

FINAL REPORT

SUSTAINABLE DEVELOPMENT OF NATURAL RESOURCES PROJECT
(PHASE II - AFGHANISTAN)

Consultancy Services for Improving the Business Environment –
Reform of the Afghanistan State Gas Enterprise (“Afghan Gas”)

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MINISTRY OF MINES AND PETROLEUM
WORLD BANK
CONSULTANCY SERVICES FOR IMPROVING THE BUSINESS
ENVIRONMENT: REFORM OF THE AFGHANISTAN STATE GAS
ENTERPRISE ("AFGHAN GAS")

FINAL REPORT

PREPARED FOR:

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Abbreviations

bcm	billion cubic metres
Afghan Gas	Afghan Gas Enterprise
APA	Afghanistan Petroleum Authority
CAPEX	Capital Expenditure
Client	Ministry of Mines and Petroleum
CLLC	Corporations and Limited Liability Company Law
EIA	Environmental Impact Assessment
E&P	Exploration and Production
EGR	Enhanced Gas Recovery
HR or HRD	Human Resource Department
HSE	Health, Safety and Environment
IMC	Inter-Ministerial Committee
KPI	Key Performance Indicator
MoF	Ministry of Finance
MoMP	Ministry of Mines and Petroleum
NFPP	Northern Fertiliser and Power Plant
OHS	Occupational Health & Safety
OMS	Operating Management System
OPEX	Operating expenditure
PMU	Project Management Unit
PPP	Public Private Partnerships
PRMS	Petroleum Resources Management System
Project	Consultancy Services for Improving the Business Environment: Reform of the Afghanistan State Gas Enterprise ("Afghan Gas")
SCADA	Supervisory Control and Data Acquisition
SOE	State Owned Enterprise
TAPI	Turkmenistan-Afghanistan-Pakistan-India gas transport pipeline project
TFBSO	Task Force for Business and Stability Operations
TOR	Terms of Reference
UNICON	UNICON Limited (UK) and their affiliated companies
WB	World Bank

1. Executive Summary

1.1 Purpose and Objectives

UNICON Ltd (UK) was engaged by the Ministry of Mines and Petroleum to undertake the World Bank funded project "Improving the Business Environment: Reform of the Afghanistan State Gas Enterprise ("Afghan Gas")". Specifically this requires a plan for the corporatisation of Afghan Gas. UNICON mobilised in December 2013 and submitted an Inception Report in January 2014 that provided an updated work plan indicating the required tasks and deliverables.

At project commencement a submission to approve Afghan Gas for corporatisation was being considered and progressing through the mechanisms of government, although there was some concern at the duration of the time being taken. Nonetheless supporting a corporatisation initiative was firmly established as the primary aim of the project and was clearly identified within the project terms of reference. Indeed, tasks and deliverables assigned were based on UNICON providing the supporting commercial mechanisms to the legal process of authorising and instigating such corporatisation. Without such authorisation and instigation, full consideration and completion of some of the tasks would be difficult. To this end the project objective could be asserted as 'to develop a strategy and plan for improving business performance of Afghan Gas'.

While it is expected that indeed, the corporatisation process will enable some rationalisation of operations and finances, through the selective transfer of assets, liabilities and employment contracts, and thus facilitate an improved organisational and financial structure of the 'new' Afghan Gas Limited company, corporatisation alone does not improve the business, its operational protocols, governance or results.

Thus, it is essential that components of commercialisation, restructure and reform are introduced into the Afghan Gas business as soon as practicable, and it is these initiatives that will have far wider impact on the development of the gas sector overall and the performance of a new Afghan Gas, than the corporatisation legal processes.

1.2 Work Program

By classifying the project work plan under three phases, UNICON was able to support its activities and findings through the logical flow of a) internal assessment (Phase I), b) external assessment (Phase II) culminating in options and strategy for reform proposals, and c) plans and methodologies for reform (Phase III).

Phase I activity concluded with submission of the comprehensive Assessment of status of Afghan Gas Operations Report, in August 2014. The report covered organisational, institutional and human resource matters, financial matters and asset ownership, technical operations and technical capability, legal issues and compliance, planning and marketing and concluded that a series of weaknesses in all areas of the business provide fertile grounds for significant improvements. However, the magnitude of change needed and the resources available mean that such change will by necessity take time and will need to be carefully constructed and monitored to achieve timely developments and add value.

The overall findings and conclusions of the market study were submitted in the External Environment Review/Market Report and such findings provided critical input to the evaluation of reform options and recommendations.

By further reference to its acquired knowledge and information as accomplished during the phase I and phase II activity, the UNICON team was able to consider and evaluate the potential for reform of Afghan Gas, the thrust of how such reform might reasonably progress and the likelihood of success based on various input elements, notably access to the resources (finance, skills, political will) required. The key considerations were based on:

- The Assessment and evaluation of the status of Afghan Gas, including its skills and capacities, infrastructure and internal resources,
- The team members combined knowledge and experience in similar reforms in other countries and in consideration of the factors relating to how the industry works and succeeds in other operating environments,
- Inputs and influences from discussions with MoMP and APA executives and Afghan Gas staff and other stakeholders coupled with the team's collective experience of how such reforms can be managed politically and socially and ensuring that sufficient weight is given to the social impact of such reforms, and
- The external market assessment and use of an economic model to provide logical assumptions and measure the impact of such assumptions.

1.3 Issues and Strategic Options

The analysis of options and recommendations were compiled in the report Proposal for restructuring, divestiture and transfer of assets Report, which was submitted formally in October 2014. At that time, the aim was for wide discussion and consultations with ministry officials relating to the options and proposals presented. While UNICON analysis included the detailed information about employees and assets, the lack of progress on approval of corporatisation meant that conclusions on the proposed asset transfers and values were effectively redundant, as the passage of time impacts heavily on such decisions.

Phase III work included a series of deliverables that in combination could be considered a suite of "Plans, guidelines, proposals and methodologies" (a tool kit) for the implementation of the proposed changes and restructure needed.

A number of technical and administrative challenges were evident during the project. The key technical challenges in corporatisation and reform of Afghan Gas were presented in the briefing note "The Case for Corporatisation", delivered in April 2014. These were indicated as follows:

- Maintaining reform momentum that has already commenced with the initiatives of the TFBSO and USAID work, this project and current activity inviting exploration contracts for new field discovery. Such momentum is at risk in a changing political environment,

- Limited resources are available in terms of money, people skills, modern operational know how and proven commercial opportunities,
- There is always work and effort in making change and the likelihood of some discomfort and concern if employees and other stakeholders consider themselves likely to be disadvantaged,
- The need for an effective regulatory environment, via a regulator, division of MoMP, ombudsman or similar and proper monitoring establishment highlight the need for change within the Ministry as well as Afghan Gas Enterprise,
- The security concerns generally prohibit effective feasibility and analysis of projects and disrupt existing initiatives.

During the project the effectiveness of APA was weakened with a reduction of staff and changes in personnel supervising the project. While there was strong interest in the work being done and the prospects for reform, there continued to be a lack of strong project leadership within the ministry especially after June 2014 and until February 2015 after the appointment of the new Minister, when communications improved significantly.

Under each proposed option for reform a key consideration is that the raw material, the natural gas remains the property of the State. Under option 1) Status Quo, the state controls the operations of the entity, through influence and management of the entity and thus receives all of the benefits of the operations through taxes and profit allocation.

Under option 2) commercialisation, even though legally the state retains ownership of the operations, and can influence management through sector regulation, the aim of commercialisation is to permit professional managers to run the business with independent decision-making (mindful of the interests of shareholders and all stakeholders) but to operate with commercial efficiency. In this situation the state receives benefits through taxes and a royalty or fee paid for gas produced, plus the potential in time for an owners dividend. However, net profits must be used at the discretion of the Board and management for the improvement, development and sustainability of the business.

Under option 3) corporatisation, it is a similar situation to option 2, however legal mechanisms rather than just ministerial policy direct that the entity is a separate corporation (separate legal entity). As a consequence the right to sue and be sued and the capacity to pledge assets as collateral adds commercial strength and impetus to the entities ability in contract negotiations of all types and this is seen as essential, in time, for the development of the business.

Under option 4) privatisation, the state cannot control, either through policy or law, the operations and management of the business, other than by regulations and general legal matters impacting on all businesses. The state will benefit from the success of the business through increased taxes and royalty/fee payments and the spin-off impact that successful businesses provide to economic and social development.

1.4 Strategy Proposal

Thus when recommending proposals for the restructure of Afghan Gas UNICON considered all the elements of the business and its potential within a rejuvenated Afghan Gas Sector. A detailed 3 year business plan has been prepared to inform Afghan Gas management once a firm decision (including relevant political commitments to resources) is made to proceed with commercial reform.

This business plan reviewed the external and internal elements impacting on business potential as determined from the project work of assessment of Afghan Gas and market and environmental review. A risk assessment was prepared. In addition UNICON asserted that the role of Afghan Gas is fundamental to the Gas sector in the short term, while it is less important as the sector develops and other participants occupy space in exploration and probable production and export of the gas.

While reform of Afghan Gas commences, the broader gas sector can develop as most of the new prospects will require significant infrastructure development in production and transportation that will not be dependent on Afghan Gas. Eventually, and it will take some years, the overall market potential will be seen in a new light with greater comfort on reserve estimates and contingent resources and the capacity to manage long pipelines and export activity.

In this context, reform of Afghan Gas is less about the type of business that it becomes and more about phased, but fundamental developments in infrastructure, internal know-how and capacity, growth in resources and opportunities to emerge as a commercial gas organisation operating to the highest standards and best practices as per a modern gas business adopting recognised international standards.

UNICON asserts that this is the most pragmatic and effective means of reform and building capacity, acknowledging that modern business systems and processes and the expansive use of technology and the monitoring and management of the business at corporate and individual level based on performance criteria, it is the impact of these elements as they translate into efficiencies, standards and cost-effective activities that provide better business results, that drive change and market development and that achieve returns on the capital investment in the business.

UNICON proposals are driven by the market study and prospective market development that will impact on Afghan Gas overall development and commercial reform. Initially securing supply to the NFPP, the existing major customer is the priority. Thereafter, developing the industrial and commercial sector in Mazar-e-Sharif can be pursued and building the CNG market, while the development of the proposed Gas-to-Power Plants in both Sheberghan and Mazar-e-Sharif are constructed and commissioned, both initially becoming anchor customers to stimulate new demand in the industrial sector and to trigger the capacity for local distribution network development that will provide opportunities for residential consumers.

Key projects identified fall under four specific headings:

- Decommissioning of Assets

- Sheberghan Power Supply
- Secure NFPP Supply and Mazar market
- Secure Sheberghan Distribution

Each of these projects has been developed in detail to indicate activities, investment and anticipated cash flow results, all combined to provide a comprehensive strategic analysis and model, with specific cost and time-based assumptions. This model is being shared with APA/MoMP and training given in its use, so that assumptions can be varied and impact assessed under multiple different scenarios. However, the strategy proposed should be seen as holistic and decisions and actions taken quickly to maximise the value of opportunity and momentum.

In this sense it is necessary to start activities in 2015 to reach goals in 2020 and beyond and the proposals given are best for: Overall performance; Gas field exploitation; Cash generation; Market development, and Survival of Afghan Gas.

Once a government decision is made regarding commitment to the reform of Afghan Gas further assistance and probably additional consulting inputs will be needed to assist in implementation.

1.5 Capacity Building

With the benefit of a time-extension UNICON was able to provide some comprehensive capacity building to senior officials from MoMP, APA and Afghan Gas and some additional staff.

UNICON devised a program supported by D M Sadaat that broadly focused on four key areas:

- Sharing the findings of the project, the key deliverables and strategy for reform,
- Providing technical operations training, relating to the gas processing and transportation issues that is required,
- Providing contract management training as requested, and
- Sharing application of the Excel Model developed that permits futuristic assessment under specific assumptions as developed in support of the recommended strategy.

While it is understood that some of the commercial concepts underpinning the strategy and the language differences, hindered easy understanding, it is believed that key personnel now know the key issues and principles. It remains for MoMP and Afghan Gas to continue to promote the recommended strategy and to effectively use the information, guidelines and tools provided.

In conclusion, UNICON asserts that significant inputs and accomplishments have derived from this project, despite some technical and administrative challenges. MoMP now has a comprehensive tool kit and very detailed strategies and models aiming to improve the operations of Afghan Gas in the years ahead.

2. Introduction

2.1. Background

UNICON Ltd (UK) was engaged by the Ministry of Mines and Petroleum to undertake the World Bank funded project "Improving the Business Environment: Reform of the Afghanistan State Gas Enterprise ("Afghan Gas")". Specifically this requires a plan for the corporatisation of Afghan Gas. UNICON mobilised in December 2013 and submitted an Inception Report in January 2014 that provided an updated work plan indicating the required tasks and deliverables.

Project progress has been in line with the agreed work plan and a series of outputs and specified deliverables has been provided during the eighteen (18) months duration of the project.

Section 3 of this Final Report details these outputs and deliverables and reconciles how each of them meets the specified tasks required in the project terms of reference.

Section 4 then identifies key issues arising during the project that impacted on the outputs and the manner in which the reform of Afghan Gas proposals materialised.

Section 5 comments on the alternative considerations and strategic options for reform of Afghan Gas, as requested by the ministry and as indicated in the project deliverables.

Section 6 provides a summary of the proposed strategy for reform as recommended by UNICON and as supported by specific underlying analysis and assumptions.

Section 7 details a program of capacity building provided by UNICON during the project extension period from June to August 2015.

Section 8 then summarises the completion of the work plan reconciling inputs and outputs and any particular matters that are relevant in comprehending the nature of the completed project as against the original work plan expectations.

2.2. Project Objectives

At the kick-off meeting in December 2013, the Director General of the Afghanistan Petroleum Authority (APA), Ministry of Mines and Petroleum, set out his vision for Afghan Gas and this project as "To prepare Afghan Gas for corporatisation".

It was agreed the process of corporatisation should include efforts to implement commercial strategies and business structures to support independent "arm's length" operations, improved service delivery and fiscal and functional sustainability. This equates to a vision for Afghan Gas to become a "modern, gas business adopting recognised international standards".

At the time a submission to approve Afghan Gas for corporatisation was being considered and progressing through the mechanisms of government, although there was some concern at the duration of the time being taken. Nonetheless supporting a corporatisation initiative was firmly

established as the primary aim of the project and was clearly identified within the project terms of reference. Indeed, tasks and deliverables assigned were based on UNICON providing the supporting commercial mechanisms to the legal process of authorising and instigating such corporatisation. Without such authorisation and instigation, full consideration and completion of some of the tasks would be difficult.

To this end the project objective could be asserted as 'to develop a strategy and plan for improving business performance of Afghan Gas'.

2.3. Project Challenges

Thus in responding to the project terms of reference and in designing and commencing the work plan it was expected by the client (the Director General of APA) and UNICON that the approval for corporatisation would be forthcoming.

Towards this end, UNICON assisted APA with several papers (briefing notes and presentations as detailed in section 3) and presentations to government and to the Inter-Ministerial Committee (IMC) in an effort to expedite the approval of the corporatisation process. Within Afghan law and government protocol, a clear process of approval by support committees is essential prior to submission to Cabinet and ultimately parliamentary endorsement.

However, even though the original submission was dated in 2012 and delayed until the end of 2013 (the commencement of the project) and even though the efforts of APA as supported by UNICON led to approval by the IMC in May 2014 – a further step along the approval process – the fact is that the general election in April 2014 and subsequent formation of a new government late in the year dominated the agenda and as such the corporatisation process was not accelerated during the project time-frame.

The realisation that such approval may be deferred and subsequent personnel changes within APA (and later within Afghan Gas) led to a slowing of the commercialisation agenda. Naturally there were many concerns about the possible implications and some speculation as to the likely impact, on employees and other stakeholders if a reform agenda of corporatisation and commercialisation were introduced. Within Afghan Gas itself there was an acknowledgement of the need and benefits of change and the potential for introduction of new technologies and business processes but a big fear of impact on jobs and thus a lack of total enthusiasm and support for the project.

In response UNICON proceeded to attend to designated work tasks and required deliverables, but formal approvals from the ministry, including an important review and assessment of options for reform after the submission of the deliverable "Proposal for restructuring, divestiture and transfer of assets" was not forthcoming.

2.4. Corporatisation

Corporatisation is essentially the legal processes that results in the dissolution of the current Afghan Gas entity – a state owned entity, operating by separate charter as a directorate of the Ministry of Mines and Petroleum – and the establishment / registration of a new limited liability

company with a shareholding (all shares held by nominated legal persons on behalf of the State).

In Afghanistan the legal processes are complex and are documented and discussed in the Assessment of status of Afghan Gas Operations Report, as issued by UNICON in August 2014.

Prima Facie, corporatisation only alters the legal status of Afghan Gas. While the process permits and facilitates the legal transfer of assets and liabilities and the contracts of employees, and within the process allows for some assets and liabilities of the existing Afghan Gas to be retained by Government and some contracts of employment to be retained by Government, it remains theoretically possible that all of the existing operations, assets, liabilities and employees could be transferred to the new entity at the same cost and conditions. In other words, the corporatisation process, of itself may not alter the appearance (financial and operational) of Afghan Gas. Corporatisation will not fix problems.

While it is expected that indeed, the corporatisation process will enable some rationalisation of operations and finances, through the selective transfer of assets, liabilities and employment contracts, and thus facilitate an improved organisational and financial structure of the 'new' Afghan Gas Limited company, corporatisation alone does not improve the business, its operational protocols, governance or results.

Thus, it is essential that components of commercialisation, restructure and reform are introduced into the Afghan Gas business as soon as practicable, and it is these initiatives that will have far wider impact on the development of the gas sector overall and the performance of a new Afghan Gas, than the corporatisation legal processes.

While the substance of commercialisation is the introduction of best practice guidelines, modern business systems and processes and the expansive use of technology and the monitoring and management of the business at corporate and individual level based on performance criteria, it is the impact of these elements as they translate into efficiencies, standards and cost-effective activities that provide better business results, that drive change and market development and that achieve returns on the capital investment in the business.

This is the principle of commercialisation: to add-value through measurable returns on the capital deployed.

3. Work Tasks Completed

3.1. Terms of Reference and Outputs

The following table provides a concise but complete reconciliation of the terms of reference tasks and requirements and how each has been addressed with specific UNICON deliverables. In addition to the specified deliverables, to assist MoMP and APA and sometimes in response to specific requests from MoMP/APA, UNICON has also provided a series of briefing notes, presentations, summary papers and other documents, as also listed.



		ToR Requirement		Outputs/Deliverables
Phase I				
				Inception Report
Task	1.1	Document Review	Del 1	Literature Review and Consultations Report
	1.2	Government & Donor Activities		
	2.1	Afghan Gas Enterprise: current structure	Del 2	Assessment of status of Afghan Gas Operations Report
	2.2	Functional Analysis		
	2.3	Institutional Relations	Del 3	Workshop 1 on Restructuring and related issues
	3.1	Legal Requirements for Financial Performance		
	3.2	Review of Financial Records, Balance Sheet		
	3.3	Assets and Liabilities		
	3.4	Financial Protocols		
	4.1	Infrastructure and Equipment Assessment		
	4.2	Technical Protocols		
Phase II				
	5.1	Customer Base	Del 4	External Environment Review/Market Report
	5.2	Pricing		
	5.3	Market		
			Del 5	Proposal for restructuring, divestiture and transfer of assets
			Del 6	Workshop 2 on Restructuring and related issues
Phase III				
	6.1	New Institutional and Staffing Requirements	Del 13	3 year retrenchment and social mitigation Plan
	6.2	Social Impacts and Mitigation Plan	Del 14	Terms of Reference for key management positions
	6.3	Legal and Financial Transition	Del 9	Legal Documents
			Del 15	Draft Board of Director requirements, Rules of procedure
			Del 16	Reconciliation of Afghan Gas balance sheet
			Del 17	Establish new Chart of Accounts
			Del 18	Prepare a Debt Recovery and Debt Payment Plan
			Del 20	Draft Terms of Reference for independent audit contract
			Del 23	Board papers to conduct 1 st Board of Directors meeting
	6.4	Technical Transition Issues	Del 10	Preparation of Technical Guidelines for pipeline safety
			Del 11	Assessment Report on Afghan Gas technical operations
			Del 12	Environmental Impact Assessment Report
	6.5	Capital Investment requirements	Del 19	Proposal for division of corporate shares, reporting requirements
			Del 21	Proposed financial structure for Afghan Gas
			Del 22	3 year budget for Afghan Gas



		ToR Requirement		Outputs/Deliverables
	7.1	Establish a PMU		Completed
	7.2	Develop & Implement Afghan Gas Commercialisation & Corporatisation Plan	Del 7 Del 8 Del 24 Del 25 Del 26	Procurement Plan 3 year Business Plan for Afghan Gas Development/Capacity building for "customer relations" and government relations Afghan Gas logo, press release template and brochure materials Workshop 3 on Restructuring and related issues Draft/Final Report

Additional outputs provided:

	Output
Briefing Note 1	Summary of Report "Energy Markets, ADB, Establishing a Gas Regulatory Framework"
Briefing Note 2	Summary of Inception Report
Briefing Note 3	Case for Corporatisation
Briefing Note 4	Comments "Afghanistan Natural Gas Policy"
Briefing Note 5	Summary Proposed Afghanistan Natural Gas Pricing Policy
Briefing Note 6	Summary for IMC "The case for Corporatisation of AGE"
Briefing Note 7	Evaluation of Gas Reserves
Briefing Note 8	Major Project achievements
Briefing Note 9	Supplementary Comments on Reserves estimation
Briefing Note 11	Market Report Update "volumes scenario"
Briefing Note 12	Overall Project progress and findings
Presentation 1	History of British Gas
Presentation 2	Inception Report
Presentation 3	Literature Review Report
Presentation 4	Gas Policy and status of Afghan Gas
Presentation 5	Project review, Report on progress - WB
Presentation 6	Natural Gas potential market
Presentation 7	Interim Gas pricing policy
Presentation 8	Gas Development Directorate
Presentation 9	Corporatisation of Afghan Gas - IMC
Presentation 10	Corporatisation of Afghan Gas
Presentation 11	Kud Barq Northern Fertiliser Power Plant
Presentation 12	Project review, Report on progress - WB

	Output
	Presentation to WB – Sept'14
	Presentation to WB – Dec'14
	Presentation to WB – Jan'15
	Presentation to WB – Apr'15
2-page Summary	Project Summary
2-page Summary	Market Potential
2-page Summary	Strategy
2-page Summary	Decommissioning Obsolete Assets
2-page Summary	AGE Power Supply
2-page Summary	NFPP and Mazar Market
2-page Summary	Sheberghan Distribution
2-page Summary	Reform Options

3.2. Phase I

By classifying the project work plan under three phases, UNICON was able to support its activities and findings through the logical flow of a) internal assessment (Phase I), b) external assessment (Phase II) culminating in options and strategy for reform proposals, and c) plans and methodologies for reform (Phase III).

Phase I therefore commenced with background studies and progressed to an in-depth assessment of Afghan Gas operations. The background study or **Literature Review and Consultations Report** provided important insight to the status of the gas sector and the Afghan Gas entity, as well as providing MoMP/APA with a useful appraisal and summary of the current situation and the views of a series of consultancy studies in the preceding 10+ years.

These studies covered a range of gas sector topics, provided some consistent and some conflicting findings and none seemed to provide significant value as there was little evidence of response, actions or comprehension of the findings resulting from such studies.

The key conclusion and important output from the literature review and preliminary overview of Afghan Gas operations was that the status quo (permitting the business to continue in its present manner viz, production, sales, operations) is unsustainable and would lead to a continuation of decline in volume and quality of gas provided, reduced revenues, further deterioration of gas infrastructure¹ and eventual erosion of any reasonable or recognisable business.

Phase I activity concluded with submission of the comprehensive **Assessment of status of Afghan Gas Operations Report**, in August 2014. The report covered organisational, institutional and human resource matters, financial matters and asset ownership, technical operations and technical capability, legal issues and compliance, planning and marketing and concluded that a series of weaknesses in all areas of the business provide fertile grounds for significant improvements. However, the magnitude of change needed and the resources available mean that such change will by necessity take time and will need to be carefully constructed and monitored to achieve timely developments and add value.

3.3. Phase II

Phase II activity commenced with a planned and detailed market study of the northern regions of Afghanistan.

This study was designed to survey a selection of current and potential residential users and industrial and commercial users in Sheberghan and Mazar-e-Sharif. The survey sought information about current power and energy use and sources, prices paid and propensity to change to gas if it became available. Following collection of the survey data a comprehensive

¹ Although it is acknowledged very recent and on going interventions aim to support some infrastructure, including well and pipeline rehabilitations (USAID and TFBSO projects)

model was developed using M/S Excel, to simulate different demand and revenue scenarios based on the survey user's indications of volume consumptions and prices.

UNICON extended this model to provide a base case, low case and high case demand projections and was able to conclude that while the overall domestic demand (northern Afghanistan) would remain low (generally less than 1bcm annually) compared to other gas consuming countries, even at preferred prices (those lower than global or regional prices and as indicated in the survey as feasible prices relative to alternate energy sources) it is still viable to develop the local gas fields and build local infrastructure. In support of this a key anchor industrial use/demand is required, specifically the proposed gas-to-power plants proposed for Sheberghan and Mazar-e-Sharif.

The overall findings and conclusions of the market study were submitted in the **External Environment Review/Market Report** and such findings provided critical input to the evaluation of reform options and recommendations.

By further reference to its acquired knowledge and information as accomplished during the phase I and phase II activity, the UNICON team was able to consider and evaluate the potential for reform of Afghan Gas, the thrust of how such reform might reasonably progress and the likelihood of success based on various input elements, notably access to the resources (finance, skills, political will) required. The key considerations were based on:

- The Assessment and evaluation of the status of Afghan Gas, including its skills and capacities, infrastructure and internal resources,
- The team members combined knowledge and experience in similar reforms in other countries and in consideration of the factors relating to how the industry works and succeeds in other operating environments,
- Inputs and influences from discussions with MoMP and APA executives and Afghan Gas staff and other stakeholders coupled with the team's collective experience of how such reforms can be managed politically and socially and ensuring that sufficient weight is given to the social impact of such reforms, and
- The external market assessment and use of an economic model to provide logical assumptions and measure the impact of such assumptions.

The analysis of options and recommendations were compiled in the report Proposal for restructuring, divestiture and transfer of assets Report, which was submitted formally in October 2014. At that time, the aim was for wide discussion and consultations with ministry officials relating to the options and proposals presented. While UNICON analysis included the detailed information about employees and assets, the lack of progress on approval of corporatisation meant that conclusions on the proposed asset transfers and values were effectively redundant, as the passage of time impacts heavily on such decisions.

Due to pending changes within MoMP and APA, UNICON was unable to stimulate the desired discussions and consultations although a formal presentation of the proposals was made in November 2014.

3.4. Phase III

This phase of work included a series of deliverables that in combination could be considered a suite of "Plans, guidelines, proposals and methodologies" (a tool kit) for the implementation of the proposed changes and restructure needed. While a number of the earlier Report submissions were made prior to detailed evaluations and considerations from MoMP/APA in respect to the proposals and options, nonetheless UNICON proceeded to complete the required tool kit for implementation.

Once the new Minister was appointed and the ministry was able to review the progress of this project the engagement with MoMP senior officials was very positive and beneficial. As indicated, although the terms of reference and initial objectives focused strongly on corporatisation, UNICON proposals favour a commitment to commercial reforms as a priority and in recent discussions with MoMP executives, it seems that this concept is acknowledged as the best way forward.

4. Key Issues Arising

4.1. Introduction

After the Inception period and during the early work of phase I activities, the APA mostly addressed any challenges and matters arising. For the period from inception through until June 2014, the APA appointed a Project Manager directly to liaise with UNICON and attend to all administrative and coordination matters. Soon after the resignation of the General Director of APA in June, the Project Manager departed and thereafter the day-to-day contact and capacity to manage issues arising diminished.

Broadly, issues arising fall within three types:

- The magnitude of proposed reforms emerging after the assessment of internal capacity,
- Information and interaction with Afghan Gas officials, and
- Communications within the Ministry.

4.2. Magnitude of Challenges in Reform of Afghan Gas

The Assessment of status of Afghan Gas Operations Report highlights the existing weaknesses prevalent across the elements of organisational structure, job design, capacity and business processes, financial management, asset maintenance and management, health, safety, security and environment and general operations management.

The Report did not conclude that it was all bad, only that the magnitude of the task to transform the existing Afghan Gas operations to a "modern, gas business adopting recognised international standards" is a significant undertaking.

Many of the key technical challenges in corporatisation and reform of Afghan Gas were presented in the briefing note "The Case for Corporatisation", delivered in April 2014. These were indicated as follows:

- Maintaining reform momentum that has already commenced with the initiatives of the TFBSO and USAID work, this project and current activity inviting exploration contracts for new field discovery. Such momentum is at risk in a changing political environment,
- Limited resources are available in terms of money, people skills, modern operational know how and proven commercial opportunities,
- There is always work and effort in making change and the likelihood of some discomfort and concern if employees and other stakeholders consider themselves likely to be disadvantaged,

- The need for an effective regulatory environment, via a regulator, division of MoMP, ombudsman or similar and proper monitoring establishment highlight the need for change within the Ministry as well as Afghan Gas Enterprise,
- The security concerns generally prohibit effective feasibility and analysis of projects and disrupt existing initiatives.

In summary, the major problems facing Afghan Gas are:

- **Lack of investment:** No investment has been made into the operations or business systems of Afghan Gas in recent times²,
- **Insecure revenue:** The revenue source is insecure due to reliance on one major customer, the Kud Burq Fertiliser Plant (NFPP) itself an enterprise with a history of payment default and which may also be undergoing significant reforms,
- **Existing gas reserves close to depletion:** The existing gas reserves used by Afghan Gas may be close to depletion³,
- **Lack of access to finance:** Without limited liability Afghan Gas cannot effectively use assets as collateral for financial support,
- **Inability to develop the market:** Due to lack of finance and lack of investment in people and business processes, Afghan Gas has been unable to develop new markets for gas,
- **Lack of skills:** There is a lack of skills at various levels, particularly of modern utility management skills,
- **Overstaffing:** There is evidence of overstaffing where employee numbers have not adjusted to the decline in business operations.
- **Ministry involvement:** The MoMP is involved in many details of the operations and Afghan Gas management are not authorised to take decisions that are usually the responsibility of executive management in an efficient commercial business,
- **Steady decline:** A combination of the above-mentioned issues has led to a state of steady decline at Afghan Gas.

In addition there is a strong sentiment in Afghanistan that social motives must be a priority without stifling financial sustainability.

Social issues arise in many forms, including environmental issues, community service and regional governance. The most dominant to manage appear to be issues of customer service

² Except for the contributions from the TFBSO project

³ UNICON, Reform of Afghan Gas, February 2014, Task 1: Literature review and consultations

(quality and price of supply) and employment (job retention and living standards for the extended family network).

In consideration of the magnitude and breadth of these issues, it was a substantial challenge to devise options and strategies with a good chance of success. Without full engagement of designated officials the task was exacerbated. The resulting proposals are a measure of the achievements of this project, but implementation success will clearly require additional support and the utmost in commitment from the highest levels of the ministry and government.

4.3. Information and Interaction with Afghan Gas Officials

UNICON made arrangements for multiple visits to the Afghan Gas headquarters in Sheberghan during the period December 2013 through to August 2014. Upwards of seven separate visits were made by one or more team members for durations ranging from 3 to 12 working days. Later further short visits were made in October and December 2014.

The early visits for introductions, explanations of our work and assistance to Afghan Gas and inquiry and requests for information were all well received. It was notable that the later visits and specific requests received slower response and several times information requests from the UNICON team members in Kabul, via APA were very slow in response.

Despite multiple requests some information, particularly regarding asset titles and details of old debts was not forthcoming. UNICON proceeded to complete analysis and reporting as necessary.

One challenge in the overall reform is that much decision-making is done centrally in Kabul, when the centre of operations is in Sheberghan and the institutional cohesiveness and support lacks strength.

4.4. Communications within the Ministry

The Assessment of status of Afghan Gas Operations Report commented on the institutional relationships between Afghan Gas and various functional departments of MoMP and MoF.

During the project the effectiveness of APA was weakened with a reduction of staff and changes in personnel supervising the project. While there was strong interest in the work being done and the prospects for reform there continued to be a lack of strong project leadership especially after June 2014 and until February 2015 after the appointment of the new Minister, when communications improved significantly.

Meanwhile the PMU continued to seek accountability for outputs and deliverables from UNICON despite a lack of formal feedback from the ministry.

5. Strategic Options

5.1. What Practical Options Exist?

As indicated, in preparing the report 'Proposal for restructuring, divestiture and transfer of assets Report' UNICON assessed and analysed a range of information drawing on wide experience in design of reform strategies.

Later, at the request of the ministry, this analysis and the potential options other than corporatisation, were summarised and presented to assist ministry officials understand the review and thinking process.

Broadly, the most feasible alternate options for reform of Afghan Gas fall under the category of:

- Status Quo,
- Commercialisation,
- Corporatisation (and commercialisation), and
- Privatisation.

The key features of each are listed and then the advantages and disadvantages and supply and demand impact are summarised.

Options	Key Features
Status Quo	<ul style="list-style-type: none"> ▪ Remains as an SOE ▪ Current Operating form, some minor improvements ▪ Little social upheaval, low investment
Commercialisation	<ul style="list-style-type: none"> ▪ Potential for increased markets and new production to boost outputs and revenues ▪ With growth, new best practices in operations, technologies and business process can be introduced over time
Corporatisation (and commercialisation)	<ul style="list-style-type: none"> ▪ Will change the corporate structure to shares limited in liability ▪ Operating as a separate legal entity will enhance capacity to enter contracts and access capital markets ▪ As a separate entity cannot depend on government support and thus must operate commercially
Privatisation	<ul style="list-style-type: none"> ▪ Will 'force' the need for regulation and a tighter sector legal framework ▪ Will focus investment where markets drive growth ▪ Will accelerate new technologies and skills into the sector ▪ Government control reduced, but returns from proper pricing leading to taxes and Royalties

Under each proposed option a key consideration is that the raw material, the natural gas remains the property of the State. Under option 1) Status Quo, the state controls the operations of the entity, through influence and management of the entity and thus receives all of the benefits of the operations through taxes and profit allocation.

Under option 2) commercialisation, even though legally the state retains ownership of the operations, and can influence management through sector regulation, the aim of commercialisation is to permit professional managers to run the business with independent decision-making (mindful of the interests of shareholders and all stakeholders) but to operate with commercial efficiency. In this situation the state receives benefits through taxes and a royalty or fee paid for gas produced, plus the potential in time for an owners dividend. However, net profits must be used at the discretion of the Board and management for the improvement, development and sustainability of the business.

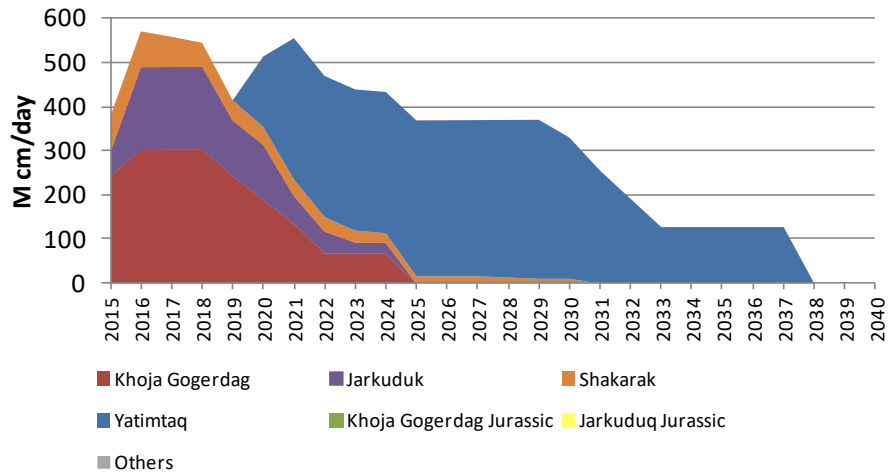
Under option 3) corporatisation, it is a similar situation to option 2, however legal mechanisms rather than just ministerial policy direct that the entity is a separate corporation (separate legal entity). As a consequence the right to sue and be sued and the capacity to pledge assets as collateral adds commercial strength and impetus to the entities ability in contract negotiations of all types and this is seen as essential, in time, for the development of the business.

Under option 4) privatisation, the state cannot control, either through policy or law, the operations and management of the business, other than by regulations and general legal matters impacting on all businesses. The state will benefit from the success of the business through increased taxes and royalty/fee payments and the spin-off impact that successful businesses provide to economic and social development.

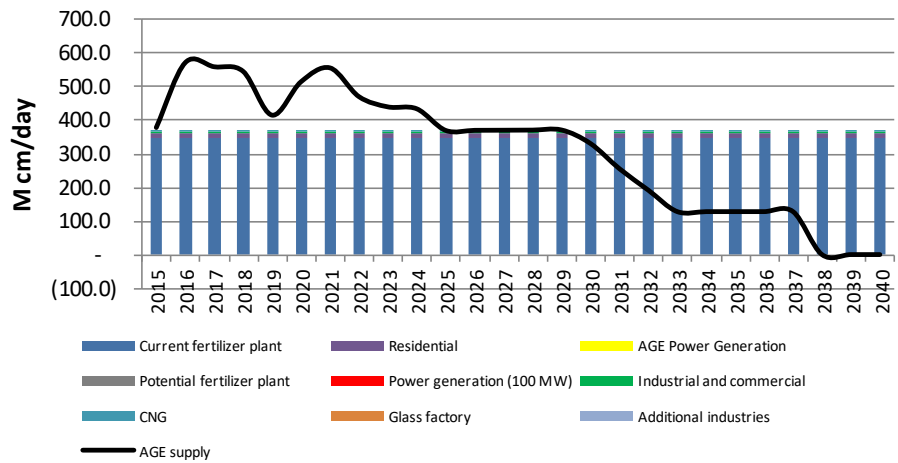
5.2. Status Quo

Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Remaining as an SOE, it is easier politically. No significant change of mind-set is required in terms of business control and operations ▪ No social upheaval because under this option most of the current employees will remain in their positions. ▪ No significant additional investment is needed, some minor improvements in the actual distribution network in Sheberghan. ▪ No additional budget or finances from Government is needed. ▪ Afghan Gas will still remain under Government control. 	<ul style="list-style-type: none"> ▪ Opportunities to invest in improvements and introduce new skills and technologies are limited ▪ Unless new gas field development (specifically Yatimtaq) is undertaken, supply will expire within 6 – 10 years at current supply levels ▪ Good potential market opportunities will be lost or sacrificed to private operators at some future time. Market development will be sub-optimal

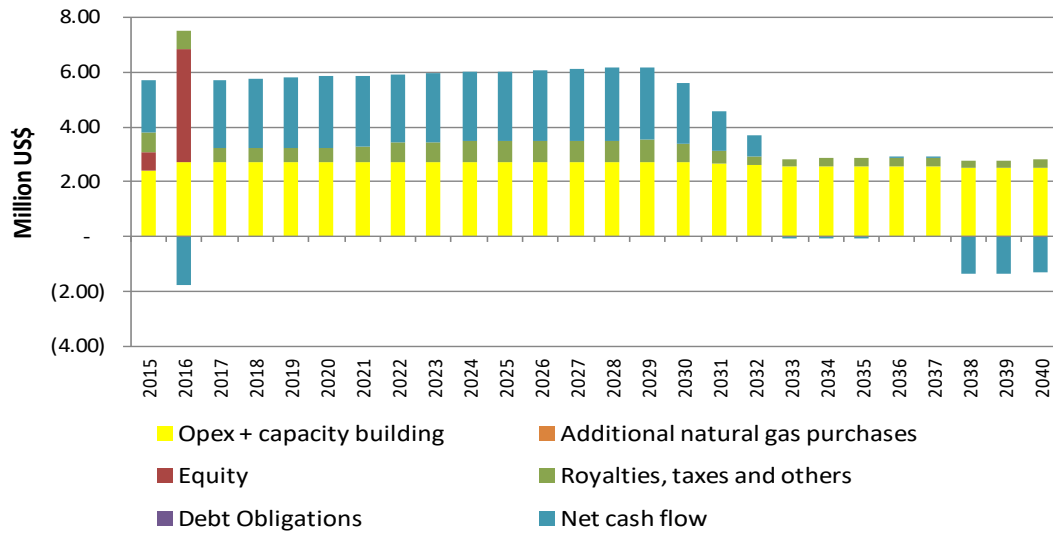
Gas Potential Supply - AGE Fields & Others



Gas Demand - Supply Superavit/Deficit



Net Cash Flow - Total

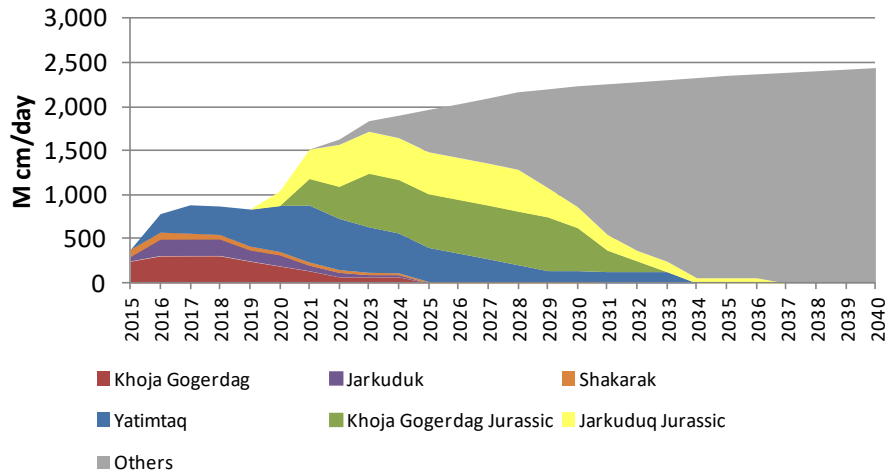


Cumulative Cash Flow	US\$m	33.92
NPV @ 15% return	US\$m	11.42

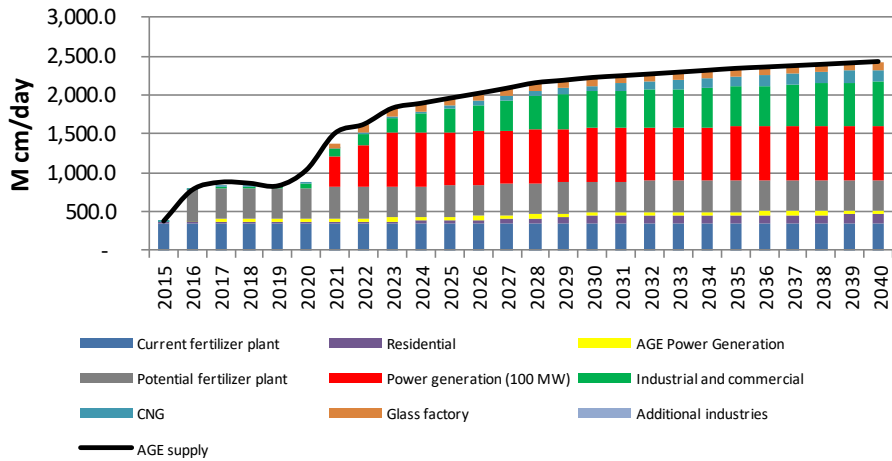
5.3. Commercialisation

Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Potential for increased markets and new production to boost outputs and revenues ▪ With growth, new best practices in operations, technologies and business process can be introduced over time ▪ Minimal major institutional changes although legal framework (for the sector) should still develop ▪ New infrastructure investment and operational practices can be leveraged to develop business process, including governance, financial management, marketing ▪ Opportunity for Afghan Gas to be a vehicle for processing any government production sharing gas from new field developments (with the associated markets to sell it) 	<ul style="list-style-type: none"> ▪ The mandate for management is still based on 'Government Goodwill' rather than enforced under the law ▪ Without legal backing, it is unclear if the separation of management of Afghan Gas and the policy making function of the ministry will work well ▪ Without legal backing, it might be that in time contractual arrangements will be limited for funding, international sourcing, etc. ▪ A significant financing challenge emerges to meet the required investment program ▪ Once potential market is established in years to come (approx. 2025) Afghan Gas will still need to procure/import gas to meet market demand

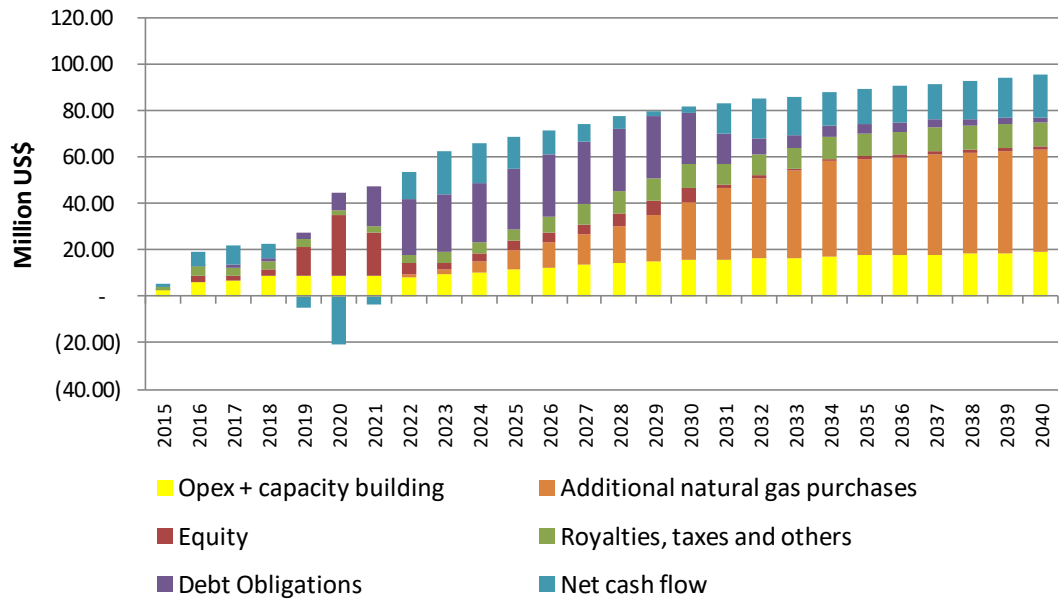
Gas Potential Supply - AGE Fields & Others



Gas Demand - Supply Superavit/Deficit



Net Cash Flow - Total

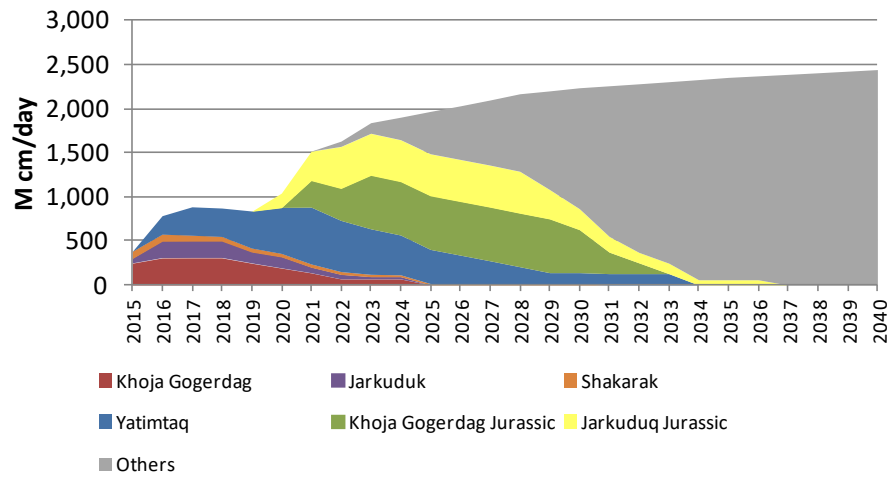


Cumulative Cash Flow	US\$m	241.57
NPV @ 15% return	US\$m	31.73

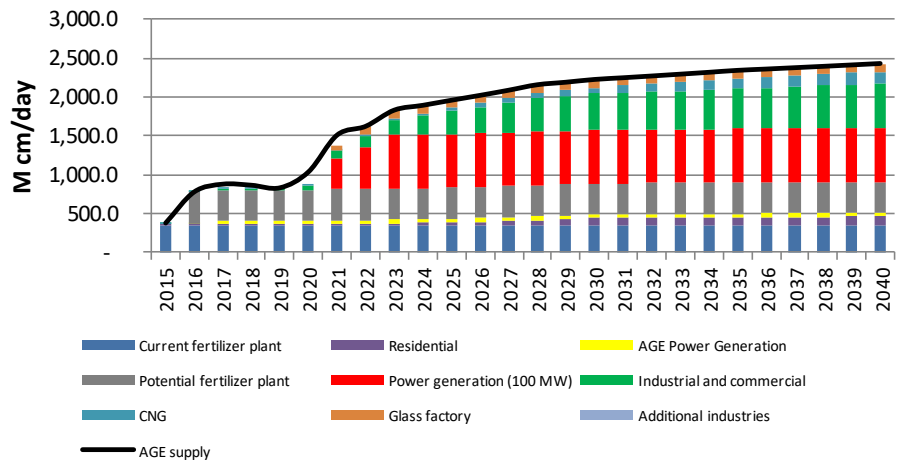
5.4. Corporatisation

Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Will change the corporate structure to shares limited in liability ▪ Operating as a separate legal entity will enhance capacity to enter contracts and access capital markets ▪ Potential for increased markets and new production to boost outputs and revenues ▪ With growth, new best practices in operations, technologies and business process can be introduced over time ▪ New infrastructure investment and operational practices can be leveraged to develop business process, including governance, financial management, marketing ▪ Empowers management, because management are given the authority and responsibility to fulfil their functions effectively and efficiently, for better business results; management are empowered to take decisions for the benefit of consumers without having to refer to Ministry. ▪ Afghan Government can retain 100% of the shares and thus still retain ownership control ▪ As a recognised legal person Afghan Gas can sue (and be sued) ▪ Formally separates the role of policy and regulation (government role) from service delivery (Afghan Gas role) ▪ Independent ownership of assets (separate to government) provides the basis of independent value and collateral ▪ As a legal person status provides the identity for commercial contracts to be formed with domestic and international organisations, Joint Ventures, Memoranda of Understanding and other types of commercial relationship. 	<ul style="list-style-type: none"> ▪ As a separate entity cannot depend on government support and thus must operate commercially ▪ Requires a significant shift in attitude, in government policy and approaches to business and in the legal framework....all that will be difficult and may take time

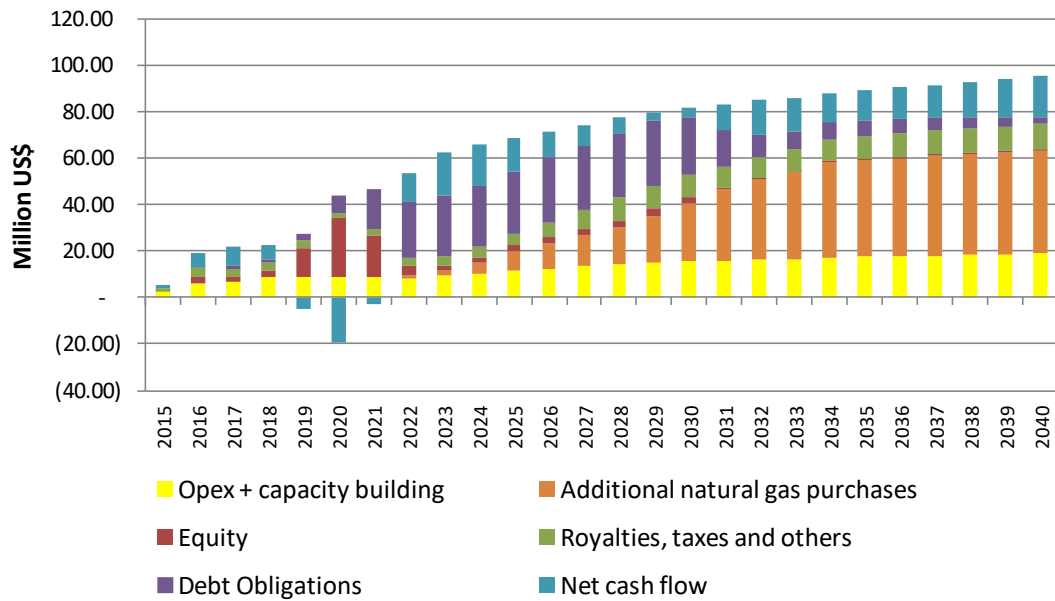
Gas Potential Supply - AGE Fields & Others



Gas Demand - Supply Superavit/Deficit



Net Cash Flow - Total



Cumulative Cash Flow	US\$m	234.21
NPV @ 15% return	US\$m	32.71

5.5. Privatisation

Advantages	Disadvantages
<ul style="list-style-type: none"> Will ‘force’ the need for regulation and a tighter sector legal framework Will focus investment where markets drive growth Market driven/Private sector initiatives help ensure business efficiencies are maintained Will accelerate new technologies and skills into the sector Government control reduced, but returns from proper pricing leading to taxes and Royalties Through contracts the Afghan Government can negotiate sector supply and domestic gas provision. Market prices will be needed to support such contracts 	<ul style="list-style-type: none"> Mismanagement and inefficiencies carry a higher risk of bankruptcy and business failure in a private rather than state sector Could be politically unpopular, as private owners usually dismiss excess employees and without the burden of social safety nets that then falls to the state. Could be difficult to obtain a fair market price for Afghan Gas (on privatisation) because the potential natural gas market is not well developed.

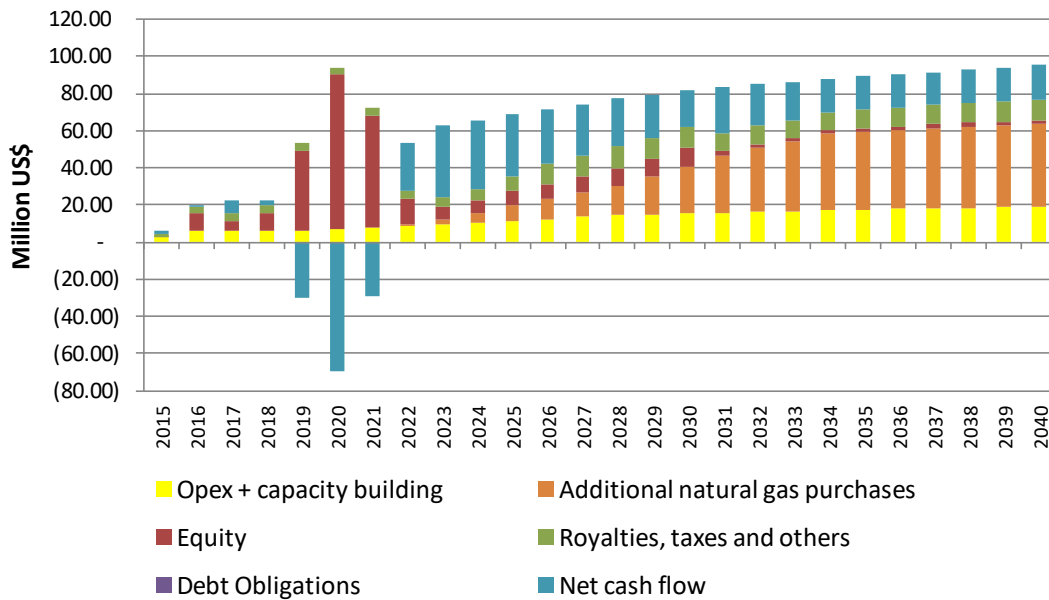
Under privatisation the Afghan Gas revenues and costs will be to the benefit of the new private owners. The Government ‘earnings’ will be derived from taxes and Royalties/Fees for the extraction of the Gas.

In this scenario, given that market forces will determine price and demand potential, it is beneficial to the government (at least in the long-term, after adjustment for any short-term social

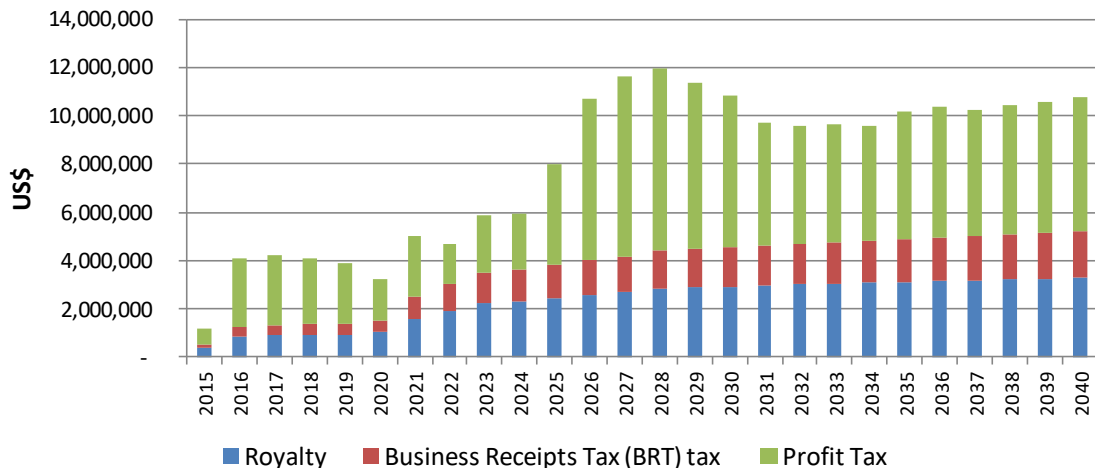
upheaval) if the market grows and the private Afghan Gas performs well, as royalties and fees will be higher, taxes will be higher and given the limited life-span of the existing Afghan Gas fields there is greater potential for the private owners to invest in new gas extraction, new wells and new fields. Also via regulatory mechanisms, the Government can stipulate that a private owner acquire any production-sharing Gas that is available to the Government (as the Government will of course need a buyer for such Gas)

In these circumstances, the best illustration of benefit to the State is the assumptions of Government revenue from such taxes and royalties. As with the other options, the added benefits of alternative fuels and expansion of commerce and industry is not adequately captured in the modular financial projections.

Net Cash Flow - Total



Royalties, taxes and Profit Tax



Cumulative Cash Flow	US\$m	339.13
NPV @ 15% return	US\$m	16.68

5.6. Summary of Options

The relative merits of each option can be summarised in the following tables.

Option	AGE Investment	Investment Funding	Production	New Markets	Legal Framework
Status Quo	Low	Donors	Unsustainable	None	No need
Commercialisation	High	Government – Private Sector – Donors	Sustainable	Mazar and Sheberghan	No need
Corporatised AGE	High	Private Sector	Sustainable	Mazar and Sheberghan	Need
Privatise AGE	Low	Private Sector	Sustainable by private	Mazar and Sheberghan	Need

Option	Independence Risk	Social Risk	Re Investment of Profits	Environmental Risk	Security Risk
Status Quo	High	Low	No autonomy	High	High
Commercialisation	High	Medium	Autonomy if there's a political decision	Medium	Medium
Corporatised AGE	Low	Medium	Autonomy	Medium	Low
Privatise AGE	Low	High	Autonomy	Low with a good contract	Low with a good contract

As indicated earlier, UNICON commenced its work directed towards developing commercial strategies to support the legal process of corporatisation. Given that corporatisation approvals were not forthcoming during the project work, UNICON determined that a viable strategy that could be politically and socially successful is to pursue an approach to commercial reforms with immediate effect, thus to capitalise on opportunities and benefits in field development that could be lost with further delay, and to build on the momentum recently established through important

donor-supported projects, TFBSO infrastructure work and the urgency of change to reverse the deteriorating situation at Afghan Gas.

Once early successes in commercialisation are achieved, the matter of corporatisation can be revisited.

6. Proposed Strategy

6.1. Strategic Considerations

When recommending proposals for the restructure of Afghan Gas UNICON considered all the elements of the business and its potential within a rejuvenated Afghan Gas Sector.

In this context, restructure proposals become multi-dimensional where infrastructure projects depend on demand opportunities and financing that often, in-turn depends on supply guarantees. In addition capacity across all elements of business management and technical operations needs significant strengthening that can only be driven by the will to change and the opportunities presented by the market to do so.

Thus while UNICON analysis did consider the high-level corporate and organisational structures that will be needed to drive the business, it also analysed options at a specific level, on a project-by-project basis.

Juggling the dynamics of inputs that are required to reform the business and the various inter-dependencies is a tough challenge. It is clear that specific interventions will be needed if positive and sustainable change is to emerge at Afghan Gas.

UNICON believes that corporatisation can and should be seen as a key catalyst for the changes needed. However corporatisation itself is a political decision and a legal process and does not change the business operations. The legal changes and the concepts underpinning a corporatised entity will be important to drive change.

If however, the corporatisation process is delayed and remains stuck in the political arena, then reform towards a commercial entity should proceed with haste. In this scenario, it is likely that at some future time, progress will be stifled without corporatisation as financing and investment options will be constrained without the relative freedoms of decision-making independence, the ability to pledge assets and potential to trade shares.

6.2. Risk Assessment

As mentioned UNICON prepared a detailed 3 year business plan to inform Afghan Gas management once a firm decision (including relevant political commitments to resources) is made to proceed with commercial reform.

This business plan reviewed the external and internal elements impacting on business potential as determined from the project work of assessment of Afghan Gas and market and environmental review. To inform the proposed strategy UNICON then documented a series of risks, suggested mitigation measures and a SWOT analysis so as to identify a suitable focus of key objectives and actions for the early work towards reform⁴.

⁴ Full details can be found in the 3 year business plan

External Business Risks

Risk	Potential Mitigation
Uncertainty in elements of legal and regulatory framework that is still under development	Capacity for Afghan Gas to have input to issues of update to existing legal framework
Issues of governance and strict compliance with laws	Development of business processes will assist in improving compliance and governance measures
Immature market and relatively high cost of development	Needs time, political commitment and donor support to develop market to a modest but profitable level, with main industrial customers, but not total reliance on only one customer
Heavy concentration on one major customer	
Demand driven pricing analysis indicates average prices below regional market prices and desirable price (based on draft Gas pricing policy)	Market demand will determine price especially as supply capacity becomes more certain, when the desire to supply more will enable market prices to become established
Currently Gas supply capacity is uncertain, no reserves certification and existing wells need rehabilitation works and deeper drilling for further production	
Significant outstanding debts to resolve	Effort and Government support will permit write-offs and trade-offs ⁵ but essential that future sales are properly paid in time
HSE risk in local supply of Gas in Sheberghan with high H ₂ content	In time, improvements to Sheberghan processing and network is required
In time, new field exploration increases risk of competitiveness in supply	Afghan Gas has momentum and initial market traction. It must work to develop markets and secure its capacity to serve the northern domestic market, including proposed Power Plants, before new field productions can compete

Internal Business Risks

Risk	Potential Mitigation
Institutional relationships do not support commercial and market driven performance and central control (at MoMP) impedes efficiency in operations	Introduce commercial management within Afghan Gas and dependence on Government institutions changes
Salary levels, currently within the Civil Service Code will be insufficient to attract necessary skills	Introduce market-based pay scales, but will take time
Significant organizational reform, skills enhancement and reduction of employees is required and is politically challenging	Ageing staff and natural attrition plus opportunities to re-direct and re-train personnel to other projects
No design and technical database is maintained to effectively manage asset lifecycles	Introduction of OMS and PRMS methodologies that will, over time, improve overall asset management
Many assets old and obsolete and not fit-for-purpose, needing rehabilitation and decommissioning	
Flowlines need corrosion protection and control programme restarted	
New field development plans are required to manage any new installations	

⁵ For possible strategies refer to UNICON 'Debt Recovery and Debt Payment Plan' Report

Risk	Potential Mitigation
No adequate gas measurement and gas flow monitoring systems	Introduction of measurement systems targeted for early attention
No internal processes or standards for operations, maintenance and security	Commercial systems in business processes, IT, HSE, field management and security will all emerge over time
There is an urgent need to develop and implement an Afghan Gas plan for company HSE and engineering standards and procedures development.	
There is increasing pressure to run Afghan Gas assets far beyond their design life and the everyday operation of aged assets is a real threat for Afghan Gas.	A program of upgrade and rehabilitation will mitigate this to some extent
Gas reserves are unknown and uncertified, risking potential validations and collaterals to drive market development	Certification of reserves is a priority requirement to support IPP investment
Distribution systems (in Sheberghan) obsolete and non existent in Mazar	Need investment commensurate with market opportunities
No modern technical know-how and technology employed	Significant technical capacity building is needed
Many other operational assets are fully written-down, idle or without proper asset management and replacement policies	Part of systems development and improvement in cash flows, will be the opportunity to introduce effective asset management practices
Antiquated manual business systems that lack commercial rigor, little IT usage, no effective networking and most communications are verbal and via physical movement of paper and ledger.	Business systems, based on IT effectiveness to be introduced over time
Lack of resources invested in business systems and processes	

6.3. UNICON Proposed Strategy

6.3.1. Preamble

The role of Afghan Gas is fundamental to the Gas sector in the short term, while it is less important as the sector develops and other participants occupy space in exploration and probable production and export of the gas. The role of private sector participants is core to the development of the sector and the gas potential.

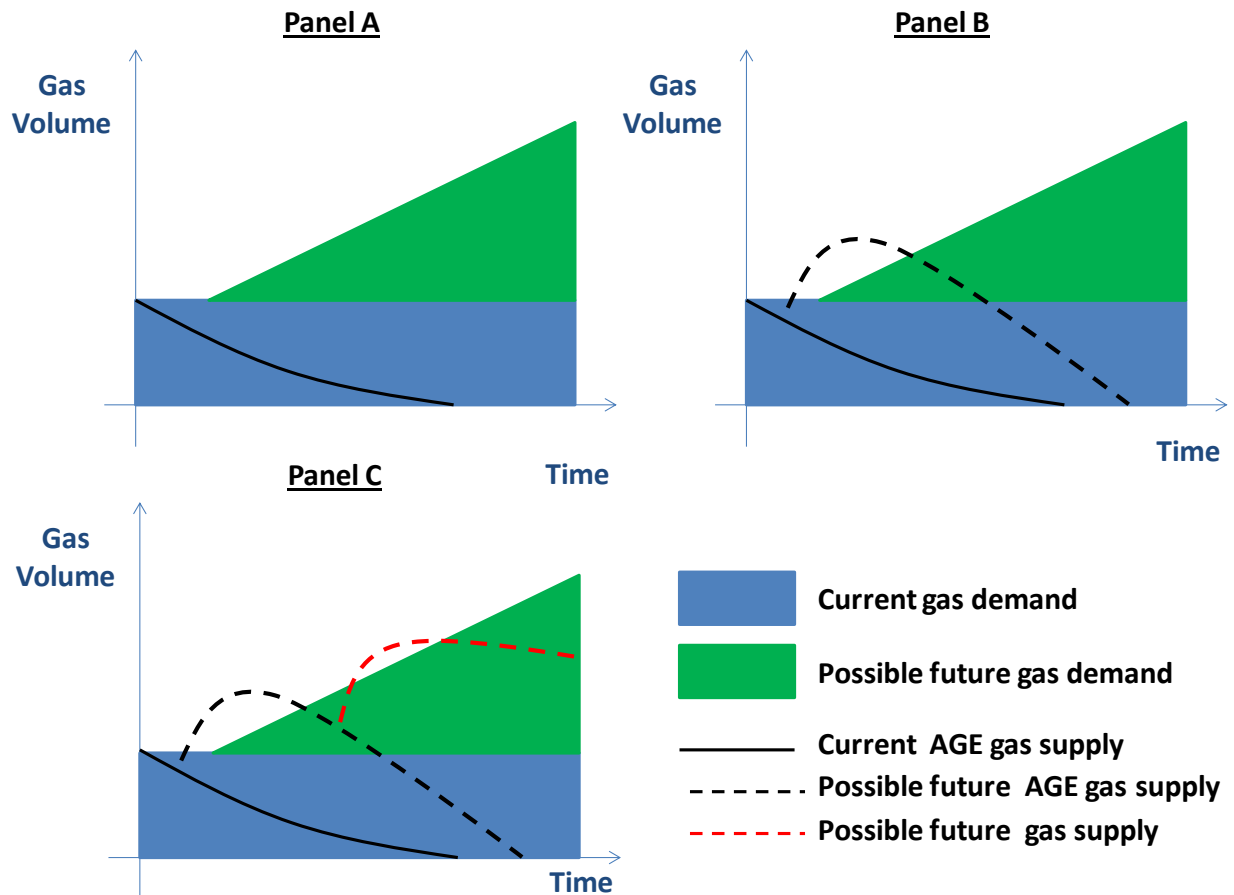
While reform of Afghan Gas commences, the broader gas sector can develop as most of the new prospects will require significant infrastructure development in production and transportation that will not be dependent on Afghan Gas. These initiatives and the TAPI pipeline are unlikely to be a key influence on reform of Afghan Gas as a consequence of time, money and complexity that is beyond the existing and near-term potential of Afghan Gas. Irrespective of commitment to the corporatisation of Afghan Gas, the Government of Afghanistan can take ownership of other entities that may occupy space in an expanding gas sector.

Eventually, and it will take some years, the overall market potential will be seen in a new light. Greater comfort on reserve estimates and contingent resources, and the capacity to manage long pipelines and export activity, will all shape the sector significantly and the overall

institutional reforms needed to support it, including the manner in which policy and regulation is managed.

6.3.2. Potential Capacity

To understand the future status of Afghan Gas it is useful to observe the following figures, through which it is possible to understand, conceptually, possible scenarios that UNICON considers for the company. Panel A represents the current scenario, with today's natural gas demand (in blue), possible future demand (in green) and Afghan Gas natural gas supply through the black line, under the assumption that Afghan Gas does not perform any additional investment to increase production capacity. In Panel B the dotted black line represents a situation where Afghan Gas makes additional investment to increase reserves and production in fields that it operates and controls. Finally, panel C shows further possible production and supply scenarios, which may or may not be provided by Afghan Gas in the future.



As shown in Panel A the current situation is not sustainable, because the normal decline rate of current producing fields causes a decrease in future natural gas supply. Panel B presents the situation where Afghan Gas can increase production from existing fields with more investment in capital and human resources. In this situation it is possible not only to supply current demand, but also Afghan Gas can explore additional markets. Finally Panel C shows the situation, where Afghan Gas could supply natural gas through other sources, either increasing supply from existing production sharing contracts in the north and/or importing natural gas.

The current situation of Afghan Gas corresponds to a purely operator company (Panel A) trying to optimise production with the resources available. UNICON consider the challenge is to move from an operating company (Panel A) to a commercial entity with increasing reserves, production and markets (Panel C). **This process involves work in two key areas: 1) increase natural gas supply and; 2) consolidate existing markets and open new business opportunities. As usual in the industry, it is difficult to determine which of these activities should be first, increase supply or guarantee demand, in this regard, UNICON propose work in parallel in a project-by-project approach.** This way can provide the necessary supply-demand balancing and create an appropriate and progressive platform so that produced gas volumes during the appraisal phase of new fields development will reach consumers.

6.3.3. Reform of Afghan Gas

In this context, reform of Afghan Gas is less about the type of business that it becomes and more about phased, but fundamental developments in infrastructure, internal know-how and capacity, growth in resources and opportunities to emerge as a commercial gas organisation operating to the highest standards and best practices as per a modern gas business adopting recognised international standards. UNICON proposes that the Operating Management System (OMS) is introduced since OMS is a worldwide-recognised system within the petroleum industry.

UNICON asserts that this is the most pragmatic and effective means of reform and building capacity, acknowledging that modern business systems and processes and the expansive use of technology and the monitoring and management of the business at corporate and individual level based on performance criteria, it is the impact of these elements as they translate into efficiencies, standards and cost-effective activities that provide better business results, that drive change and market development and that achieve returns on the capital investment in the business.

UNICON proposals are driven by the market study and prospective market development that will impact on Afghan Gas overall development and commercial reform. Initially securing supply to the NFPP, the existing major customer is the priority. Thereafter, developing the industrial and commercial sector in Mazar-e-Sharif can be pursued and building the CNG market, while the development of the proposed Gas-to-Power Plants in both Sheberghan and Mazar-e-Sharif are constructed and commissioned, both initially becoming anchor customers to stimulate new demand in the industrial sector and to trigger the capacity for local distribution network development that will provide opportunities for residential consumers.

Key projects identified fall under four specific headings:

- Decommissioning of Assets
- Sheberghan Power Supply
- Secure NFPP Supply and Mazar market
- Secure Sheberghan Distribution

6.3.4. Decommissioning of Assets

There is little value and use in many of the existing assets with little prospect of rehabilitating such assets for further use. It is important for safety, efficiency and development of corporate culture, that these obsolete assets are properly decommissioned over time.

The scrap metal potential is significant and a structured approach to decommissioning and reselling scrap metal could effectively utilise over capacity in employees, accomplish a safer and more effective work environment and when a full cash analysis is completed, probably prove to be cash-positive to Afghan Gas. In turn this can support the safe removal of surplus, non-usable parts and toxic substances that also remain at various storage sites.

UNICON proposal is to decommission obsolete assets on Jarkoduq and Khoja Gogerdag sites. All production and processing assets have been carefully screened in terms of process needs, design life, HSE, probability of engineering and vendors support for further operation, field formation change.

The proposal is based in 4 principal premises:

1. For the safety of workers and for future site health and safety standards improvement, obsolete items of plant, machinery, equipment, parts and chemicals should be decommissioned and removed from site over time,
2. Such removal will increase operating efficiencies for future workers and has the potential to signify positive change to add-value in the reform process,
3. The tasks involved can provide valuable employment opportunities for any displaced workers, in a sustainable and skills-based manner, and
4. If planned and managed well, due to the quantity, quality and value of scrap metal there is high probability of a positive cash flow resulting from this project.

The proposal calls for a tender for design and supervision of the project from an experienced overseas contractor. This will require an initial assessment of the program for decommissioning and the training of selected personnel.

It is proposed that personnel, or project employees can be selected as a component of the Afghan Gas social mitigation program whereby excess employees are diverted away from their existing role within Afghan Gas and are assigned employment under similar terms and conditions but to work on this project and after sufficient training, to provide the necessary labour for the supervision and dismantling activities. Specific tasks will include supervision, record keeping and reporting, liaison with transportation and scrap market agents within the supply chain, as well as the physical tasks associated with dismantling. A detailed program and plan will be developed and a training program for selected employees once the tender is awarded.

Assessments, based on the value of scrap metal indicate that ongoing costs of the project including the design and supervision of the project throughout its life can be met from cash flow generation. The initial investment is estimated at US\$100,000.

UNICON 'Assessment of the status of Afghan Gas operations Report' summarised detailed analysis and documentation that indicated total non-useable and obsolete assets comprises 3,430 Tons, assuming a 7% losses in the process, 3,190 Tons can be sold as a scrap metal.

In trying to keep cost-benefit analysis simple and conservative, no provision is made for resale of other non-metal stocks, parts and obsolete assets removed during the program.

Key assumptions for this project are:

- US\$ 100,000 for design and supervision contract.
- Dismantling unit cost US\$/Ton 70, that includes labour and equipment.
- Scrap metal selling price, there is no exact data of alloy steel content due to the loss of manufacturing files. The assumption is 50% of average scrap prices (US\$/Ton **2,000**) **represents a selling price equal to US\$/Ton 1,000.**

The major benefits of undertaking this project are that old, obsolete and non-usable machinery; equipment, pipes and spare parts will be removed from sites, so as to make the sites safer for workers and to improve operating efficiencies where unused items are no longer on the ground and 'in the way'. Indeed some such assets/inventories are toxic and hazardous and must be disposed of carefully.

Thus the most important benefit is a safer more secure field operating sites for Afghan Gas and its employees.

In addition without surplus and obsolete assets on site, other tasks and operations can be more efficient.

Thus a project to work on the decommissioning and removal of obsolete assets will engage surplus workers and also have the capacity to generate income.

While there is potential for this project to be approved and a design contract awarded soon with a fast-track completion within 18 months, to better reflect existing logistics and the social mitigation benefit of engaging displaced employees, it is proposed that the full decommissioning project may span five years.

Using previous assumptions the following Table presents the expected cash flow for this project. After taxes, the total benefit is about US\$ 2,114,907 during 2016 - 2020. In this point is important to mention that, considering estimated costs made by UNICON (regarding selling this assets not as a scrap but as equipment for later use, the recovery cost will be US\$ 108,530,128), which is out of Afghan Gas scope at this moment.

Project: Decommissioning of assets	Unit	2015	2016	2017	2018	2019	2020
Revenues	US\$	-	638,054	638,054	638,054	638,054	638,054
Metal volume	Ton	-	638	638	638	638	638
Metal scrap (price)	US\$/Ton	1,000	1,000	1,000	1,000	1,000	1,000
Business Receipts Tax (BRT) tax	US\$	-	12,761	12,761	12,761	12,761	12,761
Rate	%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Business Receipts Tax (BRT) tax base	US\$	-	638,054	638,054	638,054	638,054	638,054
Dismantling costs and overhead	US\$	-	176,567	76,567	76,567	76,567	76,567
Metal volume	Ton	-	638	638	638	638	638
Dismantling unit cost	US\$/Ton	70	70	70	70	70	70
Desing and Engineering	US\$	-	100,000	-	-	-	-
Overhead	US\$	-	31,903	31,903	31,903	31,903	31,903
Profit tax	US\$	-	89,745	109,745	109,745	109,745	109,745
Rate	%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Profit tax base	US\$	-	448,727	548,727	548,727	548,727	548,727
Cash Flow	US\$	-	358,981	438,981	438,981	438,981	438,981
Total Investment	US\$	-	-	-	-	-	-
Debt	US\$	-	-	-	-	-	-
Equity	US\$	-	-	-	-	-	-
Debt obligations	US\$	-	-	-	-	-	-
Capital	US\$	-	-	-	-	-	-
Interest	US\$	-	-	-	-	-	-
Net Cash Flow before Gov. Part.	US\$	-	358,981	438,981	438,981	438,981	438,981
Government participation	US\$	-	-	-	-	-	-
Net Cash Flow	US\$	-	358,981	438,981	438,981	438,981	438,981

6.3.5. Sheberghan Power Supply

This project proposal is based in 2 important ideas, being to build the capacity within Afghan Gas and Sheberghan in general to improve its power supply and the use of Gas generation and restoration of existing plant infrastructure to secure the local power supply and add-value in support of services to the proposed Sheberghan IPP and other industrial and commercial users.

This project proposal recommends the installation of 2 Gas Engine Generator Sets type CAT CG 260-16 or analog of 4,300 ekW each. Thus the total installed capacity will be 8,600 kW.

These mobile generators that can be utilised with the existing plant infrastructure and with Afghan Gas to supply feedstock sufficient power production can input into Afghan Gas own operations and within the Sheberghan region.

Depending on the requirements of DABS and the Ministry of Energy, it is asserted that such activity will provide suitable cash flow to benefit Afghan Gas, while improving power security and supply for all local consumers.

In evaluating the potential for this project UNICON has reviewed technical requirements and cost estimates with the following assumptions:

- Investment, 2 CAT CG260-16 sets, 8.6 MW total, installation on the existing site adjacent to the Jarkodug plant, Specific CAPEX as US\$ 1 million per MW, 4,300 ekW of each set with 2 sets installed; then total investment is US\$ 8,600,000.

- Natural gas consumption, one engine consumes 981 Nm³/h of lean natural gas, then total consumption is 17,187 Mcm per year (981x24x365/1000).
- Natural gas costs, about US\$ 0.34 million per year, assuming a unit cost of gas equal to US\$20/MCM.
- Other operational expenses relating to labour, maintenance and consumables are assumed at industry standards (1.5% of total investment)
- To estimate electricity sales a 60% capacity factor is reasonably conservative.
- Final electricity price, US\$/kWh 0.07 (understood to be local average market rates).

As indicated this project is designed to utilise available natural gas to fire generators for local electricity supply, thus to secure power supply for Afghan Gas own operations and to support the local area network, through greater power availability. Currently Sheberghan city faces regular (at least daily) power-outs and load sharing during peak demand in the colder months of the year. This additional input to the supply will assist local businesses and residents and provide community benefits as well as assisting Afghan Gas operations.

Based on the cost and price assumptions it is expected this project will provide positive cash flow benefits to assist in financing other infrastructure and field development needs.

Based on the assumptions given and an initial six-year life span, the following Table presents the expected cash flow from this project. After taxes and using a 15% discount rate total NPV is US\$ 5.6 million.

An initial investment of US\$4.3m and further cash injection to assist finance the second CAT generator will be required. It is anticipated such funding can be realised via local borrowing, budget or donor support and become available within a reasonable time.

Project: AGE Power Supply	Unit	2015	2016	2017	2018	2019	2020
Revenues	US\$	-	791,028	3,164,112	3,164,112	3,164,112	3,164,112
Power supply	MW/year	-	11,300	45,202	45,202	45,202	45,202
Generation capacity	MW	-	4.30	8.60	8.60	8.60	8.60
Capacity factor	%	60%	60%	60%	60%	60%	60%
Hours	Hours per year	-	4,380	8,760	8,760	8,760	8,760
Electricity price	US\$/kWh	0.07	0.07	0.07	0.07	0.07	0.07
Royalties and BRT Tax	US\$	-	28,711	114,844	114,844	114,844	114,844
Royalty	US\$	-	12,890	51,561	51,561	51,561	51,561
Rate	%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Royalty Base	US\$	-	85,936	343,742	343,742	343,742	343,742
Business Receipts Tax (BRT) tax	US\$	-	15,821	63,282	63,282	63,282	63,282
Rate	%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Business Receipts Tax (BRT) tax base	US\$	-	791,028	3,164,112	3,164,112	3,164,112	3,164,112
Investment	US\$	-	4,300,000	4,300,000	-	-	-
Generators 2 CAT CG260-16 sets	US\$	-	4,300,000	4,300,000	-	-	-
Operations costs and overhead	US\$	-	189,987	630,948	630,948	630,948	630,948
Natural gas opex	US\$	-	85,936	343,742	343,742	343,742	343,742
Natural gas consumption	MCM/year	-	4,297	17,187	17,187	17,187	17,187
Natural gas cost	US\$/MCM	20	20	20	20	20	20
Opex to operate plants	US\$	-	64,500	129,000	129,000	129,000	129,000
Overhead	US\$	-	39,551	158,206	158,206	158,206	158,206
Profit tax	US\$	-	114,466	208,464	-	-	-
Rate	%	20.0%	20%	20%	20%	20%	20%
Profit tax base	US\$	-	572,330	1,042,320	(314,793)	(380,063)	(463,123)
Depreciation	US\$	-	-	1,075,000	2,150,000	2,150,000	2,150,000
Buildings	US\$	-	-	-	-	-	-
Other	US\$	-	-	1,075,000	2,150,000	2,150,000	2,150,000
Fields	US\$	-	-	-	-	-	-
Carry forward of previous losses	US\$	-	-	-	-	(104,931)	(231,619)
Cash Flow	US\$	-	(3,842,136)	(2,090,144)	2,418,320	2,418,320	2,418,320
Total Investment	US\$	-	4,300,000	4,300,000	-	-	-
Debt	US\$	-	3,010,000	3,010,000	-	-	-
Equity	US\$	-	1,290,000	1,290,000	-	-	-
Debt obligations	US\$	-	-	(489,864)	(979,727)	(979,727)	(979,727)
Capital	US\$	-	-	(188,864)	(396,614)	(436,275)	(479,903)
Interest	US\$	-	-	(301,000)	(583,114)	(543,452)	(499,825)
Net Cash Flow before Gov. Part.	US\$	-	(832,136)	429,993	1,438,593	1,438,593	1,438,593
Government participation	US\$	-	-	-	-	-	-
Net Cash Flow	US\$	-	(832,136)	429,993	1,438,593	1,438,593	1,438,593

6.3.6. Secure NFPP Supply and Mazar market

The proposed strategy is to develop Mazar-e-Sharif and the regional market based on Yatimtaq field development as well as Enhanced Gas Recovery (EGR) for Khoja Gogerdag and Yatimtaq depleted fields with a strategy "Triggered Initial Small Investment" given the existing wells are ready for production and necessary processing assets are available to be commissioned soon.

It should be emphasised that Yatimtaq has been largely idle after the significant blowout that occurred during 1964-1966 and depleted Jurassic horizon gas almost completely. Therefore, an appraisal phase for 2-3 years is needed and during which it would be a perfect opportunity to install a new control and metering system, refresh Afghan Gas engineering skills by new well testing practice and introduce techniques for the management of field development plan processes.

Thus the initial small investment approach will provide a necessary basis and tools for field development plans to be carried out definitely. This will aim to result in securing the gas balancing for the Mazar and regional market development as well as to support the Sheberghan distribution system and Sheberghan Power Supply initiatives.

The proposal is based in 2 principal premises: 1) Secure natural gas provision to current (and possible additional) natural gas demand from NFPP and; 2) provide natural gas to possible future power generation plants in the North and industrial, commercial and residential demand in Mazar-e-Sharif and Sheberghan.

In simple terms, this project aims to recognise and promote the progressive development of market opportunities through securing supply capacity from Afghan Gas existing field resources.

In identifying key activities, of course there are strong relationships and inter-dependencies on such activity. The cash flow tables and the supporting graphs of field development and gas balancing (supply and demand) indicate how strongly related activities become, such that delay's in funding or investment in key infrastructure can impede capacity, supply and thus market development (and subsequent revenues, which themselves are a key component of related investment funding.)

UNICON attempts to map such activity, to provide revenue and cost estimates and time-lines is derived after detailed analysis to support key assumptions.

The main activities require significant investment, field development and management and some skills and capacity upgrade in support. It is a challenging and demanding proposal, but in the context of what to do and how to best utilise Afghan Gas resources and northern market potential, it is the most viable and logical strategic approach.

If there is firm understanding and commitment to develop the market potential, then this project and the related field development planning will be crucial to success. It is possible that some marginal variation in timing can be permitted, but broadly the approach outlined will provide the basis of PRMS development for future management and sustainability and the most effective balance of resource uses and market expansion.

Key assumptions are:

Activity	Details	Year	Investment
Well testing rig	Afghan Gas will be able to perform an appropriate well testing for Yatimtaq appraisal phase as well as for EGR project and new Jurassic development,	2016	US\$1,600,000
Process metering installations for Yamitaq flow lines	3 DN 80 PN 100 Ultrasonic meters (US\$ 100,000) and ABB Total Flow on-pipe type chromatograph	2016	US\$ 50,000
Dispatching center and sophisticated IT systems	Building	2016	US\$ 300,000
	Hardware/Software and IT tools		US\$ 500,000.
GIS and Integrated SCADA system	well flow rate control system	2016	US\$ 300,00
Custody Transfer Metering Station	Upgrading the existing Kud Barg pressure regulating and metering station,	2016	US\$ 200,000

Activity	Details	Year	Investment
	3 DN 300 PN 16 Ultrasonic meters sampling points, on-line chromatograph, flow computers,		US\$ 300,000
Field Development Plan	Reservoir modelling based on appraisal phase data, development phase production profile,	2016	US\$ 300,000.
Amine Plant commissioning and start up	Pre-commissioning and commissioning works require the good engineering plan based on recognized engineering practice for gas processing issue. The Contractor (TF BSO or Vendor (Quimex) shall provide all necessary works and hand-over the completion certificate as the amine plant is RFO (Ready for Operation). Moreover, the supervision of Quimex engineer is needed for several first months of operation with the purpose of possible troubleshooting,.	2016	US\$ 300,000
Jarkodug Field			
Process Metering Unit on Jarkodug site	3 DN 150 PN 100 Ultrasonic meters	2016	US\$ 150,000
	Sampling points and ABB type on-pipe chromatograph	2016	US\$ 50,000
EGR program	Wells stimulation, workovers and reactivation	2016	US\$ 200,000
Field re-development plan	EGR program justification, reserves estimate, production profile and abandonment plan	2016	US\$ 300,000
Khoja Gogerdag field			
EGR program, wells de-liquefaction techniques	Workovers and reactivation	2015	US\$ 200,000
Field re-development plan	EGR program justification, reserves estimate, production profile and abandonment plan,	2015	US\$ 200,000
Jarkodug field to develop Jurassic,			
Field Development Plan		2018 2019	US\$ 500,000 US\$ 500,000
Drilling expenses		2018 2019 2020	US\$ 8,000,000 US\$ 8,000,000 US\$ 8,000,000
Completion expenses		2019 2020 2021	US\$ 7,000,000 US\$ 7,000,000 US\$ 7,000,000
Khoja Gogerdag field to develop Jurassic,			
Field Development Plan		2019 2020	US\$ 500,000 US\$ 500,000
Drilling expenses		2019 2020 2021	US\$ 8,000,000 US\$ 8,000,000 US\$ 8,000,000
Completion expenses		2020 2021 2022	US\$ 7,000,000 US\$ 7,000,000 US\$ 7,000,000
Pipeline to Mazar			
Pipeline	12 inches, 90 Km. and cost US\$ 54,000 per inch, per mile, total investment; for budget purposes 50% in 2019 and 50% in 2020.	2019 2020	US\$ 36,450,000

Activity	Details	Year	Investment
Distribution network in Mazar			
Design engineering working		2019	US\$ 100,000
Odorisation units		2020	US\$ 60,000
Main and service lines		2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030	US\$ 2,595,000 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550 US\$ 5,595,550
Addition Processing Plant Capacity	US\$ 60,137,500, for budget purposes 50% in 2020 and 50% in 2021.	2020 2021	US\$ 60,137,500
Capacity building	Estimated at US\$1m per year, to build capability and provide necessary training in all aspects of gas management and business operations	2015 2020	- US\$ 1,000,000
Other Operating Expenses	Considering current operating costs and addition of US\$1m to cover the placement of high-skill workers in the fields and in the plants	2015 2030	- US\$ 3,418,663

The key benefits arise from the potential to develop the markets in the northern region of Afghanistan and thus provide more alternatives, competitive and useful sources of energy and fuel for industrial and residential consumers.

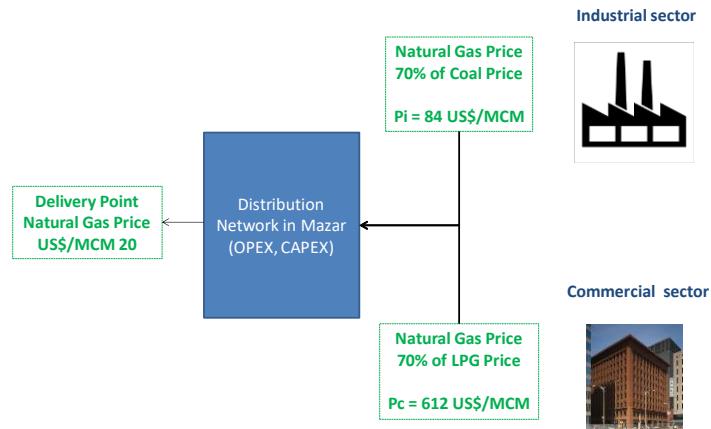
Potential demand for NFPP and Mazar markets is presented in the following table:

Project	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Demand												
Residential Sheberghan	Mcm/day	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Residential Mazar	Mcm/day	-	-	-	-	-	-	1.9	3.8	5.7	7.6	9.4
Ind.&Com. Sheberghan	Mcm/day	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Ind.&Com. Mazar	Mcm/day	-	-	-	-	-	34.3	70.3	108.4	148.3	189.9	232.8
CNG Sheberghan	Mcm/day	0.4	0.6	0.8	1.0	1.3	1.5	1.8	2.1	2.4	2.7	3.0
CNG Mazar	Mcm/day	-	-	-	-	-	-	6.2	12.7	19.5	26.6	33.9
Power Gen. AGE	Mcm/day	0.3	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.0
Power Gen. TFBSO	Mcm/day	-	-	-	-	-	-	95.3	95.3	95.3	95.3	95.0
Power Gen. North	Mcm/day	-	-	-	-	-	-	297.8	446.7	595.6	595.6	594.0
Glass Factory	Mcm/day	-	-	-	-	-	-	50.0	100.0	100.0	100.0	99.7
Fertilizer Plant	Mcm/day	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0
Add Fertilizer Plant	Mcm/day	-	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
Add. Industries	Mcm/day	-	-	-	-	-	-	-	-	-	-	-
Total	Mcm/day	366.9	814.0	814.2	814.4	814.7	849.3	1,336.7	1,582.4	1,780.1	1,831.0	1,881.2

In assessing benefits and the potential revenue for Afghan Gas, as indicated a market study was undertaken and a market model has been developed. Some important pricing assumptions are key inputs to this model and these are illustrated below and explained more completely in the other submissions and deliverables⁶. It might also be noted that UNICON has assessed

⁶ As detailed in section 3, a range of deliverables and outputs were provided that supports this analysis, assumptions and the resulting proposals.

pricing in a conservative manner recognising the desire to win new gas consumers away from other or alternative fuels. However, it is most likely that prices will be higher as this conservative approach keeps prices still well below regional international levels.



It's very important to remark that: 1) the US\$20/MCM price at delivery point is just a "transfer price" because Afghan Gas will operate the distribution network, pipeline and gas fields at least in the formative years of this project development. Thus the net cash flow generated in the distribution network will contribute to Afghan Gas total cash flow.

The following Table presents the expected cash flow, for initial 11 years, for this project. After taxes and using a 15% discount rate total NPV is US\$ 14.7 million; assuming a 70% debt.

rehabilitation of existing lines and a strategic development scheme for further market development.

This proposal is based on the premise that Afghan Gas must secure natural gas provision to current (and possible additional) natural gas demand in Sheberghan.

The important project activities relate to the total rehabilitation and upgrade of the Sheberghan distribution network, including processing of supplied gas, and pipeline distribution to provide opportunities for industrial, residential and CNG demand. Although Sheberghan represents a relatively small demand (certainly compared to Mazar-e-Sharif), it is a logistically, politically and historically important market. Provided that it can be shown to be cash-flow positive, and it is logical in the context of the broader proposed developments of the market and supply capacity then it is an important reform initiative.

The investment requirements are detailed below with a US\$240,000 initial funding need. It is assumed this can be provided within existing mechanisms as it has potential for very quick payback as illustrated in the cash flow projections.

The key assumptions are:

- **Sheberghan custody transfer metering station - 2015**, 2 DN 150 PN 16 Ultrasonic meters, flow computers, sampling points, total investment estimated at US\$ 80,000.
- **Gas Distribution System reconstruction and development**,
 - Design engineering works - 2015, Rehabilitation and Development Conceptual and Detailed Design, US\$ 100,000.
 - Odorisation Units - 2015, two units for two entry points, US\$ 60,000.
- **Distribution network** - Main and service lines, with investment spanned over a ten-year period from 2020.
- **Delivery natural gas prices**, price assumptions are:
 - CNG price, currently gasoline price is Afs56/litre, in the other hand, current legislation establish that CNG price must be 50% of gasoline price, it's an incentive to promote CNG consumption. Using a exchange rate of 56 Afs/US\$ and an appropriate energy equivalence from gasoline to CNG, the 50% of energy price is equal to US\$500/MCM as a price of natural gas used by final consumer of CNG. Then, using the estimated operating and capital costs for the CNG station the netback price at delivery point is US\$150/MCM.
 - Industrial and commercial sectors, according Afghan National Pricing policy currently both sectors pay US\$160/MCM and residential sector pays US\$71/MCM. UNICON's model assumes a constant price for industrial and commercial equal to US\$160/MCM and for residential sector a constant increase of US\$10/MCM from an initial price of US\$70/MCM.

The following Table presents the expected cash flow, for initial 11 years, for this project. After taxes and using a 15% discount rate total NPV is US\$ 6.9 million.

Concept	Unit	Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10	Y 11
Investment	000 US\$	-	-	-	-	-	1,296	834	1,015	1,236	1,504	1,830
Revenues	000 US\$	471	483	659	879	1,106	1,341	1,674	2,052	2,487	2,992	3,582
Residential	000 US\$	268	268	268	306	344	382	510	677	892	1,169	1,523
Total Households	#	15,916	16,221	16,531	16,848	17,171	17,500	17,835	18,177	18,525	18,880	19,241
Households with gas	#	1,484	1,484	1,484	1,484	1,484	1,484	1,806	2,198	2,675	3,256	3,962
Potential demand	MM CF	1,433	1,461	1,489	1,517	1,546	1,576	1,606	1,637	1,668	1,700	1,733
Volume p hh	MM CF	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Volume	MM CF	134	134	134	134	134	134	163	198	241	293	357
Price	US\$/MCM	71	71	71	81	91	101	111	121	131	141	151
Com. & Ind.	000 US\$	183	183	346	516	692	875	1,064	1,261	1,464	1,675	1,894
Volume	000 LPG Kg	395.77	403.36	411.11	419.00	427.05	435.25	443.60	452.12	460.80	469.65	478.67
Volume	MM CF	18.60	18.96	19.32	19.69	20.07	20.46	20.85	21.25	21.66	22.07	22.50
Market	%	0%	0%	6%	11%	17%	22%	28%	33%	39%	44%	50%
Volume	MM CF	77.04	77.04	78.11	79.23	80.39	81.59	82.83	84.12	85.46	86.85	88.29
Volume	000 Coal Kg	47,502	48,414	49,343	50,291	51,256	52,240	53,243	54,265	55,307	56,369	57,452
Volume	MM CF	1,173	1,195	1,218	1,242	1,266	1,290	1,315	1,340	1,366	1,392	1,419
Market	%	0%	0%	6%	11%	17%	22%	28%	33%	39%	44%	50%
Volume	MM CF	-	-	67.7	138.0	210.9	286.6	365.2	446.6	531.1	618.6	709.3
Price	US\$/MCM	84.01	84.01	84.01	84.01	84.01	84.01	84.01	84.01	84.01	84.01	84.01
CNG	000 US\$	19.71	31.54	44.02	56.84	70.47	84.60	99.38	114.82	130.76	147.51	165.09
Volume	MM CF	4.65	7.44	10.38	13.40	16.62	19.95	23.44	27.08	30.84	34.79	38.93
Price	US\$/MCM	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Costs		328.74	305.23	400.50	500.67	588.44	665.87	761.92	855.34	947.63	1,040.35	1,189.43
Natural Gas	MM CF	81.69	84.48	156.18	230.61	307.94	388.18	471.46	557.84	647.38	740.24	836.51
Natural Gas	000 US\$	46.19	47.76	88.30	130.38	174.10	219.47	266.55	315.39	366.01	418.51	472.94
Opex	000 US\$	282.56	257.47	312.20	370.29	414.34	446.40	495.38	539.96	581.62	621.84	716.49
Cost/Revenue	%	60%	53%	47%	42%	37%	33%	30%	26%	23%	21%	20%
Tax	000 US\$	28	35.50	51.61	75.61	103.54	70.17	75.85	82.13	88.83	160.77	199.32
Revenues	000 US\$	471	483	659	879	1,106	1,341	1,674	2,052	2,487	2,992	3,582
Opex	000 US\$	329	305	401	501	588	666	762	855	948	1,040	1,189
Capex	000 US\$	-	-	-	-	-	324	533	786	1,095	1,147	1,396
Cash Flow	000 US\$	113.7	142.0	206.4	302.4	414.2	(691.3)	1.6	99.5	214.9	286.5	363.3

The table above indicates project costs and time-lines. A period spanning 11 years is estimated to complete this project and this is largely driven by supply capacity projections linked to relevant demand. In this manner cash flows can remain positive year-on-year and difficult funding decisions can be avoided.

6.3.8. Key Objectives

The 3 year business plan for Afghan Gas details the analysis of the external and internal situation and the process of making progress to benefit from market opportunities and to mitigate operating weaknesses.

Resulting from this analysis are detailed business objectives, strategic actions steps, responsibilities and key indicators or targets for measuring progress. All of these are realistic and achievable, but need to be well understood with a strong commitment if the proposed reform strategy is to be successful.

It is essential that each of the key deliverables, as detailed in section 3, that relate to the implementation of the reform work, are properly understood so as to be of assistance and benefit to Afghan Gas.

6.3.9. Social Mitigation

A detailed 3 year retrenchment and social mitigation plan has also been delivered and this provides full explanation of how the proposed strategy can incorporate the required adjustments in people/staff numbers and transform skills.

This plan for full transition of skills is proposed to take up to 7 years, so as to maximise the benefit of natural attrition and retirement of workers thus making the overall transition much more acceptable socially, more practical regionally and within the community and of course more affordable financially.

The plan calls for:

Afghan Gas restructured, required staff, laid off staff and staff to be outsourced					
Departments	Employee supply		Required staff		
	Internal	External	Govt Employees	Other Employees	Total
CEO & Internal Audit	5		5	2	7
Technical Services Department	45		45	260	305
Finance Department	34		34	5	39
Legal Services Department	8	3	11	2	13
Corporate Services Department	30	7	37	5	42
Business Development Department	23	5	28	3	31
Total staff under new structure	145	15	160	277	437
Staff under current structure	324		626		950
laid off/surplus staff	179		349		528

Objective	Indicator	By When			Total
		2015	2018	2021	
Reduction of staff	no. of contracts terminated	165	180	183	528
.....of which retirement	no. of employees retired	115	194	14	323
.....re-training of retrenched staff	no. of staff re-trained	50	155	-	205
Of total retired and retrenchedre-employment assistance	no. of staff re-employed/engaged in new roles, new businesses or new activities	50	150	91	291
.....re-employment in new projects/new outsourcing opportunities and new Jobs directly triggered by reform of Afghan Gas		-	50	100	150

7. Capacity Building

7.1. Purpose

As indicated the opportunity to provide detailed capacity building was provided during the period June to August 2015.

A primary aim was to ensure as complete a dissemination of the work delivered under this project, as possible. In this regard it was important that senior officials within MoMP were presented with an overview of the work done, while designated personnel could participate in training related to the detailed outputs. In addition it was UNICON intention to support MoMP in its reform efforts and to provide training as requested.

It should also be stated that the assistance and support of Deputy Minister, Policy and Planning J. M Sadaat was critical to the success of this capacity building opportunity.

7.2. Participants

A detailed list of participants is attached as annex 1.

It is important to identify the key participant groups:

- The Minister, key deputies, ministerial support and senior hydrocarbons team,
- D M Sadaat and his team of advisers,
- Senior officials of Afghan Gas,
- Senior officials of APA, especially the technical services division
- Nominated employees of Afghan Gas and APA

7.3. Capacity Building Program

Given the objective to share as much of the work delivered and key findings as possible, as well as responding to MoMP needs, UNICON devised a program supported by D M Sadaat that broadly focused on four key areas:

- Sharing the findings of the project, the key deliverables and strategy for reform,
- Providing technical operations training, relating to the gas processing and transportation issues that is required,
- Providing contract management training as requested, and
- Sharing application of the Excel Model developed that permits futuristic assessment under specific assumptions as developed in support of the recommended strategy.

Project Findings and strategy

Several presentations were made during the period to the key officials within MoMP and Afghan Gas to share the deliverables of the project, the key outputs and findings within each deliverable and to share the options, strategy and recommendations, as detailed in this report, with the key personnel.

It is acknowledged that due to the changes of key personnel during the project and the impracticalities of working directly with senior Afghan Gas staff, some of the ideas and issues arising were new to trainees and remain difficult for them to adapt to, given the proposed thrust of commercialisation against a history of operating under a tightly controlled state environment.

Workshops were held intermittently with senior MoMP staff and over a 3 –day period with Afghan Gas and some MoMP staff. In follow up, one-on-one training was conducted with nominated Afghan Gas officials to assist in sharing the findings and proposed strategy more widely among Afghan Gas staff.

In addition UNICON participated in meetings with other consultants, notably Fichtner, to assist in sharing ideas and understanding any different assumptions that may be presented to MoMP.

Technical operations training

In understanding the magnitude of the operational changes that are required, over time, in both infrastructure development and application of new standards, UNICON engineering expert prepared and delivered a series of training workshops with the technical department of APA.

This was a comprehensive series of workshops on average 2 hours a day, 4 days a week over a period of 5 weeks and aimed to introduce new ideas, new standards and methods of operation and to ensure lively participation of trainees in identifying key issues, potential challenges and how to proceed in mitigating difficulties. Specific topics in detail:

- Role of Engineering and Engineering Deliverables,
- Completion Activities in the process of facilities pre-commissioning, commissioning, start up and hand-over,
- Construction Issues,
- Pipeline Integrity Management

Emphasis was given to engaging private partners and contractors and how to maximise efficiency and further capacity as a consequence of such private participation.

Contract Management training

MoMP expressed a particular interest in better understanding the dynamics of the various methods known to oil and gas companies in the way contracts and operations are managed.

The basis for this was two exemplary texts, "*The Global Oil & Gas Industry: Management, Strategy & Finance*" and "*Oil and Gas: A Practical Handbook*" and UNICON reviewed the texts, applied its own experience and knowledge and prepared a series of presentations to summarise

and capture the key issues and considerations in oil and gas contract and operations management.

Specific topics in detail:

- The global oil & gas industry,
- Nationalism, NOC and the curse of oil,
- Access, leasing and exploration,
- Developing oil and gas projects,
- Territorial delimitation and hydrocarbon resources,
- Licences, concessions, PSA and service contracts,
- Upstream joint ventures – bidding and operating agreements,
- Unitisation and unitisation agreements,
- Finance upstream developments,
- Transboundary pipeline development and risk mitigation, and
- Liquefied natural gas

Excel Model application

UNICON developed a sophisticated excel application to assist in modelling gas supply, demand and related cash flows to demonstrate and support the strategies recommended.

As the model was developed and extended throughout the project, initiated to present the market study findings, extended to include project costs and gas balance scenario's and then adapted to represent potential options and the recommended strategy, so the model became an integral tool, alongside some of the project deliverables, to represent different options and scenario's as assumptions and variables were adjusted.

UNICON provided detailed training on the presentation of the model, the methodology and analysis contained within the model and details of how to amend assumptions and view different scenarios. Beneficiaries of this training include the Afghan Gas management, Policy & Planning team in MoMP and specific one-on-one facilitation of the model with Afghan Gas IT officer.

7.4. Results

The capacity building was comprehensive and fully engaging to as many participants as practicable.

While it is understood that some of the commercial concepts underpinning the strategy and the language differences, hindered easy understanding, it is believed that key personnel now know the key issues and principles. It remains for MoMP and Afghan Gas to continue to promote the recommended strategy and to effectively use the information, guidelines and tools provided.

8. Work Plan Issues

8.1. Completion of the Work Plan

As indicated in section 3 many deliverables and outputs have been produced and as illustrated below, the work plan was demanding and challenging.

UNICON has now completed each task and required output within the overall requirements and time-frame proposed for the project.

With the exception of one or two delays in meeting a specified deadline, each activity completion and relating reports have been submitted in line with the above work plan as provided during the inception phase. Several of the Reports/Deliverables were shifted from February to March 2015 due to the interrelationship between the relevant activity and information such that it provided a better outcome to deliver several reports relating to legal matters and financial matters together.

As indicated (and as detailed in section 7) UNICON was invited to extend the conclusion of the project from May, through until August, even though all the deliverables (except No's 24 and 25) were completed on time. This time extension permitted in-depth capacity building following changes and internal reforms within MoMP.

8.3. Matters Arising

As indicated in section 3 there were a number of challenges in completing the project, not least the lack of progress of the proposal for corporatisation that is a political decision beyond the scope of UNICON to enforce. Coupled with that were many changes of personnel and no unified commitment within the ministry to the corporatisation process, although there is evidence of a strong commitment to reform and improve the operations and outcomes of Afghan Gas.

Early project difficulties in extracting necessary information were largely overcome and desire to work closely with other consulting firms working on gas sector reforms, was managed adequately and effectively given the circumstances and different obligations of each project team.

UNICON made specific efforts and representations to assist ensure that different consulting teams inputs were unified and coordinated so as to maximise overall impact and to assist MoMP officials in understanding findings and outputs and differences of opinion. While each project is complementary (in respect of overall gas sector reform) rather than competing, there was indication of some overlap and it is mostly about understanding different assumptions and approaches if and as different conclusions result.

Overall the result of UNICON effort is a comprehensive suite of information, 'how-to documents' and guidelines to introduce and manage major reforms to develop Afghan Gas potential in the course of the immediate future, the medium-term outlook and insight into the long-term benefits.

9. Conclusions and Completion

9.1. Key Project Conclusions

One of the main findings of the "Assessment of status of Afghan Gas operations" Report is that the current situation at Afghan Gas is difficult because of: Lack of investment; Insecure revenue; Existing gas reserves close to depletion; Lack of access to finance: Without limited liability Afghan Gas cannot effectively use assets as collateral for financial support; Inability to develop the market; all leading to a steady state of decline.

The lack of investment and maintenance means that insufficient gas is being delivered to the company's single industrial customer, and poor quality gas is being delivered to consumers in Sheberghan. Gas reserves are near depletion and the assets are in a poor condition. The situation has been steadily deteriorating each year and significant change is needed if the business is to be positioned to cope with new initiatives underway within MoMP and the gas sector.

The reform of Afghan Gas, regardless of the political decisions about corporatisation, will only proceed effectively if the gas sector develops in a positive, progressive and timely manner. In understanding the relationship between the prospective infrastructure projects that simultaneously impact on the sector and on Afghan Gas the entity, UNICON has attempted to identify relevant assumptions, project needs and priorities, in order to present feasible and sensible options for reform.

Following the 'External Environment Review/Market Report' UNICON identified key projects for Afghan Gas and proceeded to build a feasible implementation strategy adopting these projects, based on specific assumptions developed during the assessment and market study analysis work.

It is clear that all the projects allow different values for Afghan Gas and they differ in demand and consumption of the gas and prices paid, for example some demand a high volume at a reasonable price (Power Generation in Sheberghan and the Industrial sector in Mazar); others require sufficient natural gas but prices are lower (Fertilizer Plant) and others consume low volumes at low prices (Sheberghan distribution network, glass factory, for example). But even if a project is small it can generate some value for the entity. In this sense the challenge is to create a reasonable schedule to develop these projects and UNICON has proposed exactly such a program with a full suite of supporting documents. One thing is clear: **the necessity to start activities in 2015 to reach goals in 2020 and beyond.**

The Strategy as recommended and the Proposals presented are best for:

- Overall performance,

- Gas field exploitation,
- Cash generation,
- Market development, and
- Survival of Afghan Gas.

The strategy given and the projects identified:

- Conform to an effective commercialisation approach,
- Will support corporatisation when the time is right,
- Are practical, realistic and achievable,
- Provide for consumer and employee protection and safeguard,
- Ensure Government revenues are optimised over the long-term, and
- Ensure Gas is used to promote energy sustainability and increased energy independence for Afghanistan's best interests.

9.2. Project Achievements

Much has been achieved during the 18 months of the project 'Services for Improving the Business Environment: Reform of Afghanistan State Gas Enterprise'.

Specifically:

- A detailed review and documentation of the many prior projects relating to gas reform, but that have had limited impact. This review was able to identify key features and findings so as to provide a concise summary of key issues and expert opinions for future consideration,
- A thorough and detailed review of the status of Afghan Gas Enterprise, with the overall conclusion that all aspects of the business require reforms. In support of this is an inventory of personnel, assets and technical operations and reconciliation of financial management issues has been prepared,
- The first thorough market study culminating in the development of a market model for the domestic opportunity in the north, with relevant assumptions relating to volumes and prices. The model has been adapted and expanded to

include detailed cost assumptions so that all options and potential development projects can be incorporated and assumptions can be modified to indicate impact on revenues, net cash flows and profitability,

- Preparation of a detailed strategy, based on the internal assessment and external market study as well as drawing on the consulting team's wide array of experience in gas sector development and SOE reforms. This strategy is supported by detailed explanations and a suite or tool kit of plans and documents ready for implementation by new management,
- Discussions, consultations and training of findings, reports and working models with many stakeholders and specifically ministry personnel so as to improve understanding and develop momentum for reforms,
- Ultimately, the project has achieved its overall objective 'to develop a strategy and plan for improving business performance of Afghan Gas'.

9.3. Next Steps

Ultimately, government needs to make a decision on its commitment to reform of Afghan Gas. In making an affirmative commitment the basis and mode of such commitment needs to be clear, with UNICON recommendation favouring commercialisation because it can be commenced immediately, followed by corporatisation once improvements are underway and when it is deemed politically appropriate. Such a decision and providing the necessary political support will then instigate the commencement of changes as proposed by UNICON. Such changes will require expertise and assistance and probably further consulting inputs to assist in implementation.

9.4. Completion

This Draft Final Report represents the project completion as all deliverables and outputs have been submitted.

UNICON would like to sincerely thank all stakeholders involved for their contribution and support, particularly personnel from Afghan Gas, from APA and from MoMP and the valuable guidance and contributions from the World Bank team.

Annex 1

Capacity Building Program - Participants

Excellency Minister Daud Shah Saba, Ministry of Mines and Petroleum

Excellency D.M Javid Sadat, Deputy Minister for Policy

Abdul Mubeen Shahab Director, PMU

Dr. Qutbuddin Qaeym, Director General, APA

Eng. Abdul Qaum, Director of AGE

Eng. Abdur Rahim, Plan Manager of AGE

Eng. Juma Khan, Deputy Manager of AGE

Eng. Mohammad Afzal, Procurement Manager of AGE

Eng. Abdul Khalil, Technical Manager of AGE

Eng. Mohammad Younis, Account Manager of AGE

Mohammad Naim, Branch Manager in Kabul of AGE

Baryalai Barai, Senior Power/Energy Sector Specialist MoMP

Eng. Ghulam Sakhi- Technical expert, AGE

Ayob Ghorbandi - IT and accountant, AGE

Azim Marjo - Financial Department, AGE

Farhad Ahmadi, Director APA

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Ms Nabila Moradi, Policy & Planning team, MoMP

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