarantees
- O&M Contractor
  - Long-term Contract
  - Aligned to PPA obligations
- Equipment Provider
  - Long term Service Agreement
  - Warranties

**Gas Supply / Fuel Supply Agreement**

**Limited Recourse Project Finance**