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SHEBERGHAN GAS FIELD DEVELOPMENT PROJECT

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RISK ANALYSIS REPORT

May 23, 2010

Sheberghan Gas Field Development Project (SGFDP)
USAID Contractor



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ABBREVIATIONS

ADB	Asian Development Bank
AEAI	Advanced Engineering Associates International, Inc.
AIGF	Afghanistan Investment Guarantee Facility
AERA	Afghanistan Electricity Regulatory Authority
AGE	Afghan Gas Enterprise
ANDS	Afghan National Development Strategy
ANSF	Afghan National Security Forces
BCM	Billion Cubic Meters
CASAREM	Central Asia –South Asia Regional Electricity Market
CEO	Chief Executive Officer
DABS	Da Afghanistan Breshna Sherkat
EITI	Extractive Industries Transparency Initiative
EPCM	Engineering Procurement and Construction Management
FID	Final Investment Decision
FRR	Final Roadmap Report
GIACC	General Independent Administration for Anti-Corruption
GoIRA	Government of the Islamic Republic of Afghanistan
GSPA	Gas Supply and Purchase Agreement
H ² S	Hydrogen Sulfide
ICRG	International Country Risk Guide
IFC	International Finance Corporation
IFI	International Financial Institution
IOC	International Oil Company
ISO	International Standards Organization

IPP	Independent Power Producer
kV	Kilovolt
kWh	Kilowatt hour
LPG	Liquefied Petroleum Gas
MEW	Ministry of Energy and Water
MIGA	Multilateral Investment Guarantee Agency
MCC	M/s MCC-Jiangxi Copper Consortium
MMBTU	Million British Thermal Units
MoM	Ministry of Mines
MW	Megawatt
NEPA	National Environmental Protection Agency
NEPS	Northeast Power System
OPIC	Overseas Private Investment Corporation
PCL	Pollution Control License
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PRR	Preliminary Roadmap Report
PSA	Production Sharing Agreement
RAR	Risk Analysis Report
SIGAR	Special Inspector General for Afghan Reconstruction
SGFDP	Sheberghan Gas Field Development Project
US	United States
USAID	United States Agency for International Development
WB	The World Bank

EXECUTIVE SUMMARY

Risk and uncertainty are inherent in any development decision of the magnitude associated with SGFDP. Risks related to financing, project completion, performance of counterparties, and the potential actions of a sovereign state are commonly encountered in many emerging markets. The fact that investment decisions must be taken in Afghanistan at a time when the country is beset by the issues of security, corruption and the limited capacity of governmental institutions, make risk analysis for SGFDP all the more tenuous.

The high level of uncertainty surrounding the political and commercial environments in Afghanistan has meant that many of the organizations specializing in risk analysis have not evaluated the country. A review prepared by the ADB-funded Central Asia –South Asia Regional Electricity Market (CASAREM) identified several risks in developing electric power projects in Afghanistan including Political, Security, Planning, Financial, Construction, and Legal and Regulatory. Fuel Supply Risk, in the form of the quantity and quality of gas, is an additional risk for SGFDP.

The majority of risks confronting SGFDP were assessed in the Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility prepared for USAID in November 2005. In preparing the Risk Analysis Report, it was considered necessary to go beyond presenting an assessment, and recommend measures that can be implemented to mitigate risk and create the incentive for investment. Appendix A presents the assessment of AEAI's team of specialists on the potential for the mitigation measures to reduce various risks to a level where they would be considered to be manageable for private investors. A proposal for designating Projects of National Importance under the draft Law on Electricity is presented in Appendix B. Appendix C contains a summary of the risks confronting SGFDP, their impacts on construction, market, and financing along with proposals for mitigation. Reducing the various categories of risk to a manageable level is a necessary step in recruiting private investment for SGFDP. In order to successfully promote SGFDP to prospective investors, the GoIRA will also need to consider a package of policy changes and initiatives that offset risk.

Audit reports by the Office of Special Inspector General for Afghan Reconstruction demonstrate the lessons to be learned from the construction of the Kabul Electric Power Plant and a previous attempt to rehabilitate the existing gas fields at Sheberghan. However, not all risks are susceptible to mitigation.

Two aspects of Construction Risk remain contentious. While Security Risk can be reduced, mitigation measures may not be sufficient for investors to perceive the risk to be manageable. In particular, this could affect the ability to recruit experienced EPCM contractors for the construction of facilities such as the gas processing facility and electric power plant. In any case, it is unlikely that EPCM contractors will be willing to enter into agreements where they are at risk for delays and project performance associated with Country Risk and Security Risk without the inclusion of a substantial premium in the contract price.

The Minister of Mines has signalled that he is prepared to take the first step by making the existing gas fields at Yatimtaq, Khoja Gogerdak and Jar Quduq available

to private investors. This will mean a substantial lowering of geologic and reserves risk. The availability of a gas supply will also reduce Fuel Supply risk for investment in a electric power plant. A recent review of project economics indicates that a gas price of US\$ 3.06 / MM BTU will offer an acceptable rate of return to gas producers as well as allowing electric power plant investors to deliver electricity at the bus bar for US\$ 0.075 - US\$ 0.077/ kWh.

Other initiatives in respect of SGFDP are likely to entail advanced gas purchase commitments, compensation for frustration of contract, credit support and investment guarantees. A portion of this support package will require support from the international community in the form of risk insurance and co-financing with private investors. The GoIRA will also need to demonstrate support for SGFDP by entering into Production Sharing, Power Purchase and Implementation Agreements on conditions that provide stability for investors.

I. INTRODUCTION

The key objective of the Sheberghan Gas Field Development Project (SGFDP) is to recruit private sector investors for the development a 100-150 megawatt (MW) independent power producer (IPP) along with selected blocks of the Sheberghan Gas Field as the fuel supply for the electric power plant. Going forward, a number of technical, commercial, legal and financial items will need to be addressed in order to present a credible structure to potential investors. Ultimately, the investors will make the final decision on whether the risks associated with this SGFDP are sufficiently manageable.

This Risk Analysis Report (RAR) is the 3rd Deliverable for “The USAID/Afghanistan’s Sheberghan Gas Field Development Project”. The majority of risks confronting SGFDP have been assessed in the Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility prepared for USAID in November 2005. The RAR goes beyond the 2005 Feasibility Study by taking a two-step approach. The first step is to provide a clear assessment of the risks that are potential obstacles to the successful implementation of the Upstream and Downstream components of SGFDP. A significant part of this step is to propose strategies to increase certainty, by mitigating risk, in order to recruit private investment in SGFDP. The second step is to assess those risks that are outside of the typical ‘envelop’ for private investors. This includes consideration of risks associated with national planning, wholesale electric power pricing and transmission.

Risk is defined in ISO 31000 as *the effect of uncertainty on objectives* (whether positive or negative). The level of risk present in a country or market is subjective and depends upon the perception of the individual or organization carrying out the risk assessment.¹ Risk analysis is a process for the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to monitor, and minimize the probability and/or mitigate the impact of unfortunate events.

Risks can come from uncertainty in financial markets, project failures, legal liabilities, credit risk, accidents, natural causes and disasters, as well as deliberate attacks from an adversary. The risks associated SGFDP are similar to those associated with Afghanistan’s ability to participate in a regional electricity market as described by CASAREM:²

- Political risk – the fledgling Afghanistan government lacks institutional capacity and has limited security over much of the country. The legal environment is poorly developed and there is no experience with a large investment project of this sort.
- Security risk – low level but determined warfare is a continuing problem in Afghanistan (and potentially the border regions in

¹ S. Hibbert, “Risk Assessment and Management in Commercial Transactions – Observations on the Interface Between the Psychological and Documentation of Risk in Business”, Arab Investment Summit 2010.

² ADB TA 6383 REG: Central Asia – South Asia Regional Electricity Market Project.

Pakistan), and major infrastructure assets would be a visible target for anyone violently [opposed] to the government.

- Planning risk – this is likely to be made worse by the weakness of Afghanistan’s institutions including the domestic utility. Coordination of planning across the countries, high level of political and external stakeholder support, and transparent project approval procedures will help to manage this risk.
- Construction risk – the terrain is particularly challenging, raising the potential for cost overruns, and construction would be vulnerable to security risks.
- Financial (including payment) risk – the project would require a creditworthy buyer and guarantees to suppliers and financiers that payment would be made.
- Legal and regulatory risk – Afghanistan is in the process of rebuilding its institutions and establishing the rule of law. The other countries are also, to varying degrees, in the process of establishing regulatory and market environments in their electricity sectors and opening to foreign investment.

SGFDP must contend with all of the above risks in regard to electric power generation. There are additional front-end risks in the form of Fuel Supply Risk, which is associated with the reworking of the gas fields, along with gathering and processing the gas to meet fuel specifications.

The initial task in conducting a risk analysis is to specify the configuration, or structure of the proposed project. In the case of SGFDP, the ability to attract investment in the development of an independent power project (IPP) will depend upon the availability of a reliable supply of gas. As shown in Figure 1, the Upstream Structure involves development of the gas fields, including production, gathering, processing and sales. Figure 2 shows the configuration for the Downstream Structure, which includes generation, electric power purchase, financing and transmission of electrical power.

As an integrated project, both components of SGFDP must contend with Country, Construction and Security Risk. However each component has a unique set of risks to overcome. Upstream risk is primarily concerned with gas supply and involves the commitment of sufficient reserves and development of production to support a long-term gas sales and purchase contract between the gas producer and buyer. Downstream risk is mainly concerned with the reliable generation and transmission of electric power to a creditworthy buyer.

In this report, the major risks have been categorized as: Country Risk, Fuel Supply Risk, Commercial Risk, Construction Risk, Operational Risk and Security Risk. Additional reports will specifically address stakeholder consultation, working group coordination and interaction, a marketing tour, the feasibility of attracting private developers, and training and capacity building workshops.

Figure 1.
Upstream Structure
Gas Supply

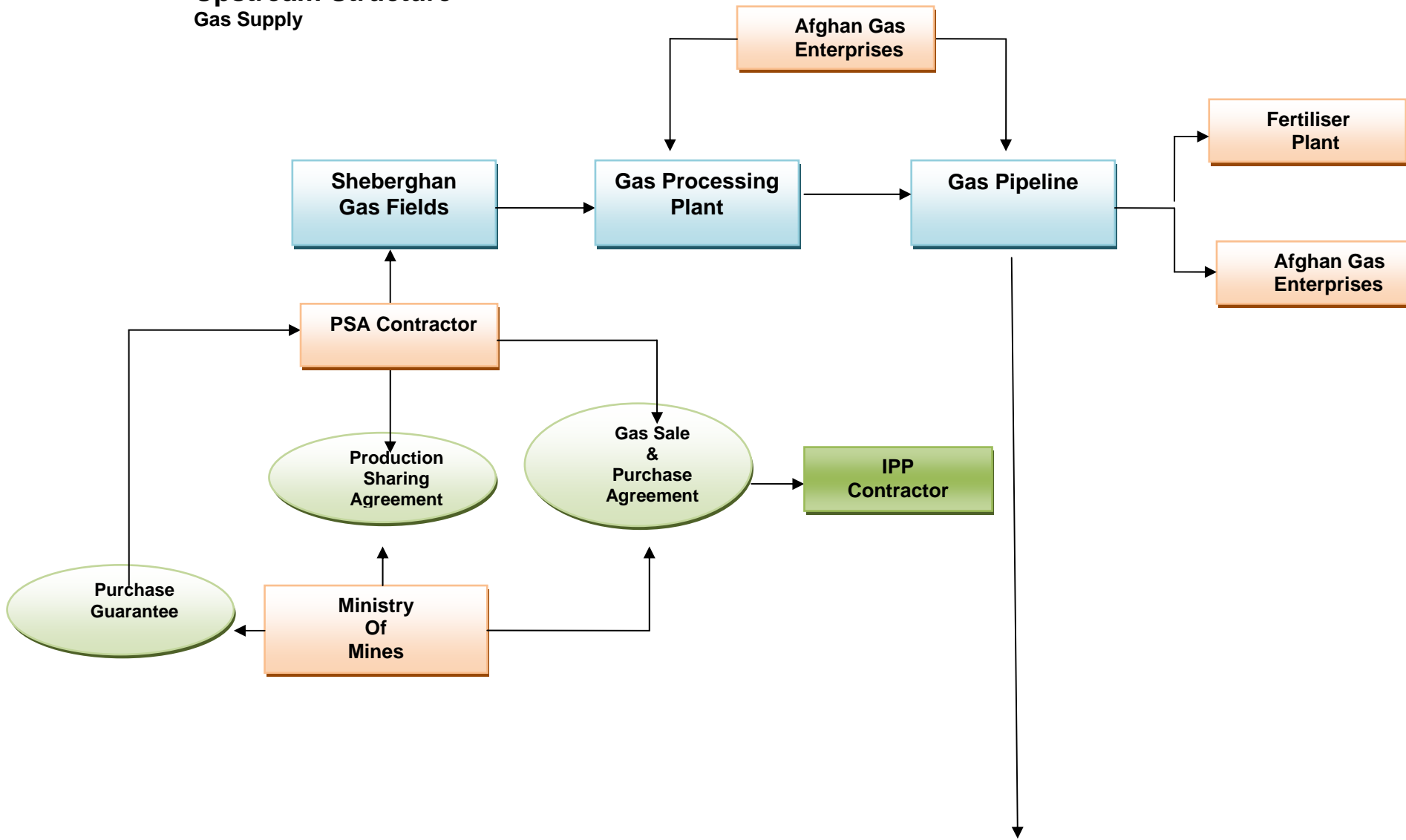
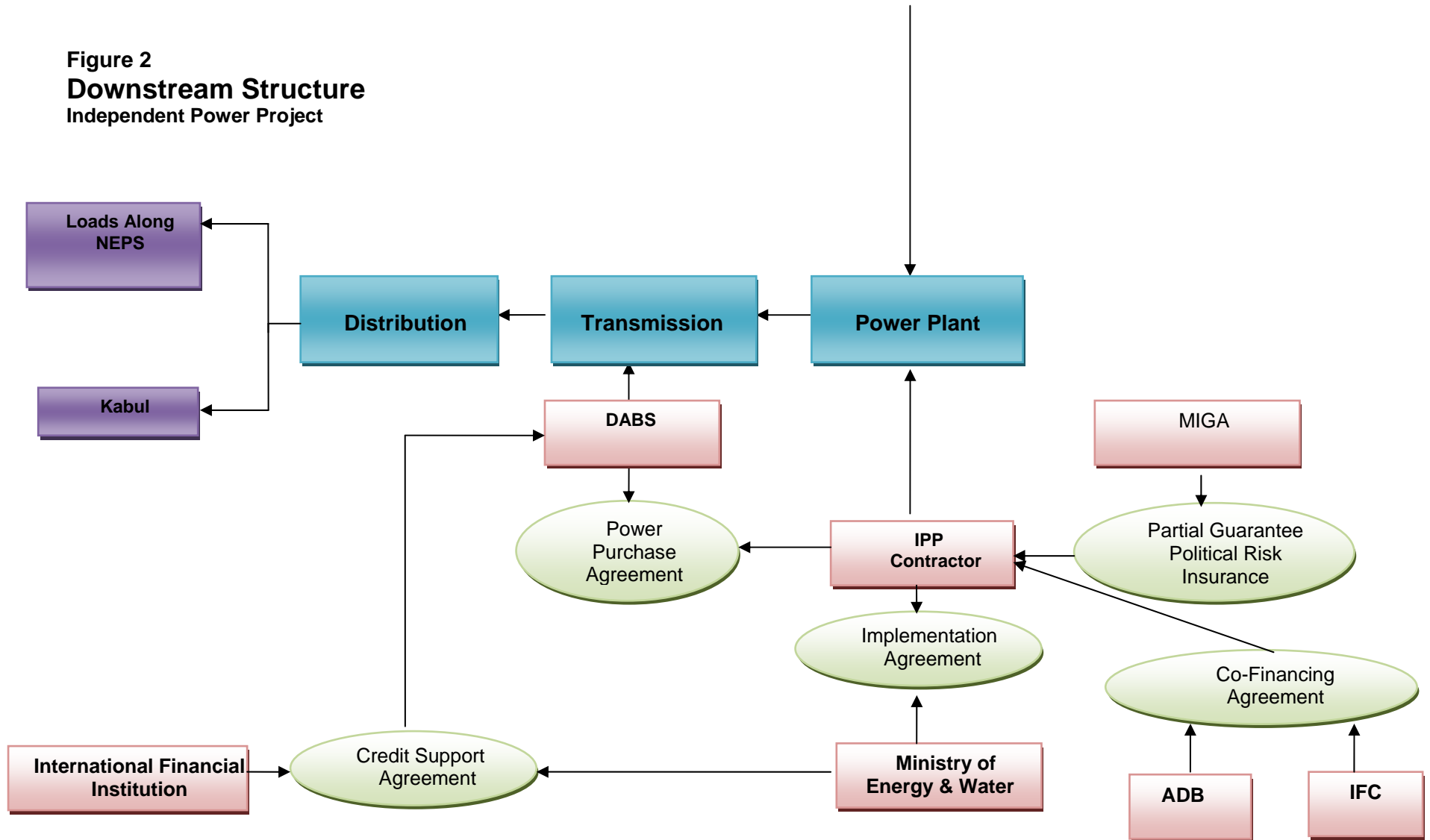


Figure 2
Downstream Structure
 Independent Power Project



II. COUNTRY RISK

Country Risk is a particularly general term, which refers to risks affecting all companies operating within a particular country. Primarily, it refers to the risk of investing in a country. This takes into consideration changes in the business environment that may adversely affect operating profits and the value of assets in a specific country. For example, financial factors such as currency controls, devaluation or regulatory changes contribute to Country Risk. Country Risk is also a measure of political violence and its actual or potential impact on the stability of governance.

Most of the organizations that analyze Country Risk do not provide a rating for Afghanistan.³ The following rating organizations have evaluated Country and Business risk in Afghanistan.

Organization	Country Rating	Business Rating
Institutional Investor	166 of 178	
World Bank Group (IFC) <ul style="list-style-type: none"> • Corruption Control • Regulatory Quality • National Business Environment 	199 of 202 194 of 202	160 of 183
ONDD (export insurance)	7 (lowest)	C (lowest)
Coface (export insurance)	Red / D (lowest)	Red / D (lowest)
Ducroire/Delcredere (export insurance)	Red / 7 of 7	C

Rating organizations acknowledge the support of the international community, and that Afghanistan has benefited from cancellation of its international debt. Nevertheless, these assessments rank Afghanistan as high risk for business investment and export trade.

Political Risk

Political Risk is often used synonymously with Country Risk. Political Risk is more finely focused and takes account of the risk of loss faced by investors due to governmental changes in their operating environment. This can include inconvertibility of currency, changes in tax laws, contract repudiation, expropriation, confiscation, and nationalization.

Political Risk also includes events that are induced by the host government, as so-called 'government force majeure', which prevents commercial parties from realizing the benefit of their agreements.

³ Business Monitor International, The Legion Group, Eurasia Group, Institutional Investor, World Economic Forum, and Political Risk Services Group. However, The Economist Intelligence Unit has prepared a risk assessment for Afghanistan.

Legal & Regulatory Risk

Legal and Regulatory Risk reflects the concerns of investors about the stability of the regulatory regime and breach of contract risk. A high level of risk in these areas is reflected in the perception of Political Risk. The legal system of a host country is expected to provide effective procedures for the enforcement of contracts and related claims. Investors are concerned whether the contractual obligations for the project will be governed by a safe, stable and predictable legal environment.

As a result, the governing law to be applied to fuel supply and power purchase agreements (PPA) is a critical issue for investors in the electric power sectors of developing countries. This point is of particular interest where the project is located in a jurisdiction, such as Afghanistan, which follows Islamic *Shri'ah* as the basis for interpretation and enforcement of agreements.

The main legal and regulatory risk of concern for SGFDP is the lack of a clear and effective legal and regulatory framework to govern the electric power sector. A draft Electricity Law is currently under preparation to clarify the duties and authority of the Ministry of Energy and Water with respect to the electric power sector, define the role of the government-owned electric service company (Da Afghanistan Breshna Sherkat or DABS), and establish the Afghanistan Electricity Regulatory Authority (AERA) to regulate the electricity market. The current draft of the Electricity Law does provide, among other things, that electricity services may be provided by privately owned and operated enterprises operating under competitive market conditions. However, the draft law is a work in progress that has yet to be submitted for consideration by the Afghan Parliament, and is subject to change. Further, once finalized and adopted, the AERA will need to be formed, capacity built, and implementing rules and regulations developed. Until these tasks are fulfilled in a fashion meeting international standards, the weakness of the legal and regulatory framework remains a source of uncertainty, and consequently an element of risk for investors in the electric power sector.

Further, the Law on Private Investment may be a source of additional concern to investors inasmuch as it limits protection to compensation for expropriation, with disputes to be governed by Afghanistan law. There are no restrictions or limitations on more subtle forms of confiscation such as new regulations and taxes, often known as the 'obsolescing bargain'. Other concerns to foreign investors such as contract stability and governmental force majeure are not addressed in the Law on Private Investment.

Payment of Customs taxes and charges also present a regulatory risk to SGFDP. Under Article 18 of the Private Investment Law, registered enterprises are only given an exemption from export duties and taxes for products that are manufactured or assembled in Afghanistan. In addition, Article 58 of the Law on (Oil & Gas) Hydrocarbons requires contractors to pay taxes and customs charges. The SGFDP is a capital intensive project which requires the importation of equipment and materials for the development of the gas fields and construction of the electric power plant. The current Customs regime is not supportive of this type of development.

Afghanistan's Law on the Environment, requires that the Upstream and Downstream components undergo Preliminary Assessments regarding their environmental impacts. Discharges and emissions are subject to Pollution Control Licenses.

Finally, other projects at Sheberghan have encountered administrative difficulties in having their equipment released from Customs. Administrative delays can create particular problems in Afghanistan where construction activities are seasonal. Delays in Customs clearances can affect project schedules and increase Construction Risk by exposing contractors to penalties for delayed completion.

Planning Risk

Construction of the Sheberghan electric power project was recommended in the 2004 Afghanistan Power Master Plan. Completion of energy development projects is measured in terms of scope, schedule and budget. A project is considered to be successful if it is completed on-time and within budget.

The ability to plan and coordinate the construction of Upstream and Downstream components of large energy projects is a key factor in achieving success. Planning and coordination are implemented at several levels. At the national level, intergovernmental planning is necessary for policy and projects of national importance. Planning and coordination of the critical path for each component is necessary in situations where the ownership is separate from the operation of related facilities.

In the case of SGFDP, planning will involve coordination of gas field development, electric power plant construction and interconnection with the transmission system. This level of coordination goes beyond the risk management activities normally associated with private investment, and must be addressed by the GoIRA. The primary step in the planning process for SGFDP will be to coordinate across the various ministries and state-owned enterprises that have a role to play in the project. This includes the Ministry of Mines (MoM), Ministry of Water and Energy (MEW), Ministry of Finance, Ministry of Economy, DABS, and AGE. The Office of Special Inspector for Afghan Reconstruction (SIGAR) has commented on the lack of an effective Master Plan for Afghanistan's energy sector.⁴

At the investor level, construction schedules for the well field, gas processing plant and electric power plant must be aligned so that front-end work, such as site acquisition and environmental permitting are completed in advance of securing investors. Design, engineering, and key commercial contracts must also be concluded in time for investors to make a final investment decision (FID) for their respective components of SGFDP.

⁴ Office of Special Inspector General for Afghan Reconstruction, "Afghanistan Energy Supply has Increased but An Updated Master Plan is Needed and Delays and Sustainability Concerns Remain", (January 15, 2010).

Corruption

The perception of Afghanistan as rampant with corruption, along with the potential exposure to corrupt practices must be included in the major risks to private investment in SGFDP. Transparency International ranks Afghanistan as 179th out of 180 governments in terms of corruption.⁵ Some multinational development organizations see this as a particular problem in the management of contracting, leasing and appropriation of natural resources.⁶ A recent report released by the Pentagon ahead of President Karzai's recent visit to Washington stated: "While Afghanistan has achieved some progress on anti-corruption... real change remains elusive and political will, in particular, remains doubtful."

Corruption in Afghanistan is attributable to the following:

- Collusion between the GoIRA and the business elite for access to capital and commercial opportunities
- Lack of transparency in government processes, including title to real property
- Role of former warlords in the GoIRA
- Poorly paid police and civil servants who supplement their incomes through bribery
- A weak judicial system⁷

The process for awarding contracts for development of the gas fields and construction and operation of the electric power plant must be transparent and subject to audit in order to avoid the taint of corruption.

The GoIRA has taken action to counter concerns about corruption by ratifying the UN Convention Against Corruption. It has also created the General Independent Administration for Anti-Corruption (GIAAC) to investigate allegations of corrupt practices.

Investor confidence in SGFDP would be increased if the GoIRA would move from 'candidate' to 'compliant' status under the Extractive Industries Transparency Initiative (EITI). EITI is aimed at improving governance in resource-rich countries through verification and full publication of payments by international oil and gas companies and government revenues from oil and gas. Currently, Azerbaijan and Liberia have been certified as in compliance with EITI, while Afghanistan and another 26 countries are candidates for certification.⁸

⁵ www.transparency.org

⁶ "Fighting Corruption in Afghanistan: A Roadmap for Strategy and Action", Asian Development Bank, United Nations Development Program, The World Bank (February 16, 2007 Discussion Draft)

⁷ www.GlobalSecurity.org

⁸ www.eitransparency.org/countries

Third-Country Risk

Material and equipment for SGFDP must be transported across international borders. The main routes are either from the port in Karachi, Pakistan or the Hairatan Bridge spanning the Amu Darya River between Uzbekistan and Afghanistan. Under the World Trade Agreement, transit nations cannot discriminate against the movement of goods across their national borders. However, they are entitled to impose 'reasonable transit fees' as a means of recovering the approximate cost of services rendered.⁹

The logistics of transporting material and equipment through third countries raises similar issues regarding Customs clearances as those discussed for Afghanistan in Legal & Regulatory Risk. Previous projects were able to avoid these issues by using heavy-lift aircraft to deliver equipment.

Mitigation of Country Risk

A primary measure for the mitigation of country risk has been to arrange political risk insurance. In the case of Afghanistan, the World Bank's Multilateral Risk Guarantee Agency (MIGA) has established the Afghanistan Investment Guarantee Facility (AIGF). AIGF provides insurance coverage for such country risk as overt and 'creeping' expropriation, currency conversion, destruction of assets from terrorism or sabotage, and host government breach of contract. The guarantee provided under AIGF is structured to insure up to 90 percent of the investment, as well as up to 450 percent of the initial investment as coverage for lost earnings.

The Overseas Private Investment Corporation (OPIC) offers political risk insurance for U.S. companies interested in investing in Afghanistan. OPIC can insure against three types of political risk: currency inconvertibility, expropriation, and political violence.¹⁰ OPIC's coverage for currency inconvertibility insures against the inability to convert profits, debt service and other investment returns from Afghanistan local currency (Afghani) into U.S. dollars, or to transfer U.S. dollars out of the host country. OPIC's expropriation coverage insures against the loss of an investment due to the unlawful nationalization or confiscation by the host government. OPIC's political violence coverage protects investors against the loss of assets or business income due to violence undertaken for political purposes, including war, revolution, insurrection, or politically motivated civil strife, terrorism or sabotage.

Rather than arranging political risk insurance as the primary mitigation strategy, IPP sponsors prefer viable government support for their projects as the means for reducing the various forms of Country Risk. The GoIRA has adopted several measures that help to mitigate Country Risk for SGFDP. The new Law on Private Investment attempts to counter concerns about political risk. For example, under the Law on Private Investment, it is possible to agree that the law of another jurisdiction will govern the commercial aspects of the investment. The law contains several

⁹ General Agreement on Trade and Tariffs 1994, Article VIII.

¹⁰ www.opic.gov/Insurance

additional provisions to reduce government force majeure. Foreign investment in electric power generation and transmission is specifically authorized.

Other provisions in the Law on Private Investment permits contracts to be governed by external law, provides compensation for expropriation, expatriation of dividends, long-term property leases, and international dispute resolution. The Afghanistan Investment Support Agency was established to assist foreign investors in obtaining the necessary licenses to conduct business, including environmental permitting. Afghanistan has also lowered Country Risk by ratifying four major conventions that protect foreign investment.¹¹

Foreign investment in natural resources and pipelines does not come under the Law on Private Investment and requires special legislation. The GoIRA has adopted the Hydrocarbons (Oil & Gas) Law, which provides for the licensing of foreign companies and allows these contractors to have possession and control over their share of oil and gas.¹² The law includes provisions such as the right of contractors to export production, repatriate income or dividends, compensation for expropriation, and resolution of disputes by international arbitration. No contracts have been awarded under this law.¹³ Therefore it is difficult to evaluate the effectiveness of these provisions.

Complying with the Law on Procurement is the first step in safeguarding against collusive style corruption. This approach would be particularly useful because institutional responsibility for the licensing and development of the hydrocarbon and electric power sectors is spread over several entities. The PRM contained an Illustrative Tender Process for IPP in Appendix C. With the assistance of NORAD, the MoM has developed a tendering process for awarding a Production Sharing Agreement (PSA). Negotiation of a specific IPP Implementation Agreement following the award of the IPP license would also contribute to the management of this risk. The Implementation Agreement could provide for an anti-corruption plan to address internal project management. All contracts should contain provisions that require the parties to comply with anti-corruption codes and standards that are appropriate to their nationality.

Transparency concerns go beyond awarding the rights to licences under a PSA and IPP. In particular, the price under the GSPA and wholesale tariff under the PPA deserve attention. In both cases, the methodology for calculating the gas price and electrical tariff would need to conform to internationally accepted standards. On one hand, MoM could demonstrate that price resulted from arm's length negotiation by using a financial model that accounted for the actual costs of production and processing, industry rate of return, and cost of alternative energy. On the other hand,

¹¹ United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards, Convention on the Settlement of Investment Disputes, Convention Establishing the Multilateral Investment Guarantee Agency, and Agreements Supporting the Programs of the Overseas Private Investment Corporation

¹² Article 3

¹³ www.afghanistanpetroleum.com

MEW could show that the tariff would comply with the provisions of the draft Electricity Act or cost of service methodology used by regulatory authorities.

The current draft of the Law on Electricity should include a provision that allows the GoIRA to grant approval for the development of an IPP, if the project is determined to be a matter of national importance. It is most likely that private investment in an IPP will be limited to a few interested parties. This is not a scenario that is covered in the draft. The proposed language for a provision that would allow this approach to be taken is drafted in Appendix B: Projects of National Importance. The alternative to this measure would be to include a so-called ‘Grandfather’ clause to exempt projects that had been formulated prior to the adoption of the new legislation.

Although it is not specifically contemplated in either the Law on Private Investment or the Law on Electricity, the execution of an Implementation Agreement for SGFDP would offer several advantages.¹⁴ Firstly, it would represent a commitment at the highest level of the GoIRA for support of SGFDP. This point will be useful in relationships and dealings with other levels of Government. Secondly, the Implementation Agreement would clarify any ambiguities or gaps in Afghanistan’s legal system as they pertain to the project. Thirdly, an Implementation Agreement would incorporate anti-corruption provisions regarding financial transparency, auditing and external monitoring, as well as liaising with the GIAAC. Finally, issues regarding Customs duties and the period for processing approvals for importation of equipment and materials could also be addressed in the Implementation Agreement.

Planning Risk will be reduced through the formation of the Sheberghan Working Group. The process for coordination will be further addressed in the Stakeholder Consultation Report. The Final Roadmap Report (FRR) will contain a critical path schedule to assist with coordination of the Upstream and Downstream Components at both the governmental and project levels.

¹⁴ Project implementation agreements are common to many emerging power markets including China, India, Pakistan and the United States (wind-energy).

III. FUEL SUPPLY RISK

Fuel Supply Risk can be divided into two categories: (i) availability of contract quality gas supply, and (ii) price. The question of gas supply must be evaluated according to the adequacy of reserves over the operating life of the electric power project; and the rate of delivery (“deliverability”) from the well field. Understanding these aspects of Fuel Supply Risk, and knowing how to manage them effectively, is the cornerstone to the overall success of SGFDP.

Previous work has focused on restoring production from of a specific number of wells. In part, this can be attributed to the attention given to donor funding, provided for the purpose of reworking a limited number of wells within the existing gas fields. Although this is important for the purpose of gaining additional information relating to specific well performance, prospective investors in the gas fields, as well as the electric power plant will regard the commitment of gas reserves to be the more critical factor.

Reserve Risk

Reserve Risk assessment combines the technical skills of oil and gas engineers with the foresight of economists to estimate the amount of gas that is recoverable from a particular field or discovery. IPP investors will expect to have sufficient reserves dedicated for the life of the project. Typically, this dedication is given by the gas supplier in the form of a long-term gas supply and purchase agreement (GSPA). The GSPA contains provisions for overall dedication of reserves as well as an annual schedule for delivery. If the gas supplier is unable to satisfy either of these contract obligations, the buyer’s obligation to purchase is reduced and the supplier may be liable for monetary damages.

The 2005 Feasibility Study for SGFDP stated that 0.19 billion meters³ (BCM) per year would be needed to produce 100 MW of electric power.¹⁵ In order for SGFDP to generate 150 MW per year for 20 years, the level of proved reserves would need to be 5.7 BCM. If adjustments are made for efficiency losses the gas reserve level increases to 6.8 BCM. At a P50 distribution, the three existing Sheberghan gas fields (Yatimtaq, Khoja Gogerdak, and Jar Quduq) have been estimated to hold 34 BCM in remaining gas reserves.

Quality Risk

The quality of the gas from the Yatimtaq, Khoja Gogerdak, and Jar Quduq gas fields will need to be analyzed to determine whether field production meets various specifications for heating value, inert gases, hydrogen sulphide (H₂S), total sulfur, water, and hydrocarbon dew point. The current lack of a gas chromatograph at the fertilizer plant means that reliable information regarding gas quality is not available.

The Preliminary Roadmap Report (PRR) discussed that most of the production from the Sheberghan gas fields contains levels of H₂S that exceed standards for health

¹⁵ Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility, Vol. I Justification & Implementation, Annex 3 Gas Assessment (November 2005).

and safety, air emissions, and equipment specifications. In terms of air emissions, feed gas can contain no more than 1.38% H₂S in order to meet World Bank standards. Gas industry quality specifications set H₂S concentrations at a maximum of 23 mg/m³. On the basis of this information, it will be necessary to construct a system of gathering lines to transport the gas to a central gas processing facility where the H₂S can be removed by one of the standard processes, such as amine sweetening.

The cost of constructing the gathering and processing facilities will need to be included in the design of SGFDP. Gas processing will also create the potential for the bottling and distribution of liquefied petroleum gas (LPG) that is separated from the methane delivered to the electric power plant. The potential for this activity cannot be evaluated until a more accurate analysis of gas quality is available.

Price / Market Risk

Price Risk reflects the concerns of both the fuel supplier and fuel buyer. The relationship between the price of gas delivered to the electric power plant and the wholesale price of electricity is the pivotal issue for SGFDP.

On one hand, the producer is concerned that the price of gas is sufficient to obtain a return that is commensurate with the cost of production and return on investment. The 2005 Feasibility Study concluded that a price of US\$ 2.00 / MM British Thermal Units (BTU) would allow for the economical recovery of production costs.¹⁶ This price may not be sufficient to allow an international oil company (IOC) to obtain a return of 18 – 25 percent.¹⁷ On the other hand, the IPP is seeking a wholesale price for electricity that is competitive with alternatives, in this case imported electricity, over the operating life of its electric power plant. Using the capital costs from the 2005 Feasibility Study, a wholesale price of electricity at the bus bar of the IPP of US\$ 0.075 – 0.077 / kilowatt-hour (kWh) would allow the gas producer to achieve a rate of return of approximately 20 percent, if the gas were priced at US\$ 3.06 / MM BTU.¹⁸ It should be cautioned that this price scenario should be further analyzed.

The main shortcoming of the Hydrocarbon (Oil and Gas) Law is that it does not provide an incentive for the development of gas. Experience has shown that the development of gas is sufficiently different from crude oil in two respects.¹⁹ It is several times more expensive to develop gas. This means that front-end fiscal measures such as royalties and rentals, when used in the context of a production sharing regime, force the cost of gas to be higher.

¹⁶ Executive Summary page 13, Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility, Vol I Justification & Implementation, Annex 5 (November 2005)

¹⁷ H. Razavi, *Financing Energy Projects in Emerging Economies* (January 1966).

¹⁸ The economic review was based on a heating value of 9520 kcal/M³, and did not adjust capital costs.

¹⁹ Energy Sector Management Assistance Programme 1993 “Long-Term Gas Contracts: Principles and Applications.” Report No. 15293. Washington, D.C.: The World Bank.

Unlike crude oil, which is traded internationally, gas development depends on the identification of a domestic market. For example, the People’s Republic of Bangladesh was able to attract investment in gas exploration and development because their gas policy and PSAs contained provisions that obligated the national oil company to undertake to purchase the gas unless there was not another buyer.²⁰ The Petroleum Policy for Bangladesh stated:

“The gas producing companies will be assured a market outlet within a reasonable time of commercial discovery, and if indication of an outlet is not given by the government within 12 months of the declaration of commercial discovery, the producer would be free to find [a] market outlet within the country.”

MoM should adopt a pricing policy in advance of a tender offer. A market-based approach is preferable to a regulated price. Pricing options include a base price with periodic adjustments, market-reference pricing that tracks competitive regional fuels, and ‘ceiling-and-floor’ prices.

Article 58 of the Hydrocarbons (Oil & Gas) Law obligates contractors to pay income tax and customs charges. In many countries that use a production sharing regime, the royalties and profit splits constitute the only fiscal obligations. Countries that impose income taxes provide for the contractor to be reimbursed from the host government’s share of production.

As discussed in Mitigation of Country Risk, the GoIRA can take several steps in terms of royalty levels, cost recovery, profit sharing and domestic purchase commitments to reduce Price/Market Risk.

Operational Risk

Operational Risk concerns the development and production of a gas field after the discovery has been determined to be commercial. It reflects the ability of the Operator to implement the development plan and maintain deliverability to meet contract obligations for gas supply.

This depends on the experience of the Operator and the level of investment in completing, reworking and equipping wells along with field processing, to remove water and other contaminants before the gas is gathered and transported to a central processing facility. It also concerns the ability of the Operator to accurately estimate and report the remaining recoverable reserves in the field. Afghan Gas Enterprise (AGE) has been responsible for operating 30 wells in the existing gas fields.

The MoM developed a procedure for the pre-qualification of bidders as part of the first tender round for Exploration and Production Sharing Contracts (EPSC). Prospective contractors were required to submit documentation as evidence of their “professional and technical qualifications and competence, financial resources, equipment and other physical facilities, managerial capability, experience, business

²⁰ Under Article 14.6 Natural Gas for Domestic Consumption this commitment is in the form of a right of first refusal, which must be exercised by Petrobangla within 6 months.

reputation and personnel necessary to perform the EPSC". No bids were received for the Jangalikalan (Gas) and Juma-Bashikurd (Gas) blocks.²¹

Mitigation of Fuel Supply Risk

Minister Shahrani has recognized the importance of committing sufficient reserves to SGFDP. As a result, the MoM is prepared to conduct a tender offer to award a PSA for the Yatimtaq, Khoja Gogerdak and Jar Quduq gas fields. This will eliminate concerns about the adequacy of dedicated reserves. It is recommended that the GoIRA take further steps by underwriting the market for gas until foundation customers are prepared to enter into their own GSPA.

The risk of whether the gas supply will satisfy the requirements for quantity for SGFDP can also be initially mitigated by an evaluation and opinion of experts. Gas composition analyses will provide reliable information regarding the composition and heating value of the gas coming from the existing fields. The construction of a gas processing and gathering system can either be included in the bid package for the existing gas fields or developed as a stand-alone facility. If the later approach is taken, donor support in the form of a loan and technical assistance may be required, especially when private investment is not available.

IPP sponsors typically reduce both risks by making the host government responsible for fuel supply. There are several options for creating this arrangement. The GoIRA could enter into a PSA with an IOC to produce the existing gas fields and explore for additional reserves.²² In this scenario, the IOC would enter into a GSPA with the IPP. The IPP would, in turn, enter into a long-term PPA with DABS. Another option would be to enter into a technical advisory agreement with an IOC to undertake the rehabilitation of the gas fields on a fee-for-services basis. Finally, the GoIRA could enter into a Conversion Agreement with the IPP sponsors to transform the gas into electricity.²³

If a PSA for the development of existing gas fields cannot be signed with an IOC, AGE could continue to operate the gas fields. However, it would require a substantial increase in institutional capacity and investment in facilities for it to meet the delivery obligations under a GSPA with an electric power plant. Initially, this would entail importing equipment, such as a workover rig, along with training personnel in its operation. Expatriate personnel would have to be recruited for supervisory and highly skilled positions. An estimated US\$ 30 - US\$ 50 million in financial support would also be needed for the construction of the gathering pipelines and processing plant to condition the gas to meet contract specifications.

The lack of interest in the exploratory gas blocks that were offered in the first bidding round indicates that incentives should be considered. Incentives can be incorporated in the terms and conditions of the PSA. In addition, the GoIRA, acting through the

²¹ www.afghanistanpetroleum.com

²² Either form of PSA is recognized under Articles 21 – 23 of the Hydrocarbon Law.

²³ A Conversion or "Tolling" Agreement between the Philippines Power Corporation and Korean Electric Power Company was used for a portion of the gas produced by the Philippine Gas Project.

MoM could guarantee the purchase of gas in order to mitigate Price/Market Risk. This would include development of a model GSPA that included provisions to address the duration of contract, take-or-pay, pricing formulas, supplier liability for shortfalls and force majeure.

The GoIRA should offer incentives for the development of gas for domestic utilization. These incentives should take the form of a commitment to purchase gas for domestic utilization, as well as the flexibility to negotiate a royalty that does not effect the economics of producing gas for the local market. Reimbursement of income tax and customs charges would also make investment in the gas fields more attractive.

IV. COMMERCIAL RISK

Commercial Risk comes in two forms: internal and external. The level of internal risks is a function of the experience and financial capability of the project sponsors. External risks relate to the creditworthiness of counterparties to such contracts as the Gas Sales and Purchase Agreement (GSPA) and the PPA.

Financial Risk

Financial Risk is associated with any form of financing and reflects the uncertainty of whether the return on an investment will be less than that required for the repayment of lending. Although the analysis in the RAR treats it as a distinct category of risk, all risks become Financial Risk. In situations where the project is financed through a combination of debt and equity, the risk to investors is that they will be required to contribute additional equity. Highly leveraged projects have higher Financial Risk than those whose financing is primarily by equity.

In the case of upstream projects, the investors bear the costs until a GSPA has been signed. Once the market is confirmed by contract, it is possible to arrange external financing to develop the gas field. Financing for the downstream IPP is frequently arranged through 'off-balance sheet' methods where the lenders initially look to operational cash flow and assets of the facility for repayment. Project financing has been widely used for the type of facilities that comprise SGFDP, including electric power plants, transmission systems, as well as upstream and downstream oil and gas units.²⁴ Relatively little use has been made of project financing in Islamic *Shari'ah* jurisdictions. This is due to the fundamental conflict of *Shari'ah* principles with the leveraged debt approach which is fundamental to project financing.²⁵

The lack of experience in Afghanistan with either conventional project financing or the design and implementation of *Shari'ah* – compliant financing arrangements represents a type of Financial Risk peculiar to SGFDP.

Contract Risk

Contract Risk reflects the uncertainty associated with loss when a contracting party either reneges or fails to perform their agreement. The interpretation and enforcement of agreements is also an element of Contract Risk.

In the case of SGFDP, Contract Risk primarily arises in the procurement process. This includes the award of contracts for the development of the gas fields as well as the construction of the electric power plant. It is common practice for the contracts between investors who operate facilities and contractors who provide services to include provisions for cross-indemnification. This is particularly the situation regarding oil field services where the Operator agrees to indemnify the Service Contractor for a variety of contingencies referred to as 'down hole' risk. In the area of

²⁴ OPIC had approved financing for US investors in SGFDP.

²⁵ M.J.T. McMillen, "Islamic *Shari'ah*-Compliant Project Finance: Collateral Security and Financing Case Studies" *Fordham International Law Journal*, Vol. 48.

electric power plant construction the indemnities concern employee safety and use of equipment. The ability of state-owned enterprises or the GoIRA to indemnify contractors has been shown to be particularly problematic.²⁶

Concerns about the enforcement of contracts depend upon whether the agreement is to be governed by domestic law, with local courts to have jurisdiction over the parties and the subject matter of the claim. There is a difference of approach between private investment in the electric power and oil and gas sectors in terms of governing law. The Law on Private Investment permits the use of the laws of another jurisdiction for purposes of dispute resolution. While the Hydrocarbons (Oil & Gas) Law is silent on the question of applicable law, the model Production Sharing Contracts prepared by the MoM specifically state that the agreements are to be governed by Afghanistan law. This would include both codifications and the principles of *Shari'ah* interpretation.

Credit Risk

Credit Risk, also known as Default Risk, is the risk of loss due to counterparty's non-performance in making payment for the delivery of electric power. Under the methodology used in the International Country Risk Guide (ICRG), the creditworthiness of the state-owned distribution company is highly correlated with Political Risk.²⁷

Despite its corporate structure, DABS is a state-owned enterprise and as such does not have a credit rating that is independent of the GoIRA. This means that the issue is one of sovereign risk. Sovereign risk is the risk of a government becoming unwilling or unable to meet its loan obligations, or reneging on loans it guarantees. The existence of sovereign risk means that creditors should take a two-stage decision process when deciding to lend to a firm based in a foreign country.

Firstly, one should consider the sovereign risk quality of the country and next consider the enterprise's creditworthiness. In the case of Afghanistan, the International Monetary Fund (IMF) has imposed restrictions on the GoIRA that restrict contingent liabilities, such as performance or payment guarantees given on behalf of its political subdivisions.

In Afghanistan a single enterprise purchases electric power. DABS is a newly corporatized state-owned company and operates at an annual loss of US\$ 50 – US\$ 60 million. In addition, it has entered into agreements for the delivery of imported electric power from suppliers in Iran, Tajikistan, and Turkmenistan under concessionary tariffs of US\$ 0.02 / kWh. In contrast, electric power imported from Uzbekistan is priced at US\$ 0.065 / kWh. The terms of purchase require payments to be made in foreign exchange five days before the month in which the electric power

²⁶ Issues regarding customs, security and assumption of risk resulted in the cancellation of a previous contract to rehabilitate the existing gas fields. Office of Special Inspector General for Afghan Reconstruction, "Afghanistan Energy Supply Has Increased but an Updated Master Plan Is Needed and Delays and Sustainability Concerns Remain", page 10 (January 15, 2010).

²⁷ R.W. Click & R.J. Weiner, "Resource Nationalism Meets the Market: Political Risk and the Value of Petroleum Reserves", *Journal of International Business* (June 29, 2009).

is delivered. This has meant that DABS has arranged a revolving credit facility with a commercial bank because payment by retail customers is due two months after invoicing.

Dr. Shams, the CEO of DABS is willing to provide a comfort letter stating that “in-principle” the state-owned electricity distributor would sign a PPA with the developer of the IPP. Again, this is helpful at the preliminary stages of SGFDP, but will not prove to be sufficient for private investors unless other measures are taken to support the payment obligations in a PPA.

Mitigation of Commercial Risk

As a general rule, Commercial Risk is transferred to third parties through contracts, insurance, and guarantees. The financing and development of an IPP depends upon a framework for risk management that utilizes back-to-back contractual arrangements to shift risks for fuel-supply, construction, and purchase of electric power from the project sponsors, to the lenders, contractors, suppliers, purchasers, and host governments. There is some question as to whether the existing legal and regulatory system in Afghanistan has the flexibility to accommodate internationally accepted practices, such as project financing, for an IPP.

MIGA and OPIC have developed special credit facilities to support private investment in Afghanistan. OPIC offers financing for projects in Afghanistan, and has increased an initial commitment it made for a US\$ 50 million line of credit to US\$ 100 million. The organization is interested in discussing a financing package specifically for SGFDP.

The IFC and ADB have participated in co-financing for other commercial activities in Afghanistan and have programs tailored to assist IPP's. Financing Risk for SGFDP could be reduced by utilizing arrangements that have been successful in other Islamic countries. Under Islamic *Shari'a* principles, financing has been arranged for petrochemical and electric power projects using *rahn-adl* (mortgage/pledge) and *sharikat mahassa-murabaha* (joint venture–bank purchase sale) structures.

It is doubtful to expect that engineering, procurement, and construction management (EPCM) contractors will accept the transfer of risk for project delay and sub-performance, even at a substantial risk premium.²⁸ Whether the risks associated with fuel-supply and payment for electric power purchases can be shifted will depend upon the nature of purchase commitments, such as take-or-pay for gas supply and capacity charges for electric power purchases. Partial guarantees by international financial institutions for investment and payment by state-owned enterprises, such as DABS, will be necessary as well.

The need for credit support arises because DABS would not be considered to be a creditworthy buyer. In the case of SGDFP, the annual payment obligation would be approximately US\$ 80 million. This figure is based on the assumption that electric power is dispatched on a firm basis from the IPP at 80 percent of capacity, at a price

²⁸ EPCM contracts that are undertaken at a fixed price typically include a 30 – 40 percent of the construction contract price as a risk premium.

of US\$ 0.075 / kWh. The PPA would include a provision for payment of a minimum bill based on a firm demand charge of 80 - 100 percent of the annual firm dispatch capacity of the electric power plant.

The first measure to mitigate credit risk for SGDFP would be to direct electricity payments into a revenue account with priority of payment to the PPA with the funds to be managed by an independent third party. A credit line arranged with bank that is acceptable to the IPP sponsors would be a second alternative. Installing prepaid meters for retail electricity customers would enhance either measure. A related issue is the ability of DABS to make payment in readily convertible foreign exchange, primarily U.S. Dollars. Investors will expect DABS to take any foreign exchange risk. Currently payments for imported electricity are being made in U.S. Dollars through commercial banking arrangements.

SGDFP will not be able to attract foreign investment unless a mechanism is arranged to support the buyer's obligations under the PPA. The main options for such an arrangement include:

- A full-faith-and-credit payment guarantee from the GoIRA on behalf of DABS, as the electric power purchaser. The acceptability of this form of guarantee will depend on the underlying credit standing of the GoIRA.
- A partial risk guarantee or credit facility that is arranged with participation from multilateral lenders, which is only activated when there is a default on payment obligations.²⁹
- Insurance for political risk related to undertaking a project in Afghanistan.³⁰

It is likely that some combination of the above arrangements will be necessary in order to satisfy investors.

The procurement practices described in the PRR can reduce Contract Risk arising from the failure of performance. Investors would prefer to have their contracts governed by external law, such as the law of England and Wales, or New York. If Afghan law is to apply, investors will need to become familiar with principles of contract interpretation under *Shari'ah* law. Other aspects of Contract Risk related to the interpretation and enforcement of agreements is addressed in the Mitigation of Country Risk.

²⁹ The International Development Association (IDA) provides partial risk guarantees for all countries with varying fees for origination and servicing. See, www.worldbank.org/guarantee

³⁰ For example, the Multilateral Investment Guarantee Agency (MIGA) has guaranteed 90 percent of project costs (\$75 million) for the West African Gas Project along with a partial risk guarantee from IDA for Ghana's obligations to purchase gas for their electric power plants.

V. CONSTRUCTION RISK

Construction Risk is the probability of loss associated with the physical construction of a project. This risk can be divided into two categories: (i) design risk, and (ii) completion risk. Design risk arises from incomplete or incorrect designs. Completion risk is more broad and includes delays, defective or deficient performance, and extra work orders.

In the case of SGFDP, other factors such as siting facilities and project security contribute to Construction Risk and must be addressed before dealing with design and completion risk. Due to weather conditions, construction is also highly seasonal in Afghanistan, which adds to delay risk.

Previous energy development projects have encountered substantial cost overruns.³¹ This experience further emphasizes the importance of working with experienced EPCM contractors.

Site Selection

The preferred site for the IPP is located adjacent to the old gas processing facility in the Gerquduq Gas Field.³² There are two remaining issues regarding the siting of the facilities for SGFDP.

As a result of several decades of armed conflict, Afghanistan is one of the most heavily mined areas in the world. This means that the locations for the well field, gathering pipelines, gas processing facility, electric power plant, and transmission interconnections will need to be de-mined.

The other siting risk concerns the manner in which the investors will hold title to the land on which the facilities are constructed. Foreign ownership of land in Afghanistan does not appear to be possible.³³ Under Article 21 of the Private Investment Act, foreign investors have the ability to lease land for up to 50 years. However, the investor must still secure the lease through negotiation as Afghan law does not recognize the right of eminent domain.

Permitting and Environmental Risk

The Law on Environment provides for comprehensive regulation to protect the environment of Afghanistan. The National Environmental Protection Agency (NEPA)

³¹ For example, completion of the Kabul Electric Power Plant was delayed by 12 months and an additional \$40 million of costs were incurred due to difficulties in construction management. Office of Special Inspector General for Afghan Reconstruction, "Contract Delays Let to Cost Overruns for the Kabul Electric Power Plant and Sustainability Remains a Key Challenge" (January 20, 2010).

³² Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility, Vol. I Justification & Implementation (November 2005).

³³ Siting selection was evaluated in the Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility, Vol. I Justification & Implementation, Annex 5 (November 2005).

is responsible for implementing the law and has authority for issuing Pollution Control Licenses under Article 32.

Several facilities that are part of SGFDP, such as the wellfield, gas processing facility, and electric power plant are likely to require Pollution Control Licenses from NEPA. Initially, a Preliminary Assessment of the potential adverse effects on the environment is prepared by the project's proponents.³⁴ If it is determined that the adverse effects are unlikely to be significant, the project can be approved. Otherwise, the proponents must prepare an environmental impact assessment according to best international practices. Depending on the results of the impact assessment, it may become necessary to prepare a Comprehensive Mitigation Plan to deal with those effects. The time for conducting the Preliminary Assessment and possible preparation of a Comprehensive Mitigation Plan will need to be factored into the schedule for SGFDP.

There are several concerns related to Permitting and Environmental Risk for SGFDP. There is little base-line environmental data to draw upon. As discussed in the PRR, approximately one year will be needed to monitor air and water quality to determine whether discharges or emissions could have an adverse impact on the environment. Institutionally, NEPA has no experience in issuing licenses for electric power plants and gas processing facilities. As a result, it will be necessary to provide technical assistance in reviewing the Preliminary Assessment and application for a Pollution Control License.

Perhaps the greatest risk in this area, is the limitation contained Article 32 (4), restricting the duration of Pollution Control Licenses to a period of five years. This is also a form of Legal and Regulatory Risk. Consultation with NEPA will be necessary to determine the likelihood of obtaining license extensions.

Water Supply Risk

The availability of a water supply for SGFDP is a concern. Certain equipment configurations (combined-cycle with steam turbine) use significantly more water than other designs. The proposal is to draw water from AGE's Quarakent pumping station, which lifts water from a well field in the Sarepul River Valley.

The adequacy of a water supply for the electric power plant will be confirmed as part of the environmental analysis. Further analysis of the cost of upgrading the water system to meet the needs of AEG and the SFGDP will be included in the IPP Feasibility Report.

Design Risk

Briefly, the electric power plant is to be designed to meet the following specifications:

- 100-150 MW capacity

³⁴ The potential environmental impacts of SGFDP were evaluated in the Technical and Economic Feasibility of Development of a Gas Fired Thermal Power Facility, Vol. I Justification & Implementation, Annex 8 (November 2005).

-
- 98 percent annual availability
 - 20 year operating life
 - 95 percent starting reliability

Design Risk affects SGFDP in several ways depending upon whether the electric power plant is constructed as a 'Greenfield' project, or involves the relocation of existing equipment.

In terms of a Greenfield project, the size of the generation units needs to be small enough to respond to load fluctuations. In order to provide reliability, individual units should have the capacity to generate 20 MW. In this way, no single unit will handle five percent of peak load. A modular approach would also allow IPP sponsors to develop a track record of operating in Afghanistan before committing to additional investment. The selection of either turbine or reciprocating engines as electric power units in terms of efficiency at higher altitudes is another concern.

There are also design issues regarding the gas processing facility in terms of the units and processing capacities. A gas assay is needed to determine the levels of contaminants, as well as heavier hydrocarbons, such as ethane, pentane, propane, and butane. This analysis will determine the design and operating severity of the processing units. It will also allow decisions to be made regarding the feasibility of constructing an LPG bottling plant as part of the design for the central gas processing facility.

Completion Risk

Completion Risk is the risk that a project will not be brought into operation successfully or is able to pass its completion test. The risk that a project may not be completed and/or produce revenue, either because the financing was cut off before completion or because construction was poorly done. A test of the project's ability to perform as planned and generate the expected cash flows is another aspect of Completion Risk. Once the completion test is passed, the project can move from recourse to project financing.

Mitigation of Construction Risk

In order to resolve issues related to the siting of project facilities, the GoIRA should assume the responsibility for land tenure and make the location available to the project sponsors through a long-term lease of up to 50 years, as permitted in the Law on Private Investment. The GoIRA could reduce Construction Risk by engaging in other front-end activities such as de-mining the site and obtaining permits and consents that could be transferred to investors once the selection is made.

Typically, Construction Risk is addressed in the provisions of an EPCM contract. The EPCM contract shifts much of this risk to the contractor under provisions for fixed price and liquidated damages for delay and failure to meet performance tests. It is also common for defective performance to be covered by a warranty for the first year of operation. In some situations the contractor has been obligated to make

contributions to equity as incentive to meet project milestones. It is problematical whether qualified EPCM contractors would accept these arrangements under the conditions in Afghanistan. Experience with construction of the Kabul Electric Power Plant has shown that a project execution plan can be a useful measure for reducing the risk of delay and cost overrun.

The risk of environmental permitting could be reduced if the MoM would gather baseline environmental data, conduct the Preliminary Assessment and obtain the necessary Pollution Control Licenses (PCL). In this way, the PCL could be assigned to the successful bidder when the contract for construction was awarded. The five year limitation on the PCL will be discussed with NEPA as part of the Stakeholder Plan.

The Preliminary Assessment should also include confirmation of a water supply from the works at the Gerquduq gas processing facility. The MEW should provide the IPP investor with authorization, in the form of a license or permit, to utilize the water supply as well as easements for water pipelines.

VI. OPERATIONAL RISK

Operational Risk concerns the cost of manpower, technology transfer, performance of generation equipment, reliability of transmission systems, and maintenance. Operational Risk also includes force majeure events in the form of natural disasters and weather conditions.

Transmission Risk

The ability to transmit SGFDP electric power over NEPS represents the greatest operational exposure. In most situations, a private investor would not anticipate taking on Transmission Risk. The PPA would provide for the payment of a fixed charge when the electric power plant is capable of producing electric power regardless of the ability of the transmission grid to transport it to markets.

The PRR discussed several feasible interconnections to NEPS. The option of connecting the IPP to the Sheberghan substation and connect the Sheberghan substation directly to NEPS at Naibabad provides for the best long term advantage for the IPP and Afghanistan. This arrangement allows greater transfer of electric power to Kabul (about 4 MW) over the Turkmenistan-Sheberghan-Mazar-e-Sharif connection. The current NEPS SLD is based on this finding and shows Sheberghan connected to Naibabad. Naibabad is a new switchyard and there is room for expansion. In comparison, Mazar is an older substation with limited space, making it more difficult to expand.

The ability to synchronize the SGFDP generators with NEPS is another serious risk. Currently NEPS is connected to Uzbekistan and Uzbekistan has not given permission to DABS to synchronize any Afghanistan generator to NEPS supplying Uzbekistan electric power. However, DABS is optimistic that its efforts to negotiate with Uzbekistan to allow DABS generators to operate in parallel and in synchronism will be successful. DABS is also making efforts to join the Central Asian Coordination Electric Energy Council so that synchronized operations between NEPS and the Central Asian Grid would be possible.

There is a possibility that DABS is not able to complete negotiations with Uzbekistan to synchronize Afghanistan Generation with Uzbekistan. In this case there are two alternatives that may be pursued. One is to sectionalize NEPS to allow SGFDP to feed Mazar-e-Sharif loads currently at about 40 MW. Another alternative would be to connect with the 110 kV mini-grid that is supplied electric power from Turkmenistan and serves the loads of Sheberghan, Andkhoy, Sarepal, Kwaja Doko, Maimana, Sherin Tagab, and Jumabazar. Permission would have to be obtained from Turkmenistan to synchronize an SGFDP electric power plant with the Turkmenistan transmission system. In this arrangement the electric power from the IPP would displace electric power drawn from Turkmenistan and in such an eventuality, the maximum electric power that can be absorbed will be limited to 50 MW. Currently Turkmenistan is supplying electric power at US\$ 0.02 / kWh. If this tariff rate is sustainable, it will be tough for the IPP to compete, even if the gas supply is free.

Maintenance Risk

Maintenance Risk arises once the project has satisfied its commissioning tests and the EPCM contractor has handover operation of the plant. An effective maintenance program is necessary to ensure reliability as well as to satisfy the conditions of the warranty given by the manufacturer of the equipment.

Gas-fired electric power plants, particularly co-generation, generally require higher maintenance costs than other types of thermal electric power plants. For this reason, operators enter into maintenance contracts with service companies.

Force Majeure Risk

Force Majeure Risk is concerned with the potential delay of completion or damage to facilities arising from unforeseen and uncontrollable events. The causes of Force Majeure can include natural disasters, catastrophic mechanical failure, or the acts of third parties. The list of events that would be recognized depends upon the terms contained in the commercial agreements, particularly the GSPA and PPA. The viability of a project is undermined if the scope of Force Majeure is too broad.

Force Majeure Risk affects all contracting parties because it excuses performance of their respective obligations, and may also suspend the terms of the contract for the duration of the event. Contract liability, including liquidated damages, is suspended as well. Obligations to make payments and supply fuel are notable exceptions to Force Majeure for electric power development projects.

Mitigation of Maintenance and Operations Risk

The main approach for dealing with Maintenance and Operations Risk is through prevention, by engaging in experienced operations and maintenance contractors or skilled technicians and technical advisors. In some cases, the contractor with the operations and maintenance contract obligates them to make liquidated damage payments in the event that outages exceed negotiated levels. Preventive measures are often coupled with business interruption insurance for the purpose of covering operational and loan repayment costs. This type of insurance can be expensive.

The Implementation Agreement and all commercial contracts should have back-to-back Force Majeure clauses which recognize the same events and provide identical relief.

VII. SECURITY RISK

Safety and security of project personnel is the principle risk to SGFDP. The main form of this risk comes from potential attacks, minefields, unexploded ordnance, potential sabotage from insurgents and local population, and theft. Under current conditions in Afghanistan, Security Risk adds approximately 15 - 40 percent to project costs. Despite its high-profile, this risk can also be managed, albeit with considerable coordination between investors, Private Security Providers, the GoIRA, ISAF, and Afghan National Security Forces (ANSF). In fact, just recently, the GoIRA has assigned the Department of Interior to provide full security to all MoM projects and activities across the country, which should radically reduce Security Risk.

SGFDP's relationship with the local population is another consideration. Approximately half of the households in the project area have had the benefit of gas distribution at little or no cost. Minister Shahrani considers maintaining local support for SGFDP to be an important element in the success of an IPP. Support from local communities can also be attained by employing and training local personnel for unskilled and semi-skilled jobs (including security related work), renting vehicles and drivers from the community and using suppliers and vendors and where applicable contractors from the community. A local workforce is the best source of information available, which is very important to mitigate the security risk.

Other forms of industrial development are being planned in the face of current security risk. For example, a Chinese company, MCC, is investing in the development of the Aynak Copper Mine in Logar Province. The infrastructure for this project will include a 400 MW coal-fired electric power plant, with 50 percent of capacity to be distributed through the national grid.

AEAI has prepared a preliminary security plan and cost estimate for the SGFDP that will be updated as part of the Final Roadmap Report. The Security Plan would also be included in the information brochure provided to prospective investors.

VIII. CONCLUSION

The development of the SGFDP is best understood in terms of risk management. Principal risks such as supply, market, political, and completion are assessed, and measures for management are adopted.

Risk is a matter of perception, and cannot be entirely eliminated. The fact that a project is to be located in Afghanistan increases a project's risk profile. Nevertheless, risk must be countered with measures that reduce significant exposures to a manageable level. The following risks had been identified as potential "deal breakers" in the PRR:

- Country Risk – corruption within the GoIRA, and security related to the on-going insurrection
- Fuel Supply Risk – dedication of a sufficient quantity and quality of gas to support a 100 - 150 MW electric power plant over a period of twenty years
- Commercial Risk – creditworthiness of DABS, as a state-owned enterprise

In the process of preparing the RAR, several other significant risks were assessed including:

- Legal and Regulatory Risk – the lack of a coherent legal and regulatory framework applicable to the electric power sector subjects investors to substantial uncertainty
- Legal and Regulatory Risk – Customs clearances can delay project schedule. Neither the Law on Private Investment nor the Hydrocarbons (Oil and Gas) Law exempt the importation of equipment from duties and taxes
- Third-Country Risk – transit fees for equipment crossing other borders
- Gas Quality Risk – gas from existing reservoirs is high in H₂S, which will require construction of a gas processing facility before consumption by customers
- Construction Risk – a Preliminary Assessment must be conducted to determine whether SGFDP will create a potential adverse effect to the environment, which will add additional time to the project schedule
- Construction Risk – an EPCM contractor is unlikely to accept risks for delay or sub-performance under a fixed price contract without a significant risk premium

Various mitigation measures have been proposed to reduce the above risks to an acceptable level in order to successfully promote SGFD to prospective investors. The principle mitigation measures include the GoIRA entering into an Implementation Agreement, which would reduce Country and Political Risk in the

form of corruption and governmental force majeure. The Implementation Agreement would also include an option for the 'buy-out' of investors, if they are unable to achieve an agreed upon rate of return, due to factors that are within the control of the GoIRA.

Fuel Supply Risk is to be mitigated through a competitive tender offer for the development of the existing gas fields. This step will establish a reliable source of fuel for electric power development. Financing must be secured for a gas processing facility and a gathering system in order to mitigate Gas Quality Risk. The operation of a gas processing facility will also create a commercial opportunity for the bottling and sale of LPG.

Construction Risk can be reduced through a project execution plan along with the advanced preparation of the Preliminary Assessment and submission of an application for a Pollution Control License. The audit of the Office of Inspector General for Afghan Reconstruction on the construction of the Kabul Electric Power Plant emphasised the need to have a project execution plan as the means for controlling cost overruns and delay of completion. A critical path schedule for both the Upstream (gas supply) and Downstream (electric power plant) components will be included in the Final Roadmap Report. The availability of an adequate supply of water can be done simultaneously with obtaining consents and approvals for construction.

There remain two risks where the suggested mitigation measures do not appear to reduce Construction Risk to a level that would allow SGFDP to be promoted as a generally recognized development package. Both are related to the present insurgency. The ability to provide security, particularly during construction, depends upon the ability of the GoIRA and its allies to bring sufficient military and political pressure on the insurgent groups that armed conflict is no longer successful. The ability to predict such an outcome within a range of probability that would encourage foreign investment is not possible at this time. In addition, while it may be possible to kindle the interest of investors, it may not be possible to recruit capable and experienced contractors to undertake the role of engineering, procurement, and construction management under terms and conditions which are customary for such projects.

Specific recommendations and their potential to reduce the various risks discussed in the RAR are summarized in Appendix A: Risk Reduction Evaluations. Based on the analysis of risks and mitigation measures, implementation of recommendations has the potential to reduce several risks, such as Financial Risk, Construction Risk and Operations Risk to manageable levels. The RAR can only offer partial solutions regarding other risks. Without a complete guarantee of investment, or a buy-out option, sponsors would need to be prepared to put a substantial amount of equity at risk, rather than rely upon leveraged debt project financing arrangements. In doing so, they would also need to relieve EPCM contractors of liability for project delays or performance issues associated with armed conflict. EPCM contracts may need to forego fixed prices, along with built-in risk premiums, in favor of time and materials or cost plus approaches. Finally, the best countermeasure for Security Risk will be to invest in skill training and job creation for Afghan nationals.

APPENDIX A: RISK REDUCTION EVALUATIONS

There is no consensus on the methodology to be used in assessing political and credit risks. Political risk analysts and credit rating agencies use different methodologies to rate a country's comparative risk exposure. Credit rating agencies tend to use quantitative econometric models and focus on financial analysis, whereas political risk analysts tend to use qualitative methods. For example, the International Country Risk Guide (ICRG) methodology used by the PRS Group is comprised of 22 variables as indicators of Political Risk, Financial Risk and Economic Risk with ratings from Very Low Risk (80 to 100) to Very High Risk (0 to 49.9).

Rather than engage in an attempt to express a rating for the various risk categories as they pertain to SGFDP, AEAI requested its team of specialists to provide their assessment of the potential for the mitigation measures discussed in this report to reduce SGFDP's risk, along with any qualifications of their view. The team's assessments are the following:

COUNTRY RISK

Mitigation Measures	Potential Reduction of Country Risk	Qualification
Implementation Agreement with provisions for Customs clearances, anti-corruption, governmental force majeure and buy-out of investors	With Buy-out – 50% Without Buy-out – 20%	Essential for IPP
Planning and Coordination through SGFDP Working Group	15%	
MIGA Political Risk Insurance to support IPP investor	15%	Essential for IPP

FUEL SUPPLY RISK

Mitigation Measures	Potential Reduction of Fuel Supply Risk	Qualification
Tender for Producing Fields under PSA with IOC	70%	Essential for IOC
Option for government to purchase gas absent third-party buyer	80%	Essential for IOC
Capacity Building to allow AGE to operate	50%	

gas fields and processing plant		
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COMMERCIAL RISK

Mitigation Measures	Potential Reduction of Commercial Risk	Qualification
Project Financing for IPP, OPIC or Commercial Bank	100%	Essential for IPA
Partial Credit Support for DABS	80%	Essential for PPA
Foreign Investment Law protection	10%	
Tender for PSA and IPP contracts with GoIRA	5%	

CONSTRUCTION RISK

Mitigation Measures	Potential Reduction of Construction Risk	Qualification
GoIRA provides sites for facilities under long-term lease	100%	Should include access roads project site
EPCM contract for gas processing plant and electric power plant	100%	No delays caused by customs and security issues
MoM prepares Preliminary Assessment and obtains Pollution Control Licenses	100%	The SGFDP will install necessary equipment to meet electric power plant emission to international standards.
Water supply confirmed in Preliminary Assessment	100%	Water withdrawal permits are given in a timely manner
Project execution plan	100%	The execution plan is vetted by experienced consultant

OPERATIONAL RISK

Mitigation Measures	Potential Reduction of Operational Risk	Qualification
Connection at Naibabad	100%	Synchronizing of SGFDP electric power with Uzbekistan power is permitted

Contract Maintenance	for	100%	Experienced contractor
Business Interruption Insurance		100%	The interruptions are of temporary nature such as natural causes.

SECURITY RISK

Mitigation Measures	Potential Reduction of Security Risk	Qualification
Security Plan	40%	Essential
Local Support	20%	Essential
ANSF Involvement	10%	Important
ISAF Involvement	10%	Important

APPENDIX B: PROJECTS OF NATIONAL IMPORTANCE

Article ??: Projects of National Importance (to be considered in the development of the draft Electricity Law)

- (a) Despite the other provisions of this Act, the Minister of Energy and Water may enter into an Implementation Agreement with investors for the Generation, Transmission, or Distribution of electricity when it is considered to be a project of national importance.
- (b) A project is considered to be of national importance if it meets the following criteria:
 - (i) The Minister has determined that investment in the project is in the interest of the nation and will advance the welfare of its people,
 - (ii) The Ministry of Energy and Water has participated in the preparation of a feasibility study or other investment report conducted under the sponsorship of an international donor agency or multilateral development bank, and
 - (iii) One or more international donor agencies or multilateral development banks have agreed to provide commitments for sovereign lending, co-financing, repayment guarantees, insurance, or other form of financial support for the project
- (c) In negotiating the terms of the Implementation Agreement for the project, the Minister shall seek consultation and assistance from the AERA on relevant issues including:
 - (i) Tariff methodology,
 - (ii) Market impact,
 - (iii) Price of electricity under electric power purchase agreements, and
 - (iv) Conditions of service
- (a) Annually, or at such other times as requested, the Minister shall provide the GoIRA with a report on the status of the project including:
 - (i) Terms of the Implementation Agreement,
 - (ii) Identity of the investors in the project, and financing arrangements,
 - (iii) Scale of investment, location and capacity of the project,
 - (iv) Schedule for construction and completion of the project,
 - (v) Use of public resources (coal, natural gas, water or other), if any,
 - (vi) Economic and social benefits of the project, and
 - (vii) Environmental permits and consents for construction and operation
- (b) Licenses shall incorporate the terms of the Implementation Agreement as conditions. The AERA shall issue the following:
 - (i) A Conditional License upon the execution of the Implementation Agreement, and
 - (ii) An Unconditional Authorization License for the operation of the project at such time as the project has been commissioned, providing the requisite environmental permits have been obtained.
- (c) Any terms in the Implementation Agreement obligating the Government to guarantee payment to investors in accordance with Article ??, shall not be effective without the approval of the GoIRA.

APPENDIX C: SGFDP RISK MATRIX

Risk Description	Potential Impact			Management
	Construction	Market	Financing	Strategies

<u>COUNTRY RISK:</u>				
1. Political	<ul style="list-style-type: none"> ◆ Project Delay ◆ Confiscation, Expropriation 	<ul style="list-style-type: none"> ◆ Reduced Supply ◆ Increased Prices 	<ul style="list-style-type: none"> ◆ Unavailable ◆ Risk Premium 	<ul style="list-style-type: none"> ◆ Implementation Agreement ◆ Political Risk Insurance
2. Legal & Regulatory	<ul style="list-style-type: none"> ◆ Customs Delay ◆ Compliance with Electricity Law 	<ul style="list-style-type: none"> ◆ Reduced Supply ◆ Increased Prices 	<ul style="list-style-type: none"> ◆ Unavailable ◆ Risk Premium. 	<ul style="list-style-type: none"> ◆ Project Implementation Agreement ◆ Stability clause in PSA & PPA
3. Corruption	<ul style="list-style-type: none"> ◆ Project Delay ◆ Increase Cost 	<ul style="list-style-type: none"> ◆ Reduced Supply ◆ Increased Prices 	<ul style="list-style-type: none"> ◆ Unavailable 	<ul style="list-style-type: none"> ◆ Implementation Agreement ◆ Liaison with GIAAC ◆ GoIRA compliant with EITI
4. Third-Country	<ul style="list-style-type: none"> ◆ Transit Fees increase cost 	<ul style="list-style-type: none"> ◆ Increased Prices 	<ul style="list-style-type: none"> ◆ Risk Premium 	<ul style="list-style-type: none"> ◆ Protection under GATT

APPENDIX C: SGFDP RISK MATRIX

Risk	Potential Impact			Management
	Description	Construction	Market	Financing

FUEL SUPPLY RISK 1. Reserve	<ul style="list-style-type: none"> ◆ Reduce plant size ◆ Staged construction ◆ Construction of dual fuel storage facilities for backup supply 	<ul style="list-style-type: none"> ◆ Market is supply constrained. 	<ul style="list-style-type: none"> ◆ Cannot be less than 15-20 years dedicated reserves for loan amortization 	<ul style="list-style-type: none"> ◆ Independent certification of gas reserves ◆ GSPA with dedication of reserves and right to call for redetermination
2. Quality	<ul style="list-style-type: none"> ◆ Increased Cost for gas processing plant & gathering pipelines ◆ Possible LPG bottling plant 	<ul style="list-style-type: none"> ◆ Must meet quality specifications 	<ul style="list-style-type: none"> ◆ Additional financing for gas processing plant & gathering system 	<ul style="list-style-type: none"> ◆ Include gas processing as recoverable cost in PSA ◆ Donor Lending for gas processing plant and pipeline
3. Price/Market	<ul style="list-style-type: none"> ◆ Excess capacity ◆ Staged construction 	<ul style="list-style-type: none"> ◆ Lack of Demand 	<ul style="list-style-type: none"> ◆ Not able to achieve rate of return on investment 	<p style="text-align: center;">Competition from Imports</p> <ul style="list-style-type: none"> ◆ Back-out imported electric power ◆ Long-term PPA

APPENDIX C: SGFDP RISK MATRIX

Risk Description	Potential Impact			Management
	Construction	Market	Financing	Strategies
4. Operational	<ul style="list-style-type: none"> ◆ Wellfield must have capacity for peak operations 	<ul style="list-style-type: none"> ◆ Back-up with diesel generation or imported electric power ◆ Liability for failure to supply 	<ul style="list-style-type: none"> ◆ Limited recourse financing more difficult to arrange 	<ul style="list-style-type: none"> ◆ Rework exiting wells ◆ GSPA with firm schedule for delivery ◆ Restrictions on third party gas sales.
COMMERCIAL RISK				
1. Financial	<ul style="list-style-type: none"> ◆ Final Investment Decision postponed 	<ul style="list-style-type: none"> ◆ Reliance on imported electricity 	<ul style="list-style-type: none"> ◆ Project Financing restricted 	<ul style="list-style-type: none"> ◆ Partial guarantees ◆ Increase Equity ◆ <i>Shari'ah</i> lending structures
2. Contract	<ul style="list-style-type: none"> ◆ Defaults delay construction ◆ Liquidated damages 	<ul style="list-style-type: none"> ◆ Defaults increase cost ◆ Letter of credit 	<ul style="list-style-type: none"> ◆ Defaults trigger recourse to equity 	<ul style="list-style-type: none"> ◆ Prequalification of vendors ◆ Bid guarantees ◆ Liquidated damages
3. Credit	<ul style="list-style-type: none"> ◆ Project delayed until payment guaranteed 	<ul style="list-style-type: none"> ◆ Pledge receipts ◆ Payment in foreign currency 	<ul style="list-style-type: none"> ◆ Financing cannot be arranged ◆ Minimum Bill based upon annual contract quantities 	<ul style="list-style-type: none"> ◆ Payment by Letter of Credit ◆ Sovereign guarantee for DSBA (full faith and credit for performance or limited to take-or-pay for duration of loan) ◆ Credit support for GoA from

APPENDIX C: SGFDP RISK MATRIX

Risk	Potential Impact			Management
	Description	Construction	Market	Financing

				donors
CONSTRUCTION				
1. Site Selection	<ul style="list-style-type: none"> ◆ Delay until access ◆ Land Mines 	<ul style="list-style-type: none"> ◆ Reliance on imported electricity ◆ Lost project revenue 	<ul style="list-style-type: none"> ◆ Secure title condition for financing 	<ul style="list-style-type: none"> ◆ GoIRA provides long-term lease ◆ Mine clearance
2. Permitting & Environmental	<ul style="list-style-type: none"> ◆ Siting and discharge restrictions ◆ Completion delayed until assessment complete and license issued 		<ul style="list-style-type: none"> ◆ Must have all consents and permits as loan condition. ◆ Compliance for donor financing 	<ul style="list-style-type: none"> ◆ Assessment of environmental impacts ◆ Pollution control license from ANEPA
3. Design	<ul style="list-style-type: none"> ◆ Final Design 		<ul style="list-style-type: none"> ◆ Preliminary design required for FID 	<ul style="list-style-type: none"> ◆ Determine <ul style="list-style-type: none"> - Greenfield electric power plant - Relocation of Kabul generators - Operating severity of processing plant
OPERATIONAL RISK	<ul style="list-style-type: none"> ◆ Limited area for 	<ul style="list-style-type: none"> ◆ Not able to wheel 	<ul style="list-style-type: none"> ◆ Less certainty for 	

APPENDIX C: SGFDP RISK MATRIX

Risk Description	Potential Impact			Management
	Construction	Market	Financing	Strategies
1. Transmission	additional lines	electric power to Kabul	financing ◆ Less access to non recourse financing or foreign investment	◆ NEPS has capacity for 300 MW, currently utilizes 150 MW
2. Maintenance	◆ Post Construction Risk	◆ Electric power restricted to local market	◆ Repayment	◆ Follow warranty criteria ◆ Engage contractor
3. Force Majeure	◆ Suspend work	◆ Suspend delivery	◆ Payments continue	◆ Back to Back Force Majeure clauses
SECURITY RISK	◆ Refusal to invest ◆ Delay or suspension of construction	◆ Back-up source of electric power supply ◆ Increased cost	◆ Sponsors and Lenders will not fund project unless risk is manageable	◆ Project Security Plan ◆ Arrangements with ANSF ◆ Local Support for project