Two of a Kind: Lessons from Tunisian Independent Power Projects

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Acronyms

BG    British Gas
BNP   Banque Nationale de Paris
BOO   Build Own Operate
CIPIE Commission Interdépartementale de la Production Indépendante d’Electricité
COD   Commercial Operation Date
CPC   Carthage Power Company
CSPIE Commission Supérieure de la Production Indépendante d’Electricité
DSM   Demand Side Management
EPC   Engineering Procurement and Construction
ESI   Electricity Supply Industry
ETAP  Entreprise Tunisienne d’Activités Pétrolières
GDP   Gross Domestic Product
HFO   Heavy Fuel Oil
ICB   International Competitive Bid
IMF   International Monetary Fund
IPP   Independent Power Project/Producer
JBIC  Japan Bank for International Cooperation
LPG   Liquid Petroleum Gas
MT    Metric ton
MW    Megawatt
MWh   Megawatt hour
O&M   Operation and Maintenance
OPEC  Organization of Petroleum Exporting Countries
PPA   Power Purchase Agreement
PSEG  Public Service Enterprise Group
RfP   Request for Proposal
ROR   Rate of Return
S&P   Standard & Poors
SEEB  Société d’Electricité d’El Biban
SPV   Special Purpose Vehicle
STEG  Société Tunisienne de l’Electricité et du Gaz
Tcf   Trillion cubic feet
TND   Tunisian Dinar
UK    United Kingdom
US    United States
VAT   Value Added Tax
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Abstract

This paper narrates the experience of Tunisia’s two independent power projects (IPPs), which were developed as part of the country’s electricity supply industry reforms. Although both plants use gas as their primary energy, the two projects vary in size, fuel supply arrangements, power purchase agreements, and the legal frameworks under which they were developed. With Rades II, the country’s first IPP, loans have been indexed to multiple currencies and, to date, charges to the utility remain affordable. This is partly due to the fact that the Tunisian dinar (TND) has been relatively stable since the inception of the contracts - unlike in other emerging economies where currency devaluations have resulted in significant increases in charges. With El Biban, the country’s second IPP, fuel supply problems have interrupted production for extended periods, impacting on overall plant performance and revenue. Although the loss in revenue is threatening the financial viability of the plant, it does not have a significant impact on the off-taker and national utility for the following reason. El Biban represents less than 1% of the country’s installed capacity with no guaranteed availability in terms of its contract with the off-taker. Still the plant is crucial in understanding Tunisia’s overall experience as well as particularly relevant to other countries throughout Africa, such as Nigeria and Tanzania, which have developed power plants as part of a larger gas infrastructure project.
1. Introduction
Starting in 1987, the Tunisian government, with support from the International Monetary Fund (IMF) and the World Bank, engaged in a series of important structural reforms, covering nearly all aspects of the country’s economy. One of the main arms of this reform programme included a privatisation initiative, with respect to public companies and state-owned enterprises.

Although government sought to open up the economy to increase efficiency, privatization did not mean the absence or elimination of government. The goal was, and continues to be, to create a partnership between public and private institutions, reducing the state’s direct involvement in industries, but maintaining state control of policy formulation and regulation. Specific attention was given to: reducing the state’s debt burden, which had been steadily increasing during the early 1980s, as well as shifting the burden of skills development and training to private entities—a cost that had been carried almost wholly by the state until then (Republic of Tunisia Prime Ministry, 2004).

Privatisation manifested itself in a number of different forms, including via independent power projects (IPP), after the opening up of the electricity sector in 1996. IPPs were developed under Build Own Operate (BOO) frameworks and long-term Power Purchase Agreements (PPA) with the state-owned national utility, Société Tunisienne de l’Electricité et du Gaz (STEG). It is these projects and the contractual relationships that define them that form the basis of our paper.

The paper is structured into three parts. The first section provides a brief description of the energy sector, and in particular the electricity supply industry in Tunisia, and the reforms that have taken place to liberalise this sector of the economy. The second section describes the two independent power projects that have been supplying power to the national grid since power sector reform started and the contractual agreements that have been reached by the various stakeholders. The last section discusses some of the key elements that affected project outcomes.

The main objective of the paper is to analyse the development and investment outcomes, namely the extent to which affordable, reliable power was delivered and investors achieved expected returns and increased their market share. Embedded in this analysis is a discussion of what determined the outcomes—what did the host country do or not do to impact on more or less positive outcomes. To what extent, for example, did the investment climate impact on the results? Was the state of electricity sector reform a major contributing element? What about actions taken by the investors in terms of the equity and debt arrangements and the fuel supply agreement? How did each of these elements impact, if at all, project outcomes?

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1 These reforms covered nearly all the functional domains of the economy and included amongst others economic regulation, fiscal policy formulation, price controls, foreign trade and investments and banking and financial systems.
2 Legislation for the privatization programme was enacted by law no. 89-9 on 1 February 1989 This was modified by law no. 94-102 on 1 April 1994, law no.96-74 on 29 July 1996, and law 99-38 on 3 May 1999, and was completed by law no.2001-33 on 29 March 2001 (Tunisian Privatisation, 2004).
3 Public companies to be privatized were defined as companies where government held at least 50% direct interest. By 1994, 46 of the 189 public companies that had been earmarked for privatisation were completely or partially privatised either through issuing shares or the sale of assets, and by 2005, more than 160 state owned enterprises had at least been partially privatised.
4 These forms included: selling active business units within a larger company; selling a percentage share of the entity (with government retaining the remainder); selling shares in the business and listing on a stock exchange; mergers and take-overs; and finally granting the right for private generators to sell electricity to the state-owned utility (the means through which IPPs would be developed).
To address these and other questions, the authors adopted an inductive research approach, initially conducting structured literature searches, followed by a country visit and detailed interviews with key stakeholders. The result of these efforts is the present study, which, in addition to documenting and analyzing the Tunisian IPP experience, contributes to a wider body of work, which seeks to analyze outcomes of IPP projects across the developing world.

2. The Tunisian energy sector
With natural gas powering both of Tunisia’s IPPs, our discussion commences with a review of the country’s petroleum sector, followed by an overview of the electricity supply industry.

2.1 The petroleum sector: the emergence of gas
During the last three decades, the energy sector has played an important role in Tunisia’s economy. Throughout the seventies, oil represented 50% of the country’s total exports, contributing considerably to financing social and economic development as well as launching heavy industrial projects (Ministry of Industry and Energy, 1999). Oil production did not, however, keep pace with energy demand, and by 2000, the country became a net oil importer (Ford, 2003). To counter this trend, the government introduced the 1999 Hydrocarbon law, which specifies royalties of 10% for oil and 8% for gas to foreign companies for successful explorations. The aim is to attract foreign investors who otherwise pass over Tunisia, especially for Algeria and Libya. A reduction in the tax rate (from 75% to 50% for foreign firms) has also been offered to lure investors, provided the state owned oil company, Entreprise Tunisienne d’Activités Pétrolières (ETAP), takes a 40% share in the deal.

Despite new exploration efforts, production in Tunisian oil fields continues to decline, and the country is increasingly turning to natural gas to feed its domestic demand. Tunisia has 2.8 trillion cubic feet (tcf) of natural gas reserves, and it is estimated that this constitutes 47% of its fossil fuel reserves. By contrast it produced only 66 billion cubic feet in 2000 (Ford, 2003). The British Gas Group (BG), the largest single investor in Tunisia’s gas-energy fields, supplies around 60% of Tunisia’s gas consumption (2004).

5 Interviews and written queries were conducted with eight stakeholders throughout 2006 in Tunisia. Interviews were followed by email correspondence to clarify discussion points. Stakeholder interviews included representatives from the Ministry of Industry and Energy, Société Tunisienne de l’Electricité et du Gaz (STEG), Carthage Power Company (CPC) and Société d’Electricité d’El Biban (SEEB). Due to sensitivity of data, stakeholders have not been identified by name and are only identified by organizational affiliation in the text.

6 The Program on Energy and Sustainable Development (PESD) at Stanford University has led a survey of IPPs across developing countries: http://pesd.stanford.edu/ipp. The Africa portion of the global study has been coordinated by the Management Programme for Infrastructure Reform and Regulation (MIR), based at the University of Cape Town’s Graduate School of Business. Detailed case studies of IPP experiences in Egypt, Kenya, Morocco and Tanzania have been completed in 2005 and 2006, available at http://www.gsb.uct.ac.za/gswebb/default.asp?intpagenr=309. The Tunisian IPP evaluation forms part of this global study and was led by MIR researcher Isaac Malgas.

7 A strategic switch away from energy intensive activities into services including tourism, which has helped to maintain the country’s energy balance.

8 Although operating on a smaller scale, oil companies from France, the UK, Italy, Germany, Hungary, Canada and Saudi Arabia amongst others are all currently active in Tunisia; furthermore Tunisia has known private participation in its hydrocarbon industry since exploration first began.

9 While expanding the Miskar offshore gas field in the south-east, BG has committed to supply a significant amount of Tunisia’s domestic gas requirement through 2020. The Miskar field produces approximately 65% of the country’s yearly gas supply (Ford, 2004).
It is the abundance of local gas resources coupled with gas taken from the Trans-Tunisia gas pipeline that has helped shape the electricity landscape in the country in terms of fuel and technology choice, with most of Tunisia’s electricity being produced from natural gas. The country receives 5.25 to 6.75% of the Algerian gas in the Trans-Mediterranean pipeline, linking Sicily with Cap Bon, in the north of Tunisia. As of 2004, natural gas accounted for 98% of all fossil fuels used in electricity production.

![Figure 1: Gas Utilisation in the Tunisian Energy Sector](image)


From the figure above, it is evident that more than three quarters of the gas supplied by STEG is for electricity production.  

2.2 Overview of the Tunisian electricity supply industry

Electricity production in Tunisia started in 1930, and by the time of the country’s independence in 1956, seven private companies were producing and distributing electricity. These seven companies were nationalised in 1962 to form one electricity company responsible for the generation, transmission (including importing and exporting) and distribution of electricity and gas. This consolidation brought about the establishment of the national utility Société Tunisienne de l’Electricité et du Gaz (STEG), with STEG being granted exclusive rights for generation, transmission and distribution of electricity (United Nations Development Programme, 2004).

From 1962 up until 1996, STEG, which remained a publicly owned company, was the sole entity allowed to provide electricity services – this excluded self generating plants which in 1962

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10 Industrial customers, public distribution, and hotels account for the major users of gas amongst the non-electricity-producing customers. The number of gas customers have increased significantly from 121,234 customers in 2000 to 207,292 customers in 2004 resulting in an expansion in the gas network from 1,633 km in 2000 to 1,759 km in 2004.

11 Some references cite that there were eight companies but it is believed that two of these companies had one owner.

12 Nationalization decree, bill no. 62-8 of 3 April 1962, which was subsequently ratified by bill no. 62-16 of 24 May 1962, outlined STEG’s position as exclusive provider.
constituted less than 1% of the country’s installed capacity. In 1996, through law no. 96-27, the state authorized private investors to generate and sell electricity to STEG. It was the 1996 legislation that opened the door to Rades II - the country’s first IPP. The country’s second IPP, El Biban, came through a different door. Alluded to earlier, the Hydrocarbon Law of 1999 also permitted companies active in upstream natural gas development to, without a formal bidding process, operate gas-fired power plants and to sell the electricity to STEG.

Despite these steps to open up the electricity market, little has changed. STEG remains a vertically integrated state-owned utility, albeit with separate accounting systems for generation, transmission and distribution, respectively. Separate accounting systems have also been cascaded down to different business units within the utility. Furthermore, it is unlikely that further significant sector reforms will be introduced with respect to unbundling in the short to medium term. With the relatively small size of the market coupled with the apparent lack of compelling drivers for such reforms, no significant benefits for the sector can be seen at present. It should be noted in this context that STEG is a commercially viable and technically efficient utility, as will be described further in Section 2.3 below, and not dependent on the state for financial aid.

2.3 The generation sector: good performer

The installed capacity in Tunisia totals 3 010 MW. Of this total, only 2.7% is renewable, comprising hydroelectric power plants (62 MW) and wind farms (19 MW). Thus, the majority of the country’s installed capacity is in the form of thermal power stations. These figures roughly match actual production as well. In 2004, 11562 GWh of electricity was produced, with hydro and wind accounting for 1.3% and 0.4% of production respectively, and fossil fuels, largely natural gas, making up the remainder. Although a net energy importer, most of the fuel used for power generation is produced from Tunisian sources. IPPs represent just over 20% of installed thermal capacity, but accounted for roughly a quarter of Tunisia’s electricity production in 2004.

STEG’s plants are generally perceived to be well-managed, with an average availability in the order of 90%. The table below lists the in-service plants with their availability factors for 2003 and 2004.

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13 Ordinance no. 96-1125 of 20th of June 1996 laid down terms and procedures necessary for granting rights to private generation companies.
14 Rades I, commissioned in the 1980s, is owned and operated by STEG and is situated in the same industrial zone as Rades II. Together the two units Rades A and B constitute Rades I.
15 The same applies for the gas divisions within STEG.
16 Figures are current as of end of 2004 and are based on STEG’s 2004 Annual Report. It is estimated that in addition approximately 100 MW are generated by self-producers (Ford, 2004). This comprises mainly generation controlled by the Tunisian phosphate industry, which sells excess capacity to STEG.
17 Rades II, the country’s first IPP accounted for 23.5% of total electricity generated and SEEB, the country’s second IPP, accounted for 1.1%.
Table 1: Plant Availability Factors

<table>
<thead>
<tr>
<th>Plant</th>
<th>Availability Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Rades A</td>
<td>96.44</td>
</tr>
<tr>
<td>Rades B</td>
<td>90.26</td>
</tr>
<tr>
<td>Sousse A</td>
<td>78.50</td>
</tr>
<tr>
<td>Ghennouch</td>
<td>95.54</td>
</tr>
<tr>
<td>Sousse – CC</td>
<td>73.80</td>
</tr>
<tr>
<td>Gas Turbine 120MW</td>
<td>97.00</td>
</tr>
<tr>
<td>Gas Turbine 20/30 MW GN</td>
<td>92.40</td>
</tr>
<tr>
<td>Gas Turbine 20/30 MW GO</td>
<td>96.60</td>
</tr>
<tr>
<td>IPP Rades II</td>
<td>93.31</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>90.43</strong></td>
</tr>
</tbody>
</table>

*Source: STEG Rapport d’Activité, 2004*

Tunisia saw electricity consumption increase by an average of 7.7% per annum, between 1997 and 2001 (TERNA, 2004). In 2002 the rate slowed to about 3.5%, with similar growth recorded through to 2005.

The country has a well-developed electricity grid across the country, especially in the northern and central areas. In 2004 the transmission system comprised 2 431 km of 225 kV lines (up from 1 236 km in 2000), 1567 km of 150 kV lines and 986 km of 90 kV lines (STEG Activity Report, 2004). The system is interconnected with Algeria and Libya at the 225 kV level. A 400 kV link has recently been implemented between Algeria and Tunisia, but it is going to be operated under 225 kV for several years. The distribution system has been expanded over wide areas to meet the national electrification goals, which has resulted in Tunisia being the top ranking country on the continent in terms of national electrification. The combined electrification rate (rural and urban) is approximately 99% for the country’s 10 million inhabitants (STEG Annual Report, 2004).

2.4 Regulation: in house, for now

Tunisia has no independent electricity regulator. One of the main reasons cited for this is the small size of the country’s electricity market. It is foreseen by industry professionals, however, that there may be a need for an independent regulator as Algeria, Morocco and Tunisia work towards an integrated ESI. In December 2003, these three North African countries signed an accord with the European Commission that they would propose to initiate plans by 2006 (which they have done) for a North African network that would eventually be integrated with the European Union (STEG Annual Report, 2004, p.46). With an increasingly large and complex system, the need for an independent regulator is thus expected.

Presently, the government is the de facto regulator with the Ministry of Industry and Energy determining tariffs based on proposals from STEG. In setting tariffs, the Ministry weighs the following factors: the financial viability of STEG; the requirements of lenders; inflation and the cost of living. Tariffs are categorized by voltage level and time of use. The tariff structure for the low voltage sector has a progressive component to encourage the efficient use of electricity.18

18 To further encourage the efficient use of energy, the Ministry of Industry and Energy has embarked on a demand-side management (DSM) programme for electricity. The aim is to promote the use of cleaner fuels such as natural gas and liquid petroleum gas (LPG) rather than heavy fuel oil (HFO) and diesel, and create
Despite upward pressure on tariffs due to increases in fuel prices (two increases in 2005 by between 2-3% and again in January 2006 by 6.5%), tariffs remain low by European standards.\textsuperscript{19} There is, however, a drive to have cost reflective tariffs, and efforts are underway to reduce cross-subsidization; these efforts have, however, been compromised by the surge in oil prices and the state's apparent need to protect residential consumers.

3. Independent Power Producers: a power experiment

Early in 1995, when broader macro-economic reforms, described in Section 1, were underway, the government conducted a feasibility study to assess the potential for private participation in the Tunisian ESI. The feasibility study was carried out by the IPP Group, a small team of high level managers from STEG, under the direct authority of the Minister of Industry and Energy.

This study concluded, within a few months, that IPPs may indeed have a favourable impact. As a result, the government’s Structural Adjustment Plan, aimed at decreasing the budget deficit and especially the percentage of foreign debt, opted to include IPPs in its portfolio. The Ministry of Industry and Energy also posited that the introduction of private capital in the electricity sector would send a strong signal to the international investment community that Tunisia was committed to opening up its economy and liberalizing its markets.

Not losing any time, in June 1995, the government invited international investors to propose a range of projects. The ESI soon emerged as the most sought after sector, with 84 potential investors indicating interest. With the feasibility study, noted above, serving as a general framework, the IPP Group subsequently prepared pre-qualification and call for bid documents.\textsuperscript{20}

3.1 Carthage Power Company, Rades II

Two years after the feasibility study was conducted, in 1997, the Ministry of Industry and Energy launched an international competitive bid (ICB) to build the Rades II power station, a combined cycle natural gas-fired plant of 400-500 MW.\textsuperscript{21} A series of standard investment incentives were extended including: VAT and customs duties exemptions on all imported equipment that could not be sourced locally pre-Commercial Operation Date (COD); and a 5-year tax holiday on companies’ income tax (post-COD), which was to facilitate loan repayment. In addition, the government committed to support permit applications in order to minimise any potential delays on the project.

Seventeen consortia responded to the pre-qualification bid, which stipulated that the project consortium have extensive experience in the construction, project management, maintenance and

\begin{footnotesize}
\begin{itemize}
\item[19] According to the 2004 STEG Annual Report, Tunisia’s industrial and residential tariffs were seen to be competitive with those in Greece, Italy, France, Spain, Belgium, and Portugal, and also with those in Morocco and Canada (Toronto).
\item[20] K&M, a US based consulting company with extensive experience in contracting private power, selected by tender on short list were appointed as consultants to prepare pre-qualification and call for bid documents and assist the IPP Group during negotiations.
\item[21] Technical specifications are listed in Appendix A.
\end{itemize}
\end{footnotesize}
operation of power plants as well as experience in non-recourse project financing and the
capacity to finance the specified equity component of the required capital. Ten firms were short-
listed, and in the final assessment, the following three consortia were retained:

- PSEG (a US-based firm) / Marubeni (Japan) / Sithe (US)
- National Power (UK) / Marathon (US)
- Intergen (US) / Endesar (Spain)

The selection criteria were based primarily on the price per MWh for which the electricity would
be sold to STEG, over the course of 20 years. To ease the evaluation process, in the request for
proposal (RfP) for the BOO project the Ministry specified acceptable interest rates, currency
exchange rates inflation rates, discount rates, fuel price and load profiles. This would later also
facilitate bid comparison and adjudication.

The PSEG / Marubeni / Sithe consortium ultimately offered the lowest price per MWh, and the
Ministry subsequently started negotiations with this triumvirate.\textsuperscript{22} It should be added that each of
the partners in the consortium had a good reputation for executing these types of projects as well
as a favourable balance sheet to fund the equity component of the capital. The firms’ technical,
project and financial track records meant that they also were in a position to negotiate favourable
rates with the lending financial institutions.

After seventeen months of negotiations, in March 1999, the project agreements were signed, and
financial closure was reached in August of the same year. Total funding came to US$ 260.7
million, with debt constituting 70\% of capital (Turki, 1999).\textsuperscript{23} Soon thereafter, the Carthage
Power Company (Pty) Ltd (CPC) was registered as a special purpose vehicle (SPV). Although
the targeted COD was for September 2001, the time lost, due to extended negotiations, meant
that the plant came online eight months later than originally foreseen.

Delays may be partly attributed to issues related to land. The site where the plant was to be built
belonged to the state and had been leased to STEG. Tunisian law specifies that equipment that is
constructed on land belonging to the state falls under state ownership. Thus in order to assuage
lenders and investors alike against possible expropriation, a decree was issued changing the land
to the private domain, which allowed the sub-lessee (CPC) to grant rights on the equipment to the
lenders.

\textsuperscript{22} The second and third ranked bidding consortia were, however, kept on standby in the event of
negotiations failing with the first.
\textsuperscript{23} The project agreements were signed on 24 April 1999 and came into force on 30 April 1999.
3.1.1 Rades II: the agreements

Like most IPPs, the project was backed by a long-term PPA, which ensured that equity and debt holders would recoup the US$ 260.7 million in addition to a favourable return, through the fixed capacity charge, tied to a minimum availability of 90%. The 20-year PPA has been front-end loaded with the debt paid off during the first ten years (although eight years after COD since repayment starts in the first two years of construction). All charges in the PPA are payable in Tunisian dinars, and are indexed to a basket of currencies proposed by the Tunisian Central Bank. Since the introduction of the Euro (€) currency in 2002, this has translated roughly into a 60/40 split in €/US$ currencies.

The fuel agreement was simplified by the fact that STEG is the exclusive buyer and distributor of natural gas in Tunisia. With gas supplied by STEG, there are no take or pay obligations on the fuel and the costs are passed through to STEG in accordance with the governing agreements in the PPA (including that CPC is responsible for complying with the stipulated heat rates).

Provision was made for arbitration by Tunisian law at the International Chamber of Commerce in Geneva until the entire debt payment is covered. Finally, an escrow facility is a requirement of the PPA, however, figures have not been made public.

3.1.2 Rades II: stakeholders

The stakeholders in Rades II are numerous with changes noted in CPC since project inception. During construction, Sithe exited the project due to internal restructuring within the company. Thereafter the initial split between PSEG, Marubeni and Sithe of 35%, 32.5% and 32.5%, respectively, changed. Sithe’s shares were absorbed by the two remaining partners, and the present arrangement is a 60/40 split between PSEG and Marubeni. The figure below illustrates the interaction of the principal stakeholders with the project.

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24 The charges may be broken into five components: 1) a fixed capacity charge linked to the plant’s required guaranteed availability (of 90%), which is how investors recoup their investment; 2) a fixed charge for the maintenance and operation of the plant; 3) a variable fuel charge that is a pass-through cost to STEG since the fuel is purchased from STEG; 4) a variable charge for the operating and maintenance of the plant; 5) other variable components such as insurance and start-up costs.

25 A number of energy companies globally were restructuring during this period as they were consolidating their positions after negative IPP experiences at the time, partly as a result of the Asian and Latin American financial crises.
The Japan Bank for International Cooperation (formerly Export-Import Bank of Japan) JBIC, (40%) and Banque Nationale de Paris and Sanwa Bank, BNP/Sanwa (60%) were the lead lenders to the project, injecting 70% of the project costs along with other commercial banks. ABB and Alstom won the engineering, procurement and construction (EPC) contract for the supply and installation of the gas and steam turbines respectively (along with completion and output guarantees) and GE International was awarded an initial six-year maintenance contract for the plant.

In 2004, PSEG announced the sale of its 60% shareholding in CPC to BTU Ventures [PSEG Press Release: 2004], a regional energy investment group with financing from both public and private sources in the Gulf Cooperation Council states. BTU formed a joint venture with STEAG of Germany, an Operation and Maintenance (O&M) service provider to form BTU STEAG O&M Services Company, which is now overseeing the maintenance and operating functions of the plant and has therefore replaced GE as well. Although offloading their position, PSEG described Tunisia as “an excellent place to do business” and confirmed that “the sale in no way reflects any unhappiness with [our] experience in Tunisia, but rather is in keeping with the company’s stated strategy of reducing its international risks by selectively selling assets if they can obtain an attractive price,” (African Energy, 2004).
3.2 Société d’Electricité d’El Biban (SEEB): a different experiment

Rades II was not alone in changing the face of power in Tunisia. A second IPP, El Biban Electricity Company (SEEB) has also contributed, albeit on a smaller scale. Although the plant only accounts for approximately 1% of total generation, the authors chose to include it in this report, as it holds several lessons in terms of fuel supply security and investor returns. It is also relevant to countries, which are seeking to commercialize stranded natural gas, such as Nigeria.

SEEB was the outgrowth of legislation enacted by the government to encourage the development of marginal gas fields by foreign independents for use in the power sector, for generating capacities below 40 MW.26 Within this framework, in contrast to the first, it was agreed by the Ministry that a selective tender, rather than international competitive bid, would be conducted.27 Investment incentives extended were as follows: a five year tax holiday, which was to facilitate debt repayment (to approximately five years); customs and import duties exemptions on all imported equipment and spares and VAT exemption. A further boon for all parties, but especially state actors, was that the project, by using previously flared gas, represented a significant environmental benefit.

3.2.1 SEEB: stakeholders

The selective tender resulted in CME, a US-based energy company specializing in development, construction, and financing of energy-related projects worldwide, being chosen as the initial developer for a 27 MW gas-fired plant. CME subsequently set up the BOO deal with Centurion Energy, an international oil and gas company, headquartered in Canada, and Caterpillar Power Ventures, as equity holders. Together these three firms developed the project—both power station and related gas infrastructure, including the pipeline to the well—for a total cost of US$30 million. It is important to note that the plant runs only on natural gas. A significant modification would be required to convert the plant to use an alternate fuel source; this stands in contrast to most of STEG’s thermal stations, which can use an alternate fuel type as a back-up—the significance of which will emerge later in this report.

The figure below shows the major stakeholders to the project:

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26 Marginal gas fields are defined as gas located too far from the gas supply network or where the quality is too low to be sold commercially. This initiative was spelled out in the Hydrocarbon Code Law no. 99-93 of 17 August 1999 and amended by Law no.2002-23 of 14 February 2002.

27 IPPs developed through the 1999 Hydrocarbon law do not need to go through an ICB procedure as in the case of Rades II. This flexibility was favored in the context of attracting exploration companies to prospect and operate in Tunisia and not as part of large scale capacity additions required due to national demand.
Caterpillar was the EPC contractor through their Power Ventures group as well as the O&M contractor in the form of Energy Services International, a Caterpillar subsidiary created specifically to operate and maintain Caterpillar plants worldwide.

The US$20.2 million debt for the project was split equally between ABS International Bank, a British lender with a Libyan majority shareholding, and AMEN Bank, a local Tunisian bank. The equity was split in the same manner between Caterpillar and Centurion Energy, giving each a 50% shareholding in the project. Although CME was the lead promoter of the project, the firm does not have any shareholding in the project; when the ROR on the project exceeds 13%, however, CME starts sharing in the profits. Finally, as with CPC, STEG is the exclusive buyer of the electricity generated.

3.2.2 SEEB: PPA

The price for the electricity in terms of the PPA is calculated as the avoided cost to STEG of producing the power and is indexed to the international oil price (low sulphur content heavy fuel oil), but was capped at US$130 per MT. The bottom limit was set at US$99 per MT. These limits, which correspond roughly to US$19-25 dollars per barrel, were set in the wake of an announcement made by the Organization of Petroleum Exporting Countries (OPEC) in 2002 stating that OPEC member countries would manage production so that oil prices would remain trading in this band. Early in 2002, during the PPA negotiations, the international oil price per metric ton hovered between US$99 and 105 (or US$19 and 20 dollars per barrel).

Other key terms of the PPA are as follows. The duration of the PPA is 20 years depending on gas availability. In contrast to most IPPs, there is no guaranteed availability required in terms of the

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28 Due to the confidential nature of the PPA, actual tariffs charged to STEG were not made known to the authors. 1 barrel = 159 litres = 0.145 MT.
29 This pricing formula was unique to SEEB and does not form part of a general framework.
contract with STEG. Provision is also made in the PPA for arbitration, subject to Tunisian law in the International Chamber of Commerce in Paris.

3.2.3 SEEB: gas supply problems

By December 2002, the agreements had all been signed, including the power purchase agreement and the land lease agreement, and on 9 May 2003 SEEB commenced commercial operations. In April 2004, nearly a year after COD, problems arose with SEEB’s gas supply. The gas was contaminated with hydrocarbon liquids, and the separators were not effective in removing the liquids from the gas to the specified humidity required by the plant hardware. This damaged the ejectors and resulted in degradation of the turbine, which in turn impacted on plant performance. Disputes between the gas supplier and the plant operator, regarding who was responsible for removing the excess liquid from the gas, were resolved four months later when more efficient separators were procured and installed on the plant.

In August 2005, the plant came to a halt again when water entered the gas well and the gas could not be extracted. As of mid-2007, the problem persists, which means that the plant has been out of service for more than have of its life, as it is captive to a single supply well.

As with Rades II, there has been some equity turnover. In September 2005, Centurion sold its share in the project to Candax, a Canadian based exploration company operating in the offshore El Biban / Zarzis oil fields. Candax plans to drill two additional wells, which should significantly alleviate the fuel supply problem. To this end, Candax awarded two different engineering contracts in May 2006 for onshore and offshore work as part of the El Biban redevelopment project. The scope includes the fabrication of two new platforms and a modification to the existing platform. There have, however, been delays, with among the many causes for the delays linked to procurement problems and the re-fabrication of work that originally failed to comply with the required safety and quality certification standards (Candax Energy News Release, 2006). Meanwhile, with SEEB out of operation since August 2005, no money has exchange hands between STEG and SEEB, and the project has been unable to meet its scheduled loan repayment, which is currently under negotiation (Candax Energy MGI Report, 2006).

4. Analysis of outcomes: balancing act

How do we make sense of Tunisia’s IPP story? Who are the losers, if any? Who are the winners, and what are the main lessons to take to the next round of power sector development? Our framework for evaluating results of the IPP experience is based on determining investment and development outcomes, as noted in the introduction. To reiterate, positive development outcomes are defined as reliable, affordable power provided to consumers; positive investment outcomes are where debt is serviced, equity rewarded as expected and there is a potential to increase investments. It is the premise of this study that in order for projects to be sustainable, development and investment outcomes must be roughly in balance. It should be noted that few projects have resulted in outright failures. Instead, what international experience shows is that an imbalance in outcomes is unsustainable and hence a project is generally renegotiated on more equitable terms (although the extent of ‘more equitable terms’ may be an area of debate).

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30 The official inauguration was in July 2003.
31 The main reason cited for Centurion’s withdrawal was to concentrate the firm’s efforts on its Egyptian activities, not fuel supply issues.
In terms of Rades II, public stakeholders have indicated tariffs are reasonable, and had STEG built a similar project the rates would have been comparable. The plant has performed well since COD (until July 2006) with an energy availability factor between 93% and 95% for the period. In 2004, Rades II accounted for nearly a quarter of all the country’s grid electricity. In addition, most of the project’s employees are Tunisian contributing to local employment and capacity building. Investors describe the outcome as positive and have indicated that their expectations were met with respect to their returns. Third party reports, namely stakeholders within the Ministry of Industry and Energy, STEG and CPC, are that the World Bank commended the Rades II independent power project, describing it as one of the best-managed projects at the time that the deals were negotiated.

For SEEB, at present, outcomes are not as positive. Although the cost of fuel is limited and the project reduces gas flaring, STEG only benefits when and if gas is available. With gas production and quality compromised for nearly half of the plant’s life to date, neither investor nor country stakeholders have reaped much benefit. Considering plant capacity is just 27 MW, equivalent to less than 1% of total installed capacity in the country, however, the overall impact from an off-taker perspective has not been too significant.

A general tilt toward investment outcomes at the expense of development outcomes has been the findings throughout the Sub-Saharan African IPPs evaluated in a larger African study, to which the Tunisian report is linked. Thus the outcomes of Tunisian projects point to a new direction, namely that investors have fared relatively well but not at the expense of the public. What is, however, perhaps more interesting, is what determined these outcomes; what were the contributing elements to success? And to what extent did the host country shape these outcomes versus the investor, that is, who should be credited with the success?

5. Country purview: the elements that shaped the outcomes

A suite of elements shaped the outcomes of the IPPs, including a favourable investment climate, clear policy frameworks and planning, coupled with competitive bidding practices and clear regulatory oversight or governance.

5.1 Investment climate: African exception

Investor incentives were extended for both projects, as described above—including a five year tax holiday—but these were virtually no different than incentives extended to projects across the continent. What made the Tunisian experience different is the following.

Tunisia has been ranked among the most competitive countries in Africa, along with Mauritius, Namibia and South Africa (Economic Report on Africa, 2004). The country has been singled out for its low inflation and its stable currency. It is one of the few countries in Africa to have had

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32 In July 2006, problems on one of the gas turbines caused CPC to shut down one unit for two months; to prevent the same incident on the other unit, CPC decided to shut it down as well for an inspection. Finding abnormal deformation of the turbine blades, CPC opted to repair, thereby incurring two weeks of lost production. The plant was again fully operational, from the second week of September 2006.

33 See footnote 11 and Gratwick, K and Eberhard, A 2006.

34 The Central Bank’s focus to preserve the value of the currency with respect to its major trading partners has greatly assisted in maintaining a stable currency. The Tunisian dinar has devalued by roughly an average of 3.5% per year with respect to the US$ over the 10-year period from 1993 to 2002, making it one of the most stable currencies on the African continent. This has also helped to keep inflation low, an average 2.58% for the period 2001 to 2005 [Tunisian National Statistics Institute: 2006] and has aided significantly in avoiding possible stresses with PPA arrangements, in contrast with certain African
Investment grade credit ratings from Moody’s, Standard & Poor’s (S&P) and Fitch, at the time of the IPP investments. The country has consistently been ranked among the least corrupt states in Africa by Transparency International’s Global Corruption Index. All of these interrelated indicators, coupled with significant and consistent GDP growth over the last four decades, have helped make Tunisia a preferred destination for FDI, and more recently IPPs.

Furthermore, as discussed in Section 1, with the privatisation programme well underway (and enshrouded in the country’s Structural Adjustment Plan), Tunisia demonstrated that it was committed to opening up its various sectors to private investors and that it had the political will to attract foreign investment. STEG was also considered a credible off-taker with a sound financial structure and customer tariff structure. In addition, the country was facing significant growth in electricity demand, and some ageing capacity needed to be replaced.

This sound investment climate may be credited in part with attracting IPP investors. Despite the fact that the Rades II bid occurred at a time when private investment in generation in developing countries was beginning to taper off (Sader, 1999), there were 17 tenders submitted for prequalification. This level of competition in turn helped drive down prices resulting in more competitive tariffs for the IPPs.

To further assuage the investors in Rades II, the government of Tunisia committed its support to the project by ensuring that STEG would always be in the position to meet its financial obligations on the project (although it stopped short of offering a sovereign guarantee). JBIC, one of the lead lenders of the Rades II project also received a letter of comfort from the Ministry of Industry and Energy stating that the government was committed to seeing the success of the project.

5.2 IPP policy and regulatory frameworks: quasi independence

The investment environment went a long way in influencing positive outcomes, for public and private stakeholders alike. Also key in impacting outcomes were the policy and regulatory frameworks and oversight.

Policy and planning resided with the Ministry of Industry and Energy. Although privately-financed power was seen as the wave of the future by many donors and policy makers worldwide, the Ministry was not overly ambitious in the early days of its IPP investments. This cautious approach together with a commitment to private-public partnerships may have also contributed to balanced outcomes for Tunisia’s IPPs.

In addition, although policy and planning was vested in the Ministry, to facilitate IPPs as well as introduce a new level of transparency, two new commissions were introduced. When STEG’s monopoly ended on 1 April 1996, decree no. 96-1125 of 20 June 1996 stipulated that ICB practices should be followed for all new generation projects and oversight would rest with the Commission Supérieure de la Production Indépendante d’Electricité (CSPIE) and the Commission Interdépartementale de la Production Indépendante d’Electricité (CIPIE).

The roles of the two commissions are summarized as follows: the CSPIE, also known by its English translation as the Higher Commission for Independent Power Production, was an inter-
countries (namely, Egypt, Kenya and Tanzania, which have all been impacted by currency devaluations to varying degrees).

In most cases tenders invited for state-owned entities and tender evaluations were reviewed by professionals external to the administration office who awarded them.
ministerial body primarily responsible for selecting the winning bid for each IPP, based on ICB practices. The CIPIE, or Interdepartmental Commission for Independent Power Production, was tasked with providing input for the preparation of terms of references and the issuance of tender documents together with the evaluation of bids. The CIPIE was also charged with following up negotiations and ascertaining the various incentives to be granted by the state on a case-by-case basis.36

These two commissions, which were subsequently set up in 1996 just before the tender for Rades II was issued, were answerable to the Ministry but also retained some degree of freedom and ultimately served as the de facto regulators during the early days of the first IPP.37 38 Both the CSPIE and the CIPIE, which were temporary commissions that operated up until all the project contracts were signed, may be credited with what has been deemed a well organized and ultimately fair and constructive bid. As one illustration, the CSPIE and CIPIE working together with the Ministry and other government agencies were responsible for arranging one of the critical elements of the PPA in the case of CPC, namely mitigating risk by ensuring that capacity charges were pegged to a basket of currencies.

In both the IPPs, PPA charges were dominated in foreign currency. The government was sensitive to the impact that currency fluctuations may have on foreign currency denominated projects. In 1985 with Rades I, STEG saw payments increase threefold due to currency changes between the Japanese yen and the Tunisian dinar. The indexed basket of currencies to which the Tunisian dinar is pegged is one of the lessons that STEG took away from the experience.

6. Project purview: the elements that shaped the outcomes
Both the investment environment and policy and planning framework contributed significantly to balanced outcomes, but there are also a suite of additional elements that deserve mention that relate directly to the projects themselves, including equity and debt arrangements, how revenue was secured and the fuel supply agreements. Due to the fact that projects differ significantly, each project will be discussed separately below.

6.1 Rades II: sound partnering and early payback
As noted previously, prices appear to be competitive and availability high (with the one exception of the period starting in July 2006). Although a performance security of approximately US$14 million was posted by CPC for completion of the project, no major problems were encountered and the security was redeemed by the project company at COD. Furthermore, equity has been rewarded and debt repaid as expected. Although there has been turnover in equity (PSEG sold its 60% share to BTU), investors have insisted that it does not reflect unhappiness with their investments but rather is a result of strategic changes within their organisation. Meanwhile, no changes have been made to the PPA.

The project successes noted above may be attributed to, among other elements, the fact that the winning consortium (of PSEG/Marubeni and Sithe) had proven extensive experience and employed a well accepted and proven technology—as required by the RfP. It should also be

36 Conditions extracted from the United Nations Development Programme [2004].
37 It should be noted that the IPP Group, as previously introduced, within the Ministry of Industry and Energy prepared the documents to be discussed by CIPIE and negotiated the project agreements under the supervision of the CIPIE.
38 An additional need for these bodies is due to the fact that STEG’s contracts are subject to public tender legislation, which do not provide for long term contracts.
noted that, although new to the field, BTU appears to have a strong commitment and increasing experience in O&M.39

Other elements that impacted favourably on outcomes were the structuring of the PPA with regard to repayment of the investment costs. The Rades II PPA charges are heavily loaded during the early years, decreasing gradually towards the end of the PPA. Although this type of arrangement may be seen to be more burdensome to the off-taker, it actually served to accelerate debt repayment and reduce interest charges with lenders;40 FX exposure associated with future payment schedules also decreased, which resulted in lowering the average price per kWh for the duration of the PPA. It should also be noted in this context that the use of project finance as opposed to government funds has relieved the state from assuming more debt.

The fuel arrangements have also been instrumental in helping to reduce risk and keep prices low. There was little to no negotiation related to fuel supply as STEG is the exclusive distributor of gas in Tunisia and therefore the only possible fuel supplier for Rades II plant.41 It was agreed that the cost of the fuel would be passed through with no take-or-pay obligations (on either side) for the following reason. STEG, as the exclusive supplier in the country, is in a better position than the project sponsor to assume the fuel risk since it has many suppliers and customers.

Furthermore, STEG’s specification for diesel as a back-up fuel in the RfP means that the plant is not captive to one fuel source. The diesel reserve requirement, however, is only for seven days, in the event that STEG has major problems with its gas supply and /or distribution network.

6.2 SEEB: partner dissent and no payback

For investors and host country stakeholders alike, the SEEB project represents a positive outcome, provided gas is available. With the gas supply compromised throughout 2005 and 2006, the outcomes are less rosy. For investors, although there are no penalties payable to STEG for non-delivery of power, the absence of revenue means that there is no income for shareholder dividends nor loan repayment, which has forced the project company to renegotiate its loans. In terms of the state, in addition to not receiving any power, it has not been able to take advantage of the low priced fuel—as world oil prices are now about three times that of the agreed rate. The elements that contributed to these outcomes are discussed below.

The fact that the gas for the El Biban power plant only had one source has surfaced as a latent weakness in the development of the project. The plant being captive to one single well meant that SEEB’s financial viability was inextricably linked to the well’s ability to feed the plant with primary energy – a risk that was probably underestimated.

Insufficient attention also appears to have been given to how the equipment would react to the fuel quality. More specifically, since El Biban could not effectively process the gas with the original separators, new stronger separators had to be installed. This led to a significant loss in revenue as the plant was shut down for a four-month period while the problems were investigated and the new separators were procured. Additional problems have been caused by water entering the well and impeding gas extraction.

39 Experience gained is through its relationship with STEAG as well as through operating other plants in the region that they have acquired.
40 Off-taker capacity charges are not synchronized with revenue in the PPA payment profile and hence impacts on cash flow.
41 STEG levies fuel charges for CPC at the same rate as for its own thermal power stations.
Although much may be blamed on the sheer mishap of the fuel situation and the miscalculation of the necessary parts or gas quality, the lack of clarity among the roles of sponsors has exacerbated the problems. It was not clear from the onset who was responsible for the damage resulting from the poor fuel quality and who would pay for the repairs, which contributed to the delays.42

Another area related to the project sponsor arrangements is the role of the lead promoter. CME, although responsible for the front-end risk analysis, does not have any share in the project’s losses. Instead, the firm shares only in its gains when the rate of return exceeds 13%. The fact that there was a huge upside opportunity but insignificant downside risk for CME could help in explaining why fuel risk, which is at the core of the project, may have been inadequately assessed and mitigated against.

Again, provided fuel exists, the story may be a positive one. Apart from piping the gas to the plant, which formed part of the project capital cost (and due to the fuel supply problems, will now increase), there are no added fuel costs. With most of the costs of the electricity produced coming from operating the plant, expense payments should be minimal and income maximised. It was estimated in 2003 that profit after tax would earn Centurion approximately US$1.8 million per year with oil prices averaging US$22.50 per barrel.43

7. Next steps: less gas, more wind
Currently, the Ministry of Industry and Energy and STEG have indicated that there is no plan to fix the percentage of privately contracted power; that is, IPPs may be developed on a case-by-case basis.44 Meanwhile, the state is still committed to its policy objectives of opening up the economy, attracting private investment and limiting its debt in infrastructure projects. On 26 May 2003, the BG Group and the Tunisian government signed a memorandum of understanding for the Barca project, a 500 MW combined cycle gas plant [BG Press Release: 2004]. The Barca project is intended to use untreated gas to meet Tunisia’s increasing power needs. Negotiations with BG stopped in June 2004, however, as a result of concerns related to the gas supply guarantee for the project. Due to time constraints, the government has since given STEG the go-ahead to develop the next power station.

A feasibility study is also underway to build a 1200 MW IPP in the north of the country with approximately two-thirds of the capacity earmarked to be exported to Italy. Although this study is still in its infancy, should the results of the study prove positive, COD is slated for 2011/2012. With its interconnection to Italy, such a project would go along way in strengthening the grid, enhancing links with neighbouring countries, and represent one more step towards a Mediterranean power market.

As part of its tenth development plan (2003-2007) the Tunisian government is also planning the construction of wind farms with a capacity of about 120 MW. The RfP has already been signed and bid evaluation is scheduled for early 2007. As part of the country’s 11th development plan,

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42 Generally having the fuel supplier as a co-owner is seen as a way to mitigate fuel risk; however, in this case it did not help as all the down-time has been as a result of fuel supply problems.
43 The gas price was fixed by the Ministry of Industry and Energy in a manner that both the gas provider (the gas previously flared) and project company may remain interested in the project. As a result, the outcome for the project company is still favourable despite the ceiling price for electricity produced.
44 Relevant factors such as timing and fuel supply security, amongst others, would be important considerations.
the construction of an additional 200 MW by private investors on a competitive basis is expected for the period from 2008 to 2011 [TERNA, 2004].

8. Conclusion

The decision to introduce IPPs was prompted by broader macro-economic policy goals—not due to STEG’s inability to raise the capital to finance projects. Although it is still the early days, the introduction of the plants appears to have contributed to these goals, namely helping to relieve the state of assuming more debt, focus limited state funding on social infrastructure, and attract foreign investment. More specifically with regard to FDI, the projects have helped enhance Tunisia’s image internationally as an investment destination and showed that the country is able to facilitate large privately financed infrastructure projects.

To recap, for Rades II, the bidding was based on a competitive tendering process with the primary consideration being the price per kWh. With ten short-listed bidders, competition helped drive down prices. The Ministry of Industry and Energy has also asserted that had STEG constructed and operated the project the resulting average discounted tariff for Rades II would have been in the same ballpark as that of the investor. A further boon for the country is that the Carthage Power Company employs approximately 60 employees most of whom are Tunisian and approximately 80% of its operating and maintenance expenditure occurs within the country.

In terms of the El Biban plant, it arose within a separate legal arrangement (namely, the 1999 Hydrocarbon law), which was to encourage the development of marginal gas fields by foreign independents, and also contribute to a reduction in gas flaring. No competitive tender was required, but STEG did specify that it would buy electricity only at a tariff indexed to the avoided cost of heavy fuel oil to STEG between approximately $19-25 dollars per barrel. With the international oil price more than doubling since this agreement, STEG may be said to benefit significantly—provided the plant is in operation. The two major shutdowns have led to STEG not receiving power and the project not receiving revenue as intended. However, with the plant capacity at 27MW, less than 1% of the installed capacity, this is not considered significant from STEG’s perspective. The same may not be said for the investors, who are presently renegotiating loan payments. Still, all is not lost. New investors are drilling back-up wells and there is an expectation of a reasonable return going forward.

Experience in other developing countries has shown exogenous shocks as a major factor destabilising PPAs when payments are denominated in foreign currency. In Tunisia, this has not been the case. The deals were negotiated and signed in a favourable economic environment with stable exchange rates, and deals continue to hold in a stable investment climate. In addition, the clear planning and policy frameworks have gone a long way in attracting and sustaining deals. The oversight of the CSPIE and CIPIE has been instrumental in ensuring a clear and legitimate bid for Rades II and progressive negotiations in the case of El Biban. Furthermore, indexing charges to a basket of currencies for Rades and to a limited band for SEEB, has kept prices low.

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45 Although private capital has helped to free up funds for the government to reduce foreign debt, there is no evidence of a significant tapering off of the country’s external debt in the broader context of the country’s structural reforms - both in absolute terms and as a percentage of gross domestic product. It did, however, arrest a potential upward trend in the external debt as a percentage of GDP for further details see Appendix B).

46 This is evidenced in the growing middle class, a reduction in poverty levels and a marked improvement in a number of social indicators.
In terms of the actual project sponsors, based on our analysis, it seems that they have worked favourably in the case of Rades II and less favourably in the case of SEEB, where there is room to speculate that the partnering arrangements may have been incomplete. Rades II back up fuel, albeit only for seven days, provides a critical insurance policy for STEG as gas supplier and off-taker. On the other hand, the quality of fuel supply for SEEB has been the Achilles heel of the project, which has the potential to inform other similar projects, particularly new gas-to-power projects in both East and West Africa.

The stakeholders in both projects describe investment and development outcomes as positive, feeling that the agreements were fair and risks efficiently allocated. Shareholders enjoy the assurance that their profits can easily be repatriated and the regulatory framework for IPPs brought with it the assurance of good governance. Investor expectations were met with respect to their returns on the project (in the case of CPC) and a positive relationship with the off-taker continues to sustain these sentiments.
Bibliography


**Interviews**

Selected interviews with personnel from the Ministry of Industry and Energy, February 2006.


Selected interviews with personnel from the Carthage Power Company, February 2006.

Appendix A: Technical Specifications: CPC and El Biban

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Appendix B: External Debt in US$ as a percentage of GDP

![Graph of Tunisian External Debt](image)

Source: 2004 African Development Indicators from the World Bank Africa Database.

47 The turnkey project comprised two gas turbines supplied by Solar Turbines, also a subsidiary of Caterpillar and included the construction of 11km of transmission line to access the STEG network.