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Chartered Accountants

Oil & Gas Regulatory Authority

Un accounted for Gas – Study

2nd DRAFT
03 February 2017

Risk Consulting | Karachi office
February 2017



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Mr. Shahzad Iqbal,
Executive Director (Gas),
Oil and Gas Regulatory Authority,
Plot No 54-B, Fazl-e-Haq Road,
Blue Area, Islamabad,
Pakistan.

3 February 2017

Dear Sir,

Second Draft – Unaccounted for Gas (UFG) study.

With reference to the tasks specified in our scope of work as per contract Ref. OGRA – 9(379)/201 dated 21 April 2016 (the Contract) to provide advisory services on determining UFG levels, we are pleased to enclose four (4) copies of the 2nd Draft of UFG Study.

Based on our contract, we compiled our 1st draft report which was shared with Oil and Gas Regulatory Authority (OGRA, the Authority) and accordingly the Authority shared the draft report with the Sui Southern Gas Company Limited (SSGC) and Sui Northern Gas Pipeline Limited (SNGPL) to ensure factual accuracy of information contained in the draft report. After discussions and analysis of the feedback received we made appropriate changes to the draft report and have finalized the report which is being submitted to you as second draft report.

It has been our privilege to have this opportunity to work with you, and we would like to express our gratitude for the co-operation and courtesy extended to us by you, OGRA and teams of SSGC and SNGPL during the course of the engagement

Yours sincerely,

Rana Nadeem Akhtar
Partner

Encl.
2nd Draft Report

Structure of Report

The report comprises of the following 3 sections:

Report Sections

Section 1 – Background and Situational Assessment

This section provides a brief context of the UFG issue. We have endeavored to evaluate the existing UFG related practices of Sui Companies and OGRA in the light of international better practices, as applicable in demographics and dynamics of Pakistan. We have assessed the UFG contributing factors¹ to form basis of our recommendations and proposed way forward as discussed in section 2 and 3 of the report respectively.

Section 2 – Our Recommendations

This section of the report highlights our recommendations in relation to UFG control, calculation methodology and the UFG Allowance. Further, we have endeavored to highlight the impact that our recommendations will have on Sui Companies.

Section 3 – Way forward

We have proposed a roadmap with specimen Key Monitoring Indicators (KMIs) to monitor the progress against UFG reduction plans and achievement of those KMIs has been linked with the UFG Allowance.

¹ UFG Contributing factors refers to theft, measurement errors, pipelines leakages, effect of change in sales mix, minimum billing, gas losses law and order affected areas and other factors.

Scope Elements

- Identify the bulk consumers in both gas companies with their respective volumes, inline with the international practices.
- International best practices adopted for treatment of theft by non registered consumers.
- Preparation of methodology for treatment of theft volume in the UFG computation as well as what actions would be required by the companies to qualify for such volumes.
- Suggest appropriate way forward for quantification and treatment of Law & Order affected areas and define prerequisites to qualify for law and order volumes.
- Suggest whether there is a justification to consider allowance in UFG for volume against minimum billing claimed by the gas companies.
- Devise a mechanism to stream line the Btu equivalence issue in case of third party access and treatment of third party gas volume for calculation of UFG.
- Suggest methodology for calculating UFG in the light of present practice, definition as per rules and international practices applicable.
- Develop rationalized overall benchmark for UFG, in natural gas sector/ development of a formula to calculate UFG on yearly basis.
- Establish a formula to calculate the impact of volumetric shift from bulk to retail sector for calculation of UFG.
- Elaborate international best practices as well as appropriate discounts for local operating conditions, with specific reference to countries with similar operating environment along with details of company's network / consumers in respective countries.
- Develop framework for incremental improvement in all areas/ components of UFG control.
- A methodology / mechanism is to be devised for capping the volumes to be allowed (if any).

Abbreviations and Acronyms

AFS	Available for Sale	MP&NR	Ministry of Petroleum and Natural Resources
AGA	American Gas Association	NGTR	Natural Gas Tariff Rules
Authority	Oil & Gas Regulatory Authority	NTSB	National Transportation Safety Board
BCF	Billion Cubic Feet	OGRA	Oil and Gas Regulatory Authority
BTU	British Thermal Unit	PDA	Price Determining Authority
CMS	Consumer Meter Station	PE	Polyethylene/ane/yne
CNG	Compressed Natural Gas	PGW	Philadelphia Gas Works
CP	Cathodic Protection	PRS	Pressure Reducing Station
CPS	Cathodic Protection Stations	PUC	Pennsylvania Utility Commission
ECC	Economic Coordination Committee	PUG	Passing Unregistered Gas
EREGEG	European Regulators' Group for Electricity and Gas	RERR	Revised Estimated Revenue Requirement
EOI	Expression of Interest	RLNG	Re-gasified Liquefied Natural Gas
ERR	Estimated Revenue Requirement	SMS	Sales Meter Station
EVC	Electronic Volume Corrector	SNGPL	Sui Northern Gas Pipeline Limited
FIR	First Investigation Report	SSGC	Sui Southern Gas Company Limited
FRR	Final Revenue Requirement	Sui Companies	SSGC and SNGP
GCV	Gross Calorific Value	TBS	Town Border Station
GoP	Government of Pakistan	TOR	Terms of Reference
GPA	Gas Processing Association	YoY	Year-on-Year
GPRS	General Packet Radio Service	3PLE	Triple Polyethylene
JMC	Joint Meter Check		
KM	Kilo Meter		
KMI	Key Monitoring Indicators		
MMBTU	Million British Thermal Unit		
MMCF	Million Cubic Feet		

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Executive Summary

2nd Draft

Executive Summary - Working Towards a Better Solution

Background, History and Impact

- Gas losses or Unaccounted for Gas (UFG) has been a long standing challenge for both the Sui Companies and the Oil and Gas Regulatory Authority (OGRA, the Authority).
- The twofold mandate of Authority demands it to protect the public interest by respecting their rights and secondly requires it to enable a controlled and regulated environment for the utilities. OGRA has to make sure that good consumers are not penalized for menace created by illegal consumers and that adequate UFG control mechanism is implemented and appropriate UFG allowance is provided in the gas tariff.
- On the contrary, SSGC and SNGPL are coping up with several technical/operating challenges and susceptibilities viz. unfavorable operating conditions, expanding outreach coupled with vulnerable supply management, demographical challenges in terms of law and order discontents, low pace technical advancement – vis-à-vis network expansion – in terms of measuring capacities, theft identification and controlling leakages etc.
- Also, the Government with its socio-economic agenda intends to provide utilities to every individual in Pakistan. In this relation, Sui Companies are instructed time to time by the local and federal governments to expand their outreach where gas supply and its maintenance is not even commercially viable.

- All of these challenges are contributing factors to UFG. Further, weak and delayed legal recourse system has also exacerbated UFG situation. Over the past decade the actual UFG has swelled drastically. Gas losses are provided following in Fig. ES -1.

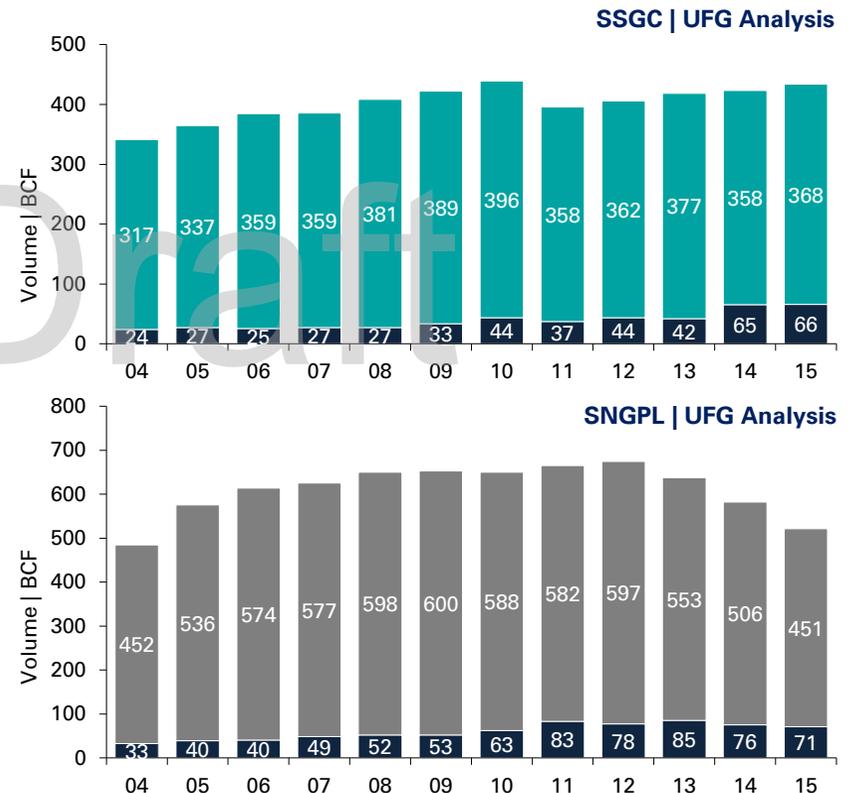
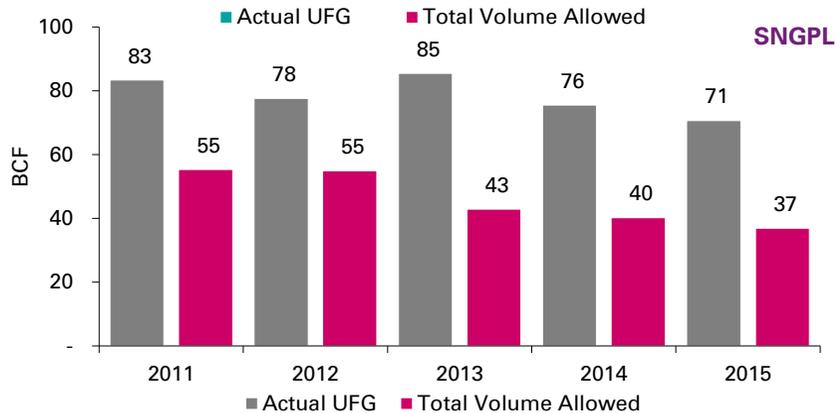
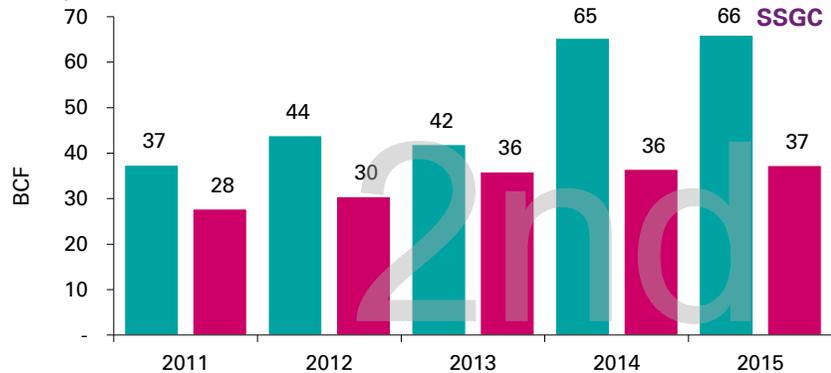


Fig. ES - 1 UFG as part of Gas Available for Sale.

*The above UFG volumes are rounded to nearest BCF before any volumetric allowances by OGRA as deemed sales. (i.e., Theft by non-consumer and law & order)

Executive Summary - Working Towards a Better Solution

- OGRA being cognizant of the increasing gas losses, associated financial & operational risk and impact on equity for both the Sui Companies, initially devised a three year incentive based schedule from year 2003-04 to reduce the UFG to 6.00%. UFG allowed by OGRA against Actual UFG is provided below:



*The above UFG volumes are rounded to nearest BCF before any volumetric allowances by OGRA as deemed sales. (i.e., Theft by non-consumer and law & order)

- To further comprehend this issue, UFG calculation formula applied by OGRA to calculate UFG needs to be understood.

UFG Calculation

- In line with the international better practices, UFG is calculated as the difference between the metered gas volume injected into the transmission and distribution network – Point of Dispatch (POD) – and the metered gas delivered to the end consumers at Consumer Meter Station (CMS) during a financial year.

This is expressed as a percentage of the metered quantity of gas entering the network / Available for Sale (AFS). The formula used to calculate UFG is:

$$UFG \% = \frac{(A - C) - B}{A - C}$$

Where,

A = gas received by the company (gas purchased) during a financial year;

B = volume of natural gas metered as having been delivered by the licensee to its consumers (gas sold); and

C = metered natural gas used for self consumption.

- As discussed previously, gas losses are because of operational & technical challenges faced by the Sui Companies. These challenges are termed as the contributing factors to UFG. Fig ES-2 briefly describes these factors.

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Fig. ES-2 UFG Contributing Factors

Key UFG Contributing Factors

- 1 Bulk to Retail Shift** – Claim of increase in UFG due to shift of gas supply from Bulk to Retail sector, which is more prone to theft and technical losses over the period i.e.. change in sales mix
- 2 Theft** – Consumption of gas in an illicit / un-lawful manner either by metered consumer or non-consumers.
- 3 Law & Order** – Claim of UFG volumes for areas where prevailing law and order situation hinders gas company operations resulting in UFG.

Other UFG Contributing Factors

- 4 Leakages** – Natural gas leaked to the outside atmosphere from within a transmission/ distribution system and staying un-accounted for.
- 5 Minimum Billing** – Difference of minimum billed and actual consumption volumes.
- 6 Measurement Errors** – Mechanical faults resulting in slow meters and billing errors.
- 7 Other Factors** – Various other reasons contributing towards UFG which include BTU Equivalence, third party access and increase in gas prices.

- The existing measurement mechanisms at Sui Companies are not adequate enough to provide UFG details appropriately at contributing factors level. Sui companies are unable to determine the actual difference between the volume received and dispatched for a particular network segment.
- Accordingly, with the existing setup it is not possible to identify actual gas losses associated with each contributing factor in UFG.
- Sui Companies currently exhibit break up of UFG into contributing factors based on assumptions and estimates. We have endeavored to provide a formula to calculate UFG on yearly basis, including technical and local conditions component, as per our scope of work under the contract of the engagement and UFG definition given in NGTR, 2002 and applicable law.
- In line with our scope of services, we have devised a methodology for capping the UFG allowances, considering growth in natural gas sector, a balance between consumers & the Sui Companies and to maintain reasonable pressure on the Sui Companies to put due efforts to control these gas losses. This methodology includes introduction of framework with a model for incremental improvement in all areas/components of UFG control for the Sui Companies.

- A study conducted by US Department of Energy concluded that: **“You can not manage what you do not measure. If you do not measure it, you can not improve it”**.
- Internationally, measurement based mechanisms are used to regulate and control UFG as it is primarily associated with data and meter errors. The gas distribution companies globally have a measured and managed approach to gauge UFG with robust gas distribution networks where gas being transported is fully measured end to end.

Executive Summary - Working Towards a Better Solution

Proposed Way-Forward

Model for incremental improvement for UFG control

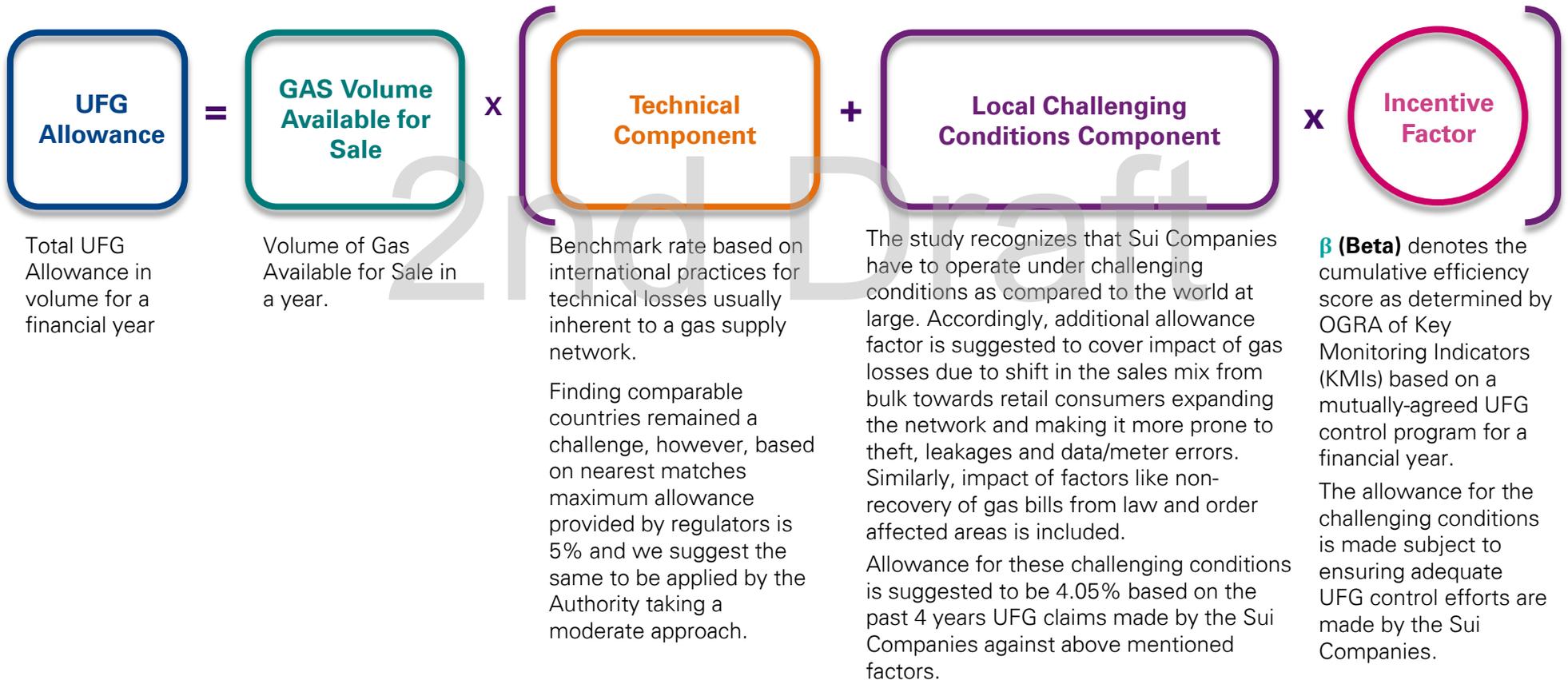
- Interventions at strategic and operational levels of the Sui Companies are required for the resolution of UFG issue. Failure to control gas losses stems from the absence of a mindset that owns this problem and puts a cohesive and coordinated strategy to address the same.
- In this regard, UFG Control framework with an objective of “Enhanced UFG Control” is proposed.
- This framework requires improvement in the following four areas of the Sui Companies:
 - Network Measurement and Visibility;
 - Network Rehabilitation;
 - Theft Control; and
 - Research & Development.
- To better ensure implementation of the UFG control framework, the implementation is translated into a UFG Benchmark formula used for calculating UFG Allowance which is explained under the below caption.

UFG Benchmark and Control Formula

- We have proposed a two component formula for calculating UFG Allowance viz. Technical Component and Local Conditions Component.
- KPIs and KMIs have been devised in consultation with the leadership of Sui Companies and the Authority to achieve improvement in the identified four areas of UFG Control framework:
 - Network Measurement and Visibility;
 - Network Rehabilitation;
 - Theft Control; and
 - Research & Development
- All KPIs, together with their respective KMIs, are provided with scores aggregating to a total of 100%. The incentive factor enables additional relief of 4.05% for contributing factors representing local conditions, subject to the achievement of KMIs.
- Going forward, OGRA is suggested to monitor performance of Sui companies and achievement of KPIs vis-à-vis agreed KMIs periodically, at least annually especially before approval of Final Revenue Requirement (FRR).
- UFG control framework aims to bring year on year improvement in UFG levels. Albeit specific funds and resources will be required to achieve these KPIs and augment controls over UFG but the benefits expected to be derived in the form of reduced overall UFG levels will be exemplar.

Executive Summary - Working Towards a Better Solution

$$\text{UFG} = \text{Volume} \times (\text{Rate1} + \text{Rate2} \times \beta)$$



Executive Summary - Working Towards a Better Solution

- Our recommendations as detailed above will be for the next five (5) years as required under our scope of work in the contract, subsequent to which the Authority is advised to review the mechanism and revise the UFG Allowance, if deemed appropriate. However, during the interim revision period, the recommended UFG model may remain valid.
- For the FY 2017, the Authority may review and assess the efforts made by the Sui Companies against their approved annual UFG reduction plans and may provide appropriate allowances to the Sui companies based on their performance against their respective annual UFG reduction plans.
- For the FY 2013, 2014, 2015 and 2016 , the Authority may review its earlier (provisional) UFG Allowances in the FRR, in line with the proposed UFG Control Framework to help ensure appropriate relief is granted to the Sui Companies.
- This Executive Summary shall not, in any respect, be considered as substitute of the report and shall be read in conjunction with our detailed report.

Draft



Preamble

2nd Draft

Preamble

Introduction

- Oil and Gas Regulatory Authority (the Authority, OGRA), with an intention to carry out an independent study for determining UFG Benchmarks/ targets for natural gas sector in Pakistan invited proposals vide advertisements dated 26 November 2015 titled “Selection of consultant firms for determining UFG Level”.
- KPMG Taseer Hadi & Co. (KPMG, we, us, our) submitted the proposal through letter reference KAS-SNH-395, dated 30 December 2015 (our Proposal). After the due selection process, the Authority appointed KPMG as consultant for carrying out the Study for determining UFG level on the Terms of Reference (TORs) agreed under the Contract for Service dated 21 April 2016 reference: OGRA – 9(379)/2015 (the Contract).
- The key objectives of the proposed UFG study are to assist OGRA in regulating the UFG related matters for the gas utility companies i.e. Sui Southern Gas Company limited (SSGC) and Sui Northern Gas Pipelines Limited (SNGPL).

Scope of Services

Our scope of the work as per the Contract comprises of the following tasks:

To assist Oil and Gas Regulatory Authority for determining and fixing the UFG benchmark(s) for the gas utility companies i.e.. SNGPL and SSGCL for next five years and thereafter development of a formula to calculate UFG on yearly basis keeping in view all the relevant factors as well as international best practices. Based on the “Request for Expression of Interest” for selection of consultant firms for determining UFG level, the scope of the project covers the following:

Task 1: Rationalized Overall UFG benchmark

- Develop rationalized overall benchmark for UFG, in natural gas sector /development of a formula to calculate UFG on yearly basis, including fixed and variable parameters, as per relevant clauses of OGRA Ordinance and UFG definition given in NGTR and applicable law.

Task 2- International best practices

- The benchmark study must elaborate international best practices as well as appropriate discounts for local operating conditions, with specific reference to countries with similar operating environment along with details of company’s network / consumers in respective countries. References on UFG Benchmarks prepared by other renowned regulators should be included along with their methodology adopted to calculate UFG disallowance, if any.

Preamble

Task 3: Factors Contributing UFG

Brief of some of the issues which are the contributing factors raised by the gas companies in the specific socio economic conditions and the required tasks identified by OGRA are as follows:

A. Shift of bulk sales to retail sector

- Identify the bulk consumers in both gas companies with their respective volumes, inline with the international practices.
- To establish a formula to calculate the impact of shift of volume from bulk to retail sector for calculation of UFG, inline with the international practices also indicate reference countries.

B. Theft

- International best practices adopted for treatment of theft by non registered consumers along with proper referencing vis-à-vis countries specific conditions.
- Preparation of methodology for treatment of theft volume in the UFG computation as well as what actions would be required by the companies to qualify for such volumes.

C. Law and order affected areas

- Suggest appropriate way forward for quantification and treatment of such volumes as part of UFG in line with

the best international practices with specific references along with legal provisions vis-à-vis local conditions.

- Define pre- requisites to qualify for law and order volumes.

D. Minimum billing

- Whether there is a justification to consider allowance in UFG for volume against minimum billing claimed by the gas companies, giving references, if any keeping in view applicable legal provisions.

E. Formula for UFG calculation

- To suggest methodology of calculating UFG in the light of present practice, definition as per rules and international practices applicable.

F. BTU equivalence issue in case of third party access

- To devise a mechanism to streamline the above anomaly in line with the best international practices vis-à-vis local conditions.

G. Treatment of third party gas volume for calculation of UFG

- To suggest treatment of such gas volumes as per standard norm / best international practices.

Preamble

Task 4- Capping Volumes of allowable

- A methodology / mechanism is to be devised for capping the volumes to be allowed (if any) as mentioned in Task 3 (A), (B), (C), (D) above, with a view to create a balance between consumers and the licensees and to maintain reasonable pressure on the licensees to put due efforts to control these losses.

Task 5- Anticipated development in natural gas sector

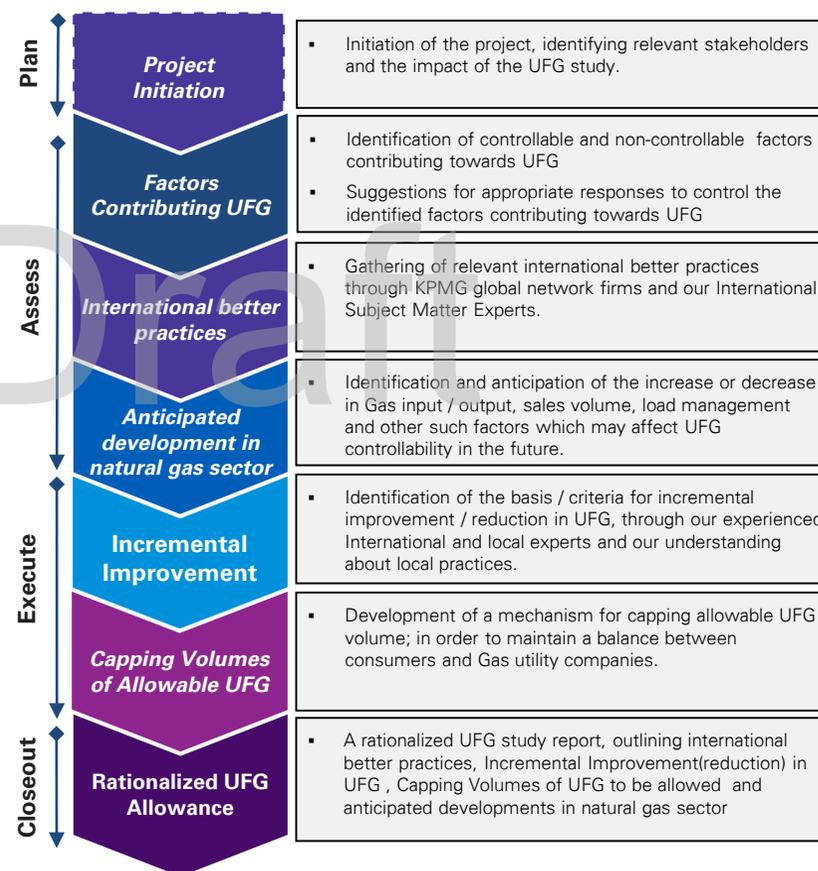
- The benchmark must also cater for anticipated development in natural gas sector, which may include increase in gas input due to indigenous gas discoveries, import of natural gas through interstate pipelines /LNG, increase / decrease in gas sales volumes, load management, and other such factors as per international best practices.

Task 6- Incremental Improvement

- Develop framework for incremental improvement in all areas/components of UFG control.

Our Approach

Our project approach as explained in our proposal is as follows:



Preamble

Work Done

In order to carry out our scope of work and in line with our work approach, we have performed the following steps:

- Performed walkthroughs for the relevant activities relating to UFG determination and quantification;
 - Conducted meetings with the relevant key personnel at the Sui Companies to obtain understanding of the claims, major impediments and challenges faced by the companies in monitoring and controlling UFG (**details provided in Annexure D – Key Persons Interviewed**);
 - Reviewed relevant information and documentation prepared and submitted by Sui Companies as supporting evidences and basis of our understanding of the business and operational model of the Sui Companies along with the regulatory and policy documents (**details provided in Annexure E – Key information/documents reviewed**);
 - We regularly discussed and shared the progress and issues related to the engagement with focal persons and project committee at OGRA. The Authority was also updated using structured presentations at regular intervals.
 - We also attended OGRA hearing in Karachi on SSGC petitions to augment our understanding on the subject and gather views of industry representatives.
 - Subject matter experts were deployed and assessment was performed to determine the underlying causes of UFG and difficulties faced in their quantification and net impact on UFG disallowances.
- Reviewed reduction plans developed by Sui Companies and assessed the anticipated increase/decrease in Gas volumes, sales volume, load management and other such factors which may affect UFG controllability in the future.
 - Reviewed the financial position of the Sui Companies to understand the impact of UFG disallowance at various levels.
 - Visited company installations from TBS to CMS, meter plants and measurement teams for practical experience of the on field gas supply mechanisms.
 - Accessed through our global network support, UFG management practices and related regulatory approaches to manage and control UFG levels in various international jurisdictions.
 - Accompanied the SSGC theft control teams to observe procedure followed to detect theft by non-consumers.
 - Developed a rationalized UFG calculation formula and proposed a structured UFG management & control strategy for the Sui Companies.

Standard Terms and Conditions and Terms of Contract

- This engagement is governed by the Contract and terms contained in it and our Standard Terms and Conditions as outlined in our Proposal.
- In case there is an overlap between any provision of the Contract and our Standard Terms and Conditions, provision of the Contract shall prevail.

Preamble

Duration of engagement

- This engagement was carried out from 22 April 2016 to 15 August 2016 and the data and information relevant for this study has been gathered during that period. We have not sought to update the data or information after that date.
- The data used for the analysis generally pertain to the period beginning 1 July 2010 and ending 30 Jun 2015, except as specified otherwise.

Use & Circulation of report

- This document has been prepared specifically to determine the UFG allowance for the gas utility companies to help the Authority regulate the UFG issue. Accordingly, this report should not be used for any other purpose.
- This document is confidential and for the internal use of its intended users. Therefore, circulation of this document should be restricted and should not be distributed to any person other than those mentioned above. This report should not be referred to or quoted, in whole or in part, without our prior written consent except as specifically provided in terms and conditions of the Contract.

Notice to the Reader

- Reader to the report should take into account the limitations and notices mentioned at the end of the report.
- Also, the terminologies used in the report have specific meaning and accordingly are defined under the heading 'Specific terminologies used' at the end of the report.

2nd Draft



Section I -

Background and Situational Assessment

2nd Draft



Background

2nd Draft

Background

Introduction

- In Pakistan, OGRA is the prime regulatory authority vested with the responsibility to regulate Natural Gas Sector in Pakistan. OGRA regulates the two natural gas transmission and distribution companies, SSGC in the south and SNGPL in the north.
- Key regulatory activities performed by OGRA are managing licensing for transmission and distribution of natural gas, advising the Federal Government on fixing the gas prices for consumers and regulating related matters.
- Gas is a public utility and accordingly its price is regulated based on the principle of cost reimbursement. Utility companies submit their tariff petitions to OGRA stating Revenue Requirements (Revenue required to meet the Costs to provide gas to the consumers) and claim for Rate Base (return on assets employed) as guaranteed in the licensing agreement with OGRA.
- On gas pricing OGRA is guided by Natural Gas Tariff Rules, 2002 (NGTR) issued under the OGRA Ordinance, 2002. Based on NGTR and tariff petitions submitted by utility companies, OGRA evaluates and decides the petitions by allowing the costs to supply gas and the guaranteed return. As a result upward or downward revisions are decided to gas sale prices and are communicated to Federal Government for notification.
- One of the critical elements of price revision petitions is the allowance for UFG. It represents the value of normal portion out of the total UFG accepted by the authority to be included in the gas price.
- The term UFG is used in various forms by gas utility companies across the world in rate proceedings, filings, reviews, and related documents.
- Internationally, UFG generally refers to gas in a transmission and / or distribution system which the utility company cannot account for as usage or through appropriate adjustments. Adjustments are usually made for factors as variations in temperature, pressure, meter-reading cycles, or heat content; calculable losses from construction, purging, line breaks, etc., where specific data is available to allow reasonable calculation or estimate; or other similar factors.

Historical Perspective of UFG Allowance

- General underlying factors causing UFG have been pipeline leakages, measurement problems and theft. All these need focused management and control but these may, to a limited extent, be taken as un-controllable also.
- Un-controllability or inherent susceptibility of gas supply network to leakages and theft form the basis for UFG values to be allowed as a normal loss and included to the gas price. If disallowed, the loss will be borne by the utility company.

Background

- UFG allowance beyond normal and un-controllable values will result in unjustified price increase to be borne by consumers and authority needs to remain cognizant of such a situation. On the other hand if the gas companies are not allowed normal un-controllable UFG values these would fail to meet revenue requirements and may fail to survive in the long run. However, identifying and controlling UFG that is beyond normal and un-controllable values remains the responsibility of gas companies.
- In Pakistan, prior to establishment of OGRA in 2002, Price Determining Authority (PDA) as a practice fully allowed the claimed UFG values to be included in the gas price. At that time UFG levels were determined by gas companies around 7-8% of the total gas available for sale.
- In the year 2002, OGRA in its first determination of gas price accepted the then UFG level which was also around 8%. However, gas companies were required by OGRA to reduce UFG level to 6%, or less, in the next three years. This target was again revised in 2005 and OGRA required the gas companies to further reduce UFG level to 4% by 2012.
- UFG has been increasing from around 7% in FY 2002, 8% in FY 2008, 10% in FY 2011 and up to 15% in FY 2015 owing to various reasons and has now become a critical survival factor for the gas companies.
- In FY 2010, Sui Companies requested the Authority to relax the then allowable UFG level associating the increasing UFG levels to network expansion. OGRA appointed consultants to review and advise the allowable UFG levels for the Sui Companies. The study from the consultants could not be concluded and the Authority decided to continue with allowable UFG rate at 4.5%.
- Considering 4.5% allowable UFG as unjust, gas companies approached respective High Courts for a stay on the above stance of the Authority.
 - The High Courts granted stay orders and directed the Authority to apply a provisional UFG rate of 7% to the price revisions petitions filed by the gas companies. However, for SNGPL the stay order was revoked for FY 2013 and onward petitions which were decided by the Authority using UFG allowance rate of 4.5%. For SSGC the stay order of Sind High Court has also lapsed during the year putting SSGC also to SNGPL's position.
 - Beside approaching courts of law gas companies also approached the Government and presented their plea for providing policy guidelines as per the mandate of Federal Government under section 21 of OGRA Ordinance 2002. As a result, the Economic Coordination Committee of the Cabinet (ECC) provided policy guidelines against case reference No. ECC-154/25/2014 dated 20-11-2014 of Ministry of Petroleum and Natural Resources (MP&NR, the Ministry) (Refer Annexure K- ECC decision) advising OGRA to *provisionally allow* under following heads representing

Background

UFG volumes as deemed gas sales for the purposes of revenue requirements:

- a. Volume pilfered by non-consumers, detected and determined by the companies in accordance with OGRA Procedure as provided in rule 30 of Natural Gas Licensing Rules 2002;
 - b. Volumes consumed in law & order affected areas; and
 - c. Impact of change in Bulk-to-Retail ratio on UFG, using the base year 2003-04.
- ECC also required that UFG Study, as required under clause 21.1 of Licensing Conditions applicable to the gas companies, should be completed as soon as possible. As per the ECC guidelines above, the authority was expected to provisionally allow UFG volumes till the said UFG Study is completed.
 - Following the ECC guidelines OGRA partially allowed for a. and b. above but did not consider the impact of c. while deciding the price revision petitions for the years 2013, 2014 and 2015. This partial allowance was in addition to the 7% UFG allowance as per the stay order of the High Court for SSGC and 4.5% for SNGPL. The following table illustrates the volume of activity and related UFG allowance by OGRA in the past 5 years:

A snap-shot of scale of activity and developments of Sui Companies is provided on the following page.

Note:

SSGC – UFG Profile						BCF
	2011	2012	2013	2014	2015	
Gas Available For Sale	396	406	418	423	434	
Total UFG Volume Actual	37	44	42	65	66	
Total UFG %age	9.4%	10.8%	10.0%	15.4%	15.2%	
UFG Allowance @ 7%	27.7	28.4	29.3	29.6	30.4	
UFG Allowance for:						
- Theft by non-consumers						
- Law & order affected		2.0	6.6	6.8	6.9	
Total Volume Allowed	27.7	30.5	35.8	36.4	37.3	
Effective Allowance %age	7.0%	7.5%	8.6%	8.6%	8.6%	

*The above UFG volumes are rounded to nearest BCF. **Source: SSGC FRR [FY 2011 – FY 2015]**

SNGPL – UFG Profile						BCF
	2011	2012	2013	2014	2015	
Gas Available For Sale	665	675	638	582	522	
Total UFG Volume Actual	83	78	85	76	71	
Total UFG %age	12.5%	11.5%	13.4%	13.0%	13.5%	
UFG Allowance @ 7% & 4.5% *	46.6	47.3	28.7*	26.2*	23.5*	
UFG Allowance for:						
- Theft by non-consumers						
- Law & order affected	8.7	7.7	14.2	14.0	13.5	
Total Volume Allowed	55.3	55.0	42.9	40.2	37.0	
Effective Allowance %age	8.3%	8.1%	6.7%	6.9%	7.1%	

*The above UFG volumes are rounded to nearest BCF. **Source: SNGPL FRR [FY 2011 – FY 2015]**

Snapshot of SSGC and SNGPL

SSGC	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gas Connections												
Domestic	1,713,153	1,766,839	1,837,495	1,920,098	2,045,957	2,127,593	2,219,138	2,338,853	2,460,494	2,546,619	2,618,806	2,683,024
Commercial	18,152	19,055	19,938	20,971	22,558	23,606	24,156	24,998	24,494	24,119	23,740	23,408
Industrial	2,638	2,795	2,978	3,184	3,561	3,801	3,863	4,042	4,129	4,119	4,156	4,153
Total Connections	1,733,943	1,788,689	1,860,411	1,944,253	2,072,076	2,155,000	2,247,157	2,367,893	2,489,117	2,574,857	2,646,702	2,710,585
Network Size (KMs)												
Transmission Network	2,980	2,943	3,062	3,290	3,309	3,320	3,320	3,337	3,401	3,490	3,551	3,551
Distribution Network	24,339	25,752	27,542	29,830	31,930	34,282	36,785	39,253	40,905	42,360	43,090	43,890
Total Network Size	27,319	28,695	30,604	33,120	35,239	37,602	40,105	42,590	44,306	45,850	46,641	47,441
Gas Available for Sale (MMCF)	341,033	364,689	384,356	385,846	408,484	422,387	439,341	395,779	405,737	418,396	422,735	433,798
Gas Sales (MMCF)	318,068	337,638	353,869	351,994	377,372	384,522	388,828	360,012	364,409	373,645	353,904	362,510

SNGPL	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gas Connections												
Domestic	2,263,875	2,437,541	2,641,273	2,869,208	3,101,303	3,358,439	3,611,187	3,836,091	4,151,518	4,394,281	4,670,962	4,908,461
Commercial	38,842	41,358	43,919	45,925	49,176	52,242	54,631	55,877	55,906	56,212	53,957	47,913
Industrial	2,881	3,271	3,773	4,425	5,443	5,953	6,375	6,606	6,628	6,561	6,455	4,649
Total Connections	2,305,598	2,482,170	2,688,965	2,919,558	3,155,922	3,416,634	3,672,193	3,898,574	4,214,052	4,457,054	4,731,374	4,961,023
Network Size (KMs)												
Transmission Network	5,763	6,121	6,195	6,625	7,016	7,347	7,585	7,613	7,654	7,654	7,733	7,796
Distribution Network	38,258	42,192	46,964	52,394	59,951	67,449	75,653	81,828	87,796	93,646	95,855	97,300
Total Network Size	44,021	48,313	53,159	59,019	66,967	74,796	83,238	89,441	95,450	101,300	103,588	105,096
Gas Available for Sale (MMCF)	484,678	575,913	613,968	625,199	650,052	652,987	650,291	665,235	674,868	638,076	581,961	521,533
Gas Sales (MMCF)	451,959	536,382	573,387	576,628	598,361	585,316	587,163	581,901	597,283	552,621	506,423	450,843



UFG Definition, Calculation and
Methodology

2nd Draft

UFG Definition

Unaccounted for Gas

- UFG in a fiscal year is the difference between gas available for sale and actual sales.
- According to NGTR, rule 2(m) “UFG means, in respect of a financial year, the difference between the total volume of metered gas received by a licensee during that financial year and the volume of natural gas metered as having been delivered by the licensee to its consumers excluding therefrom metered natural gas used for self-consumption by the licensee for the purposes of its regulated activity; and such other quantity as may be allowed by the Authority for use by the licensee in the operation and maintenance of its regulated activity.”
- General underlying factors causing UFG have been pipeline leakages, measurement problems and theft. All these need focused management and control but these may, to a limited extent, be taken as un-controllable.
- UFG is technically linked to nature and size of the gas supply network and the quality of gas itself. Aging pipes are prone to leakages if not maintained, weak or faulty measurement equipment hamper accounting for the supplied gas and supply to densely populated or remote areas in domestic sector are susceptible to theft.

UFG defined in International jurisdictions

- We referred to the American Gas Association that defined UFG as:

“ the difference between the total gas available from all sources, and the total gas accounted for as sales, net of interchange, and company use. This difference includes leakage or other actual losses, discrepancies due to meter inaccuracies, variations of temperature and/or pressure, and other variants, particularly due to measurements being made at different times. In cycle billings, an amount of gas supply used but not billed as of the end of a period. ”

- Further, the Pennsylvanian Public Utility Commission has recommended the following UFG calculation methodology;

$$\text{UFG \%} = \frac{\text{Gas received} - \text{Gas delivered} - \text{Adjustments}}{\text{Gas received}}$$

- In addition to above, in Germany the UFG is calculated as the difference between the measured gas supplied in the grid and the gas billed to consumers, thus leaving the grid paid.
- In accordance with the Reconciliation Code of the New Zealand Gas Industry of 1 July 2000, UFG means the Long-term difference between the metered quantities of gas entering a transport system at a Receipt Point and the metered quantities of gas leaving the transport system at a Delivery Point, expressed as a percentage of the metered quantities of gas entering the transport system at the Receipt point.

UFG calculation

- Based on the above definition and our understanding of nomenclatures used at Sui Companies, UFG is the

UFG Calculation

difference between the metered gas volume injected into the transmission and distribution network – Point of Dispatch (POD) – and the metered gas delivered to the end consumers – Consumer Meter Station (CMS) – during a financial year.

Mathematically;

UFG = Gas received at POD – Gas delivered to CMS, adjusted for self consumptions and other adjustments allowed by the Authority.



- UFG is expressed as a percentage of the metered quantity of gas entering the network/ Available for Sale (AFS) and the formula used to calculate is:

$$\text{UFG \%} = \frac{\text{Gas Available for Sale} - \text{Gas sold}}{\text{Gas Available for Sale}}$$

Where;

Gas available for sale is the total gas purchased during the year less the metered natural gas used for self consumption by the licensee for the purpose of its regulated activity and such other quantity as may be allowed by the Authority for use by the Sui Companies in

the operation and maintenance of its regulated activity. i.e..

$$\text{Gas available for sale} = \text{Gas Purchased} - \text{Internal Consumption}$$

Gas sold is the metered quantity of gas delivered to the customer and gas volumes allowed by the Authority to be treated as deemed sales. Currently, OGRA allows volumes against law & order affected area, pilfered volumes and gas shrinkage.

SNGPL has contested the UFG calculation methodology based on the arguments that the existing formula for UFG calculation is not in accordance with the UFG definition stated in NGTR, 2002.

- We were provided with **Annexure F – Revision of Method for Calculating UFG** vide letter reference SGMD:113, dated 15 June 2016 where SNGPL has suggested the following formula (the proposed formula) for UFG calculation.

$$\text{UFG \%} = \frac{(A - B) - C}{A}$$

- Where, A is the gas received by the company (gas purchased) during a financial year and B is the volume of natural gas metered as having been delivered by the licensee to its consumers (gas sold), and C is the metered natural gas used for self consumption.
- The difference between current formula and the proposed formula is of denominator. SNGPL has proposed to use Gas Purchased as denominator for calculating UFG

UFG Methodology

- Percentage instead of using 'Gas available for Sale'.
- Using the existing UFG calculation methodology, the percentage of UFG at SNGPL for the Year 2014-15 is 10.97% and by using the formula suggested by SNGPL, UFG for the said year will be 10.88%.
- This reflects a decrease of 0.09% in the UFG percentage as a result of the change in the UFG calculation formula.

Accounting Treatment for UFG

- Organizations involved in manufacturing and / or distribution activities suffer various types of losses during the production and or distribution processes. Some of these losses are inherent to the product / processes and are unavoidable, other types of losses might otherwise be avoided through various measures. As per the generally accepted accounting and costing principles these can be categorized into the following:
 - normal loss; and
 - abnormal loss.
- The inherent loss expected or anticipated prior to production in the processing operations is defined as a normal process loss. It is thus termed as a standard loss and accepted as unavoidable. Weight losses, shrinkage, evaporation, rusting etc. are the examples of normal loss. Normal loss is absorbed in the cost and thus increases the cost of production of the useable or saleable units of product manufactured or distributed.

Example working based on SNGPL FRR 2014-15

UFG through existing formula used by OGRA

$$\text{UFG} = \frac{\text{Gas available for sale} - \text{Gas Sold}}{\text{Gas available for sale}} \times 100$$

$$\text{UFG} = \frac{521,533 - 464,304}{521,533} \times 100$$

$$\text{UFG} = 10.97\%$$

UFG through SNGPL's recommended formula

$$\text{UFG} = \frac{(\text{Gas purchases} - \text{Gas sold}) - \text{Adjustments}}{\text{Gas purchases}} \times 100$$

$$\text{UFG} = \frac{(525,891 - 464,304) - 4,358}{525,891}$$

$$\text{UFG} = 10.88\%$$

*The above workings are based on Gas Sales reported in FRR after volumetric allowances as deemed sales.

UFG Methodology

- Abnormal process losses are caused by unexpected or abnormal conditions such as accidents, machine breakdowns, use of substandard material etc. as per generally accepted accounting principles abnormal loss is the loss which occurs over and above normal loss. Therefore, abnormal loss is also called an avoidable loss.
- These losses are segregated from process costs and investigated to prevent their occurrence in future. Abnormal loss is not absorbed in the cost of product manufactured or distributed.
- With regards to Sui Companies transmission activity is relatively loss free and almost all the UFG related losses relate to distribution activity.
- As stated earlier, underlying factors causing UFG related losses have been pipeline leakages, measurement problems and theft. All these need focused management and control but these may, to a limited extent, be taken as un-controllable also. Un-controllability or inherent susceptibility of gas supply network to leakages and theft form the base for UFG values to be allowed as a normal loss and included to the gas price.
- However, to what extent such losses are normal is the key to determining the benchmark UFG level. This can only be achieved if the entire supply throughout the distribution network is well measured enabling the gas companies to pin point losses geographically, further, quantify these losses into various contributing factors.
- As per applicable accounting principles, the gas companies should only be granted allowance for UFG contributing factors that are unavoidable as these form a part of the normal business activities and cannot be eliminated. The remainder should be disallowed and borne by gas company as a consequence of failure or inability to control the factors rendering gas to be un-accounted for.

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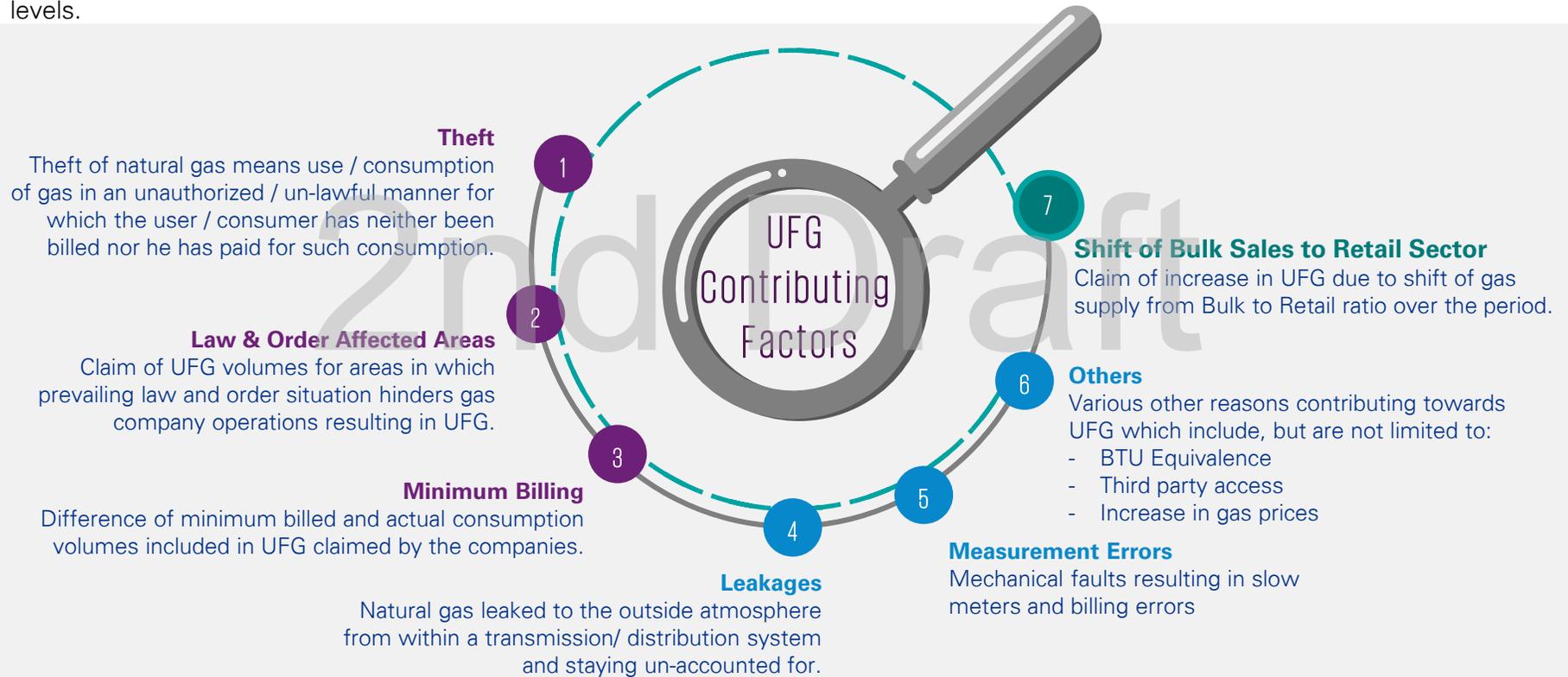


UFG Contributing Factors

2nd Draft

UFG Contributing Factors

For the purpose of our study and in line with our scope of work we have endeavored to evaluate and analyze UFG contributing factors relating to Sui Companies in the context of current situation. We have attempted to understand and present the link between contributing factors and their impact on UFG levels. Following are the major contributing factors of gas lost and UFG. We have presented the components which are globally accepted as UFG contributing factors along with their significance in UFG levels.



In the following pages, we have discussed these contributing factors and their impact on Sui Companies.

Contributing Factor 1 - Theft (Cont.)

Gas Theft

- Theft of natural gas is any unlawful / unauthorized use or consumption for which the consumer / user has neither been billed nor such consumption is paid for.
- In Pakistan, Natural gas theft has been a problem for Sui companies and is perceived to be forming a major portion of annual gas losses / UFG. Gas theft can be classified into two broad categories as follows:
 - a. Gas theft by Registered Consumers; and
 - b. Gas theft by Non-Consumers
- **Theft by registered consumers** is the unauthorized use of gas by consumers having registered connections of the Sui Companies. Theft by consumers generally occur due to meter tempering or by meter by-pass. While tempering with meters, leakages above and under ground may also occur.
- In such cases, the consumer is identified. Accordingly, theft volumes are estimated and charged to the consumer based on past consumption patterns.
- **Gas theft by non-consumers** is pilferage of gas by parties not registered on the company's network. In such cases mostly underground pipes are tempered with, to draw connections for pilferage of gas. Identification and quantification of theft is difficult and prone to estimation errors.

These individuals / organizations do not exist on Sui Companies billing records and are therefore difficult to identify and approach.

Theft – Causes and Concerns of Sui Companies

Continuous growth of distribution network

- Distribution of gas in retail sector to densely populated or remotely located areas is prone to theft. Underground gas infrastructure and the fact that gas is the cheapest domestic fuel make it more vulnerable to theft.
- Gas supply to domestic consumers by laying pipelines had remained on government's socio-economic agenda forcing the gas companies to supply gas in retail sector where theft is more likely and difficult to detect. Continuous expansion resulted in shift of consumer mix towards retail and theft also increased adding to UFG volumes.

Situation in gas producing areas

- People living in gas producing areas, especially in Balochistan have held the premise that they own the gas extracted from their land and are not supposed to pay for it. Accordingly, residents do not prefer metering and get illegal connections wherever possible and do not pay when billed.

Contributing Factor 1 - Theft (Cont.)

Countrywide moratorium

- Countrywide moratorium on new gas connections was enforced since FY 2011 because of decreasing availability of natural gas. Sui Companies had the concern that in certain areas people are willing to obtain legal connections and when refused they attempt to use illegal means to consume gas perceived as the cheapest available fuel.

Non availability of any law in the past

- Due to the absence of any anti gas theft legislation before FY 2011, controlling gas theft was difficult. Sui Companies were not able to take legal actions against gas pilferers which encouraged gas pilferers and multiplied incidents of gas theft. However, increasing UFG levels show that this concern even addressed has not made any positive impact.

OGRA Procedure for Dealing with Theft of Gas Cases

- OGRA formulated procedures in 2005 for dealing with gas theft cases, Refer Annexure H for details.
- This document provides guidelines for Sui Companies to deal with theft cases including:
 - Instances/ acts that amount to theft;
 - Various sources of information used to locate gas theft and its documentation;
 - Basis of suspicion of theft;
 - Course of action to be followed on theft detection;
 - Assessment of value of gas stolen; and
 - Procedure for recovery of gas

- Concerns have been raised by Sui Companies regarding certain clauses defined in the document. Sui Companies, accordingly filed an application in July 2013 for the review of the procedure for dealing with theft of gas cases requesting the Authority to allow them claiming recoveries of theft for the actual period of the crime and to amend the maximum time period fixed for booking recovery of theft cases which is maximum one year.
- The premise of the request was based on the fact that many a times recovery claims stay pending in courts of law for longer periods and there are no special courts for gas theft.
- OGRA decided the review request in July 2014 against the Sui companies request to extend the time period beyond one year. Refer Annexure I for details.
- Sui Companies still claim that the refusal of the Authority to allow them from claiming recoveries of theft for the actual period of the crime contributes a significant proportion to the annual UFG losses suffered/ faced by them.

Detection of Theft

- **For detection of theft by consumers** Sui Companies usually react to information received through internal/external sources which include phone calls or surveillance and monitoring by company officials.
- Another proactive method applied is based on a monthly data analysis of consumer consumption pattern using a

Contributing Factor 1 - Theft (Cont.)

software tool that provides list of consumers where consumption has varied beyond a certain percentage (e.g. 5%) of normal average consumption. The list is then reviewed for any seasonal variation and effect of pressure profiling activities in certain areas. Based on this analysis, the suspected consumers are visited for further evidence collection.

- As a result of visits the following possibilities occur:
 - Meter is identified to be malfunctioning or tempered;
 - Leakage is identified;
 - Extra connection bypassing the meter is noted;
 - Nothing evidenced to confirm the suspicion, means a false alarm.
- Accordingly, meters are then sent to meter workshop for diagnosis and impact analysis.
- In case of leakage, respective departments are notified for rectification.
- Similarly, in cases where meter is found tempered with or an indication of meter by-pass is found, the consumer is served with a notice and accordingly procedures specified by OGRA are followed to estimate and charge the theft volume to consumers.
- **In cases of theft by non-consumers** information received through internal/external sources which include phone calls or observations by surveillance and monitoring teams indicate towards possibility of theft. In such cases, raids by specialized teams supported by law enforcement agencies

are conducted. On detection, illegal connections are removed and attempts are made to quantify the theft volume. Refer Annexure I for details.

Estimation of Theft volume

- In cases relating to theft by registered consumers, estimation of theft volume is based on historical consumption pattern of the consumers. As per OGRA procedures only volume equal to gas consumed in previous one year can be charged to the consumer and billed as claim. However, in case of theft by direct by-pass the period shall not exceed three (3) years subject to provision of concrete physical/ documentary evidence .
- For non-consumer theft, procedures that are generally applied include the following:
 - Check meters are installed at the location for a pre-defined period to measure gas consumption of the area and based on its readings, consumption of the area is estimated.
 - The impact of seasonal variation in the consumption pattern is also incorporated into the estimation.
 - Calculation of gas theft volume where theft setups have been removed, is based on estimating the gas flow from the hole made for the illegal connection and the pressure in the line. Beyond that estimation is also dependent on judgment of the gas company staff for the period of pilferage, area and no of houses / facilities to which gas was supplied etc.

Contributing Factor 1 - Theft (Cont.)

- Defined approaches as supported by OGRA procedures may appear appropriate in theory. In practice whether these are sufficiently and efficiently applied to enable Sui Companies to detect most of the gas theft cases, remains a question to be answered. The following tables highlight the detection of theft by gas companies:

Table TT – 1 Theft by Consumers - detected

	SSGC *		SNGPL	
	No. of Cases	Volume (MMCF)	No. of Cases	Volume (MMCF)
2011	332	133	14,919	4,042
2012	581	177	21,188	8,312
2013	713	142	26,602	7,196
2014	905	270	29,520	10,712
2015	1,502	439	39,173	3,028

Source: SSGC & SNGPL Reported Information

* The information provided by SSGC represents Surveillance & Monitoring (S&M) department only i.e.. (Industrial and Commercial consumers)

Table TT – 2 Theft by Non-Consumer Claimed

	SSGC	SNGPL
	Volume Claimed MMCF	
2011	-	6,607
2012	2,059	11,172
2013	6,387	10,136
2014	8,772	7,406
2015	10,420	8,735

Source: SSGC & SNGPL Reported Information

Treatment by OGRA for theft cases

- Sui Companies contend that when theft is detected and its volume is estimated, the volume becomes accounted for and thus shall not become part of UFG.
- In case where theft by registered consumers is detected, OGRA procedures are followed for calculating the volume pilfered and claims are billed to consumers. Any photographic or other evidence is documented for future reference.
 - However, if recoveries are not made within one year of billing the claim, cumulative volume related to such cases is added back to UFG volume.
 - In case of theft by non-consumers, claim-files are prepared under OGRA procedures. Notices are sent to parties identified and FIRs are lodged for recovery of claims.
- A considerable number of such consumers approach various courts of law and file for stay orders. Consequently, recovery process becomes time-consuming and surpass the one year time for recovery as set by OGRA.
- Sui Companies argue that for the reason narrated above, companies' efforts against theft control are not acknowledged. And therefore, contest that theft should not be linked with recoveries.

Contributing Factor 1 - Theft (Cont.)

- ECC considering socio-economic conditions and complexity of the UFG issue, has given policy guidelines to OGRA under section No. 21 of OGRA Ordinance, 2002 in the case No. ECC-154/25/2014 dated 20 November 2014 of Ministry of P&NR. ECC has advised OGRA to provisionally allow Sui Companies claims against Gas Volume pilfered by non-consumers. ECC further reminded OGRA to have the UFG study completed as soon as possible.
- OGRA while giving Determination of Final Revenue Requirement of Sui Companies for the years 2013, 2014 & 2015 has allowed 80% of actual established volume against non consumers. The gas volumes claimed and their respective allowance by OGRA in the respective years is provided below:
- Logic behind the allowable limit of 80% of the claimed volume is not clear. Further, how these claims are verified by OGRA is also not evident.
- Also, the judgment and subjectivity involved in estimation of pilfered volume in each case raises concerns on the accuracy of such claims.
- Sui Companies argue that due to weak legal recourse available, political influence exercised as a culture and possibility of collusion by company staff. Therefore, it becomes extremely difficult to recover amounts against pilfered volumes from non-consumers in the ordinary course of business and thus, OGRA should exclude these claims from UFG calculations.
- However, if this is done on a continuous basis it becomes a window for shifting the burden caused due to theft by non-consumers to good consumers. It may be construed as relieving Sui Companies from their responsibility of controlling the UFG.

Table TT – 3 Analysis of Theft Volumes allowed and disallowed

	SSGC			SNGPL		
	Claimed	Allowed	Difference	Claimed	Allowed	Difference
	<i>Volumes in MMCF</i>					
2011	-	-	-	6,607	6,607	-
2012	2,059	1,218	841	11,172	5,586	5,586
2013	6,387	5,110	1,277	10,136	8,109	2,027
2014	8,772	5,110	3,662	7,406	5,925	1,481
2015	10,420	5,110	5,310	8,735	5,925	2,810

Source: SSGC & SNGPL Reported Information

Contributing Factor 1 - Theft (Cont.)

Table TT 4 – SNGPL Consumer Wise Analysis of Theft volume and Recoveries

	No. of Cases		Volumes Booked (MMCF)			Volumes Recovered (MMCF)			Total %age Recovered	Consumers	Cases / Consumers
	Ind. & Com.	Dom. & Sp. Dom	Ind. & Com.	Dom. & Sp. Dom.	Total	Ind. & Com.	Dom. & Sp. Dom	Total			
2011	8,071	6,848	3,578	464	4,042	2,919	304	3,223	80%	3,898,574	0.38%
2012	7,316	13,872	7,641	671	8,312	6,335	327	6,662	80%	4,214,052	0.50%
2013	8,521	18,081	6,367	829	7,196	5,108	415	5,523	77%	4,457,055	0.60%
2014	6,601	22,919	9,065	1,647	10,712	3,161	914	4,075	38%	4,731,374	0.62%
2015	5,506	33,667	1,597	1,431	3,028	999	1,080	2,079	69%	4,961,023	0.79%

Source: SSGC & SNGPL Reported Information

- The table provides the volumes booked and recoveries made in respect of all different consumer categories of SNGPL for the past five (5) years.
- In the last five years there is a decline of 9% in the total number of cases detected for industrial/commercial, however, this category accounts for the major portion of volumes booked i.e. around 85% of total booked volumes during the period beginning FY 2011 – FY 2014.
- Additionally, in FY 2015 industrial and commercial theft volumes decreased by 82% while increase in efforts toward domestic and special domestic category resulted in an increase of 47% in the number of cases detected. However, the volume booked in the respective category decreased.
- Further, the number of cases identified, compared to the total consumer base has remained less than 1% in the last five (5) years. This may highlight deficiency in theft detection, monitoring and control. Whereas, theft as a whole contributes a significant portion of annual UFG of the Sui Companies.

Contributing Factor 2 – Law and Order Affected Areas

UFG in Law & Order Affected Areas

- The premise for the captioned factor is the hindrance in gas supply operations and recovery of gas bills in the areas where law and order situation is abnormal. It may be due to a military operation against terrorism, political unrest or any tribal resentment to pay bills claiming ownership of gas being produced from those areas.
- Gas companies have claimed for certain areas that due to adverse law and order situation, employees cannot go and perform controlling activities and therefore, UFG volumes are very high in those areas.
- In FY 2011, SNGPL was allowed for volume adjustment against their claim for gas supplied through 13 SMSs in Nowshera and Gurguri districts of KPK. This allowance is continuing to date where claims based on gas supplied to these areas are accepted by OGRA.
- SSGC has also made claims on the above grounds for Sariab region in Quetta, same were allowed by OGRA since 2012.
- Volumes for the claims are calculated through meter readings of gas supplied through Sales Meter Stations (SMS) and any billed volume is deducted therefrom.

$$\text{Unbilled Volume} = A - B$$

Where; **A** is gas supplied from SMS and **B** is gas billed to the customers in the affected area

- ECC of the Cabinet advised OGRA to provisionally allow Sui Companies for such claims till the UFG study is completed.
- However, OGRA permitted 75% of the claimed volume as deemed sales for UFG computation purposes and advised Sui Companies to claim the balance form Federal Government. Later, Federal Government advised back to OGRA to follow ECC guidelines and fully allow such claims as there is no mechanism with them to allow such subsidy.
- Claimed volumes and allowances under this factor for the last 5 years are provided below:

Table LO – 1 Analysis of Theft Volumes allowed and disallowed

	SSGC		SNGPL	
	Claimed	Allowed	Claimed	Allowed
				<i>MMCF</i>
2011	-	-	2,136	2,136
2012	1,286	813	3,377	2,136
2013	1,950	1,463	8,124	6,093
2014	2,279	1,709	10,803	8,102
2015	2,355	1,766	10,048	7,536

Source: SSGC & SNGPL Reported Information

- We understand and acknowledge the issue of “law and order affected areas” faced by the Sui Companies and its impact on the existing UFG levels. The same has been acknowledged by the Chief Minister of Khyber Pakhtunkhwa wide its letter to the Authority dated 19 December 2013 (**Refer Annexure R – KPK Letter**).

Contributing Factor 3 - Minimum Billing

Minimum billing

- The Authority has notified minimum consumption charges for the natural gas consumers, vide Consumer Price Notification under section 8 of OGRA Ordinance, 2002 and Rule 18(3) of NGTR 2002. A minimum consumption of 40M³ per month per domestic consumer is set by the Authority i.e. consumers having gas consumption of less than 40M³ will be subject minimum charges which may be notified from time to time.
- The current applicable minimum consumption charges for domestic customers is based on 40M³ vide OGRA's notification dated 1 September 2015 are:

Amounts in PKR per month	
Domestic Sector	
Stand alone Meters.	148.50
Mosques, Churches, Temples, Madrasas and other religious places.	148.50
Government and semi- Government offices, Hospitals, Clinic, Maternity Universities, Colleges, Schools and private Educational Institutions, Orphanages and other charitable Institutions along- with Hostels and Residential colonies to whom gas is supplied through bulk meters including captive power.	810.00
Refer Annexure L - Gas Price Notification	

Impact of Minimum billing on UFG

- Minimum billed domestic customer is assumed to have consumed a volume of 40M³, though consumption recorded is as per its metered reading. This may be less than 40M³ due to actual consumption being less by the consumer or due to any measurement error of the meter.
- In cases where consumer actually consumes more than 40M³ and the installed meter measures it below 40M³ as a result of meter being Sticky/ PUG, any difference between the volume billed (40M³) and actual volume metered (meter reading) is not absorbed in the volume of gas sold and becomes the part of UFG.
- Therefore, customers may become subject to minimum billing due to either of the following reasons:
 - The consumer has in actual consumed less than the notified minimum consumption(40M³); or
 - The metering errors (slow, PUG, sticky, etc.) have resulted in less volumes being metered than the consumer's actual consumption which may be higher or less than the notified minimum consumption (40M³)

The minimum consumption of 40M³ per month is substantiated through various studies carried out by Sui Companies, the Authority and University of Engineering and Technology Lahore concludes that the average gas consumption for 4 hours a day by a common domestic consumer is 40M³. For details refer **Annexure M – Minimum Consumption**

Contributing Factor 3 – Minimum Billing (cont.)

Table MB – 1 Customers Subject to Minimum Billing

	SSGC	SNGPL
	<i>Number of Customers</i>	
2013	692,966	1,070,079
2014	718,941	1,200,886
2015	761,104	1,651,585

Source: SSGC & SNGPL Reported Information

- No segregation was made available as to what extent these minimum billed consumers represent the actual less than 40M³ consumption and between consumers who were billed at minimum owing to measurement errors.
- As in cases of malfunctioned meters the difference between meter reading and minimum volume may not reflect the actual gas supplied and hence that may remain un-accounted for. Quantifying such volumes at company level is only possible where malfunctioned meters are fully identified which is not the case.

Claim of Minimum billing

- Sui Companies claim that minimum billing due to metering errors is an uncontrollable factor and such volume should be included in the gas sold considering it as a deemed sales for UFG calculation purposes. Following table shows claims over the past 5 years:

Table MB – 2 Minimum Billing Claims

	SSGC	SNGPL
	<i>MMCF</i>	
2011	-	6,883
2012	3,987	7,541
2013	4,705	7,663
2014	5,365	8,238
2015	5,916	9,327

Source: SSGC & SNGPL Reported Information

- Further, in its determination of FRR of SSGC for FY 2011 the Authority promulgated that *“the amount claimed by Sui Companies against minimum billing includes even those cases where meters are not registered for gas supply”*.

Contributing Factor 4 - Leakages

Pipeline leakages

- Internationally, leakage is defined as “the action of unmeasured gas passing from within a transmission/ distribution system to the outside atmosphere”
- The volume of gas lost as a result of pipeline leakage is generally correlated with the size of leaks and the pressure of gas passing through the pipeline. (i.e., larger the size of the leak or higher the pressure, greater the volume of gas lost.)

Causes of Pipeline leakage

- The factors instigating the increase in pipeline leakages at Sui Companies, generally include:
 - Size and age of network
 - Corrosion
 - Third party damage

1. Size and age of network

- Size and age of network is a prominent factor contributing towards the increase in pipeline leakages for Sui Companies, as aged pipelines are considerably more susceptible to leakages. This is due to their extended exposure to adverse environmental conditions, earth movement, heavy rains and flood, temperature, high winds, excavation by the operator, fire or explosion external to the pipeline, accidents and rupture of previously damaged pipe and terrorist attack etc.

- Following tables illustrate the increase in the proportion of aged pipelines in the distribution network of Sui Companies, *(Based on the Information received from Sui Companies)*

Table L – 1a Distribution Network Ageing

KMs	SSGC			Total
	Below 10 Years	10 to 20 Years	20 Years & above	
2011	16,303	13,383	8,918	38,604
2012	17,231	12,927	9,973	40,132
2013	18,126	11,830	11,601	41,557
2014	18,729	11,083	13,277	43,088
2015	18,103	10,378	15,406	43,887

Source: SSGC Reported Information

Table L – 1b Distribution Network Ageing

KMs	SNGPL			Total
	Below 10 Years	10 to 20 Years	20 Years & above	
2011	49,003	32,825	-	81,828
2012	53,703	34,093	-	87,796
2013	57,832	35,814	-	93,646
2014	57,571	19,909	18,375	95,855
2015	55,015	20,503	21,782	97,300

Source: SNGPL Reported Information

- This clearly demonstrates insufficient network rehabilitation by Sui Companies which has consequently increased the pipelines aged 20 years & above.
- During the course of our discussion with the management of Sui Companies it was argued that they were compelled to expand their network size and consumer base, on the premise of Government’s socio-economic agenda.

Contributing Factor 4 - Leakages (Cont.)

- This has made, difficult for Sui Companies to control pipeline leakages through adequate network rehabilitation with the existing capacity limitations. However, as the maintenance and network rehabilitation is the responsibility of Sui Companies, network rehabilitation carried out by SSGC and SNGPL for their distribution network of 43,890 Km and 97,300 Km, respectively, is as follows:

Table L – 2 Rehabilitation of Mains & Services

	SSGC	SNGPL	KMs
2011	219		99
2012	119		102
2013	162		115
2014	106		128
2015	95		231

Source: SSGC & SNGPL Reported Information

- The table above indicates the extent of rehabilitation carried out by Sui Companies which is not sufficient. For e.g. in FY 2015, SSGC and SNGPL network rehabilitation was of only 0.22% and 0.24% of their total distribution networks, respectively.

2. Corrosion

- Corrosion is a natural process, which results in pipeline deterioration, caused due to the exposure of metal to environment. Distribution network of Sui Companies is substantially covered with steel pipes which are naturally exposed to corrosion.

- The following is composition of Sui Companies' distribution network in terms of Steel and PE:

Table L – 3 Composition of Distribution Network

	SSGC	SNGPL	KMs
2015			
Steel	37,118		69,945
P.E	6,772		27,355
Total	43,890		97,300

Source: SSGC & SNGPL Reported Information

- The extent of corrosion depends upon the following factors:
 - I. Pipeline Wall Thickness;
 - II. Pipeline Coating;
 - III. Pipeline Ageing;
 - IV. Material Grade; and
 - V. Depth of Cover.

I. Pipeline Wall thickness

- Corrosion occurs independent of wall thickness, but thinner the pipeline wall, the sooner the pipeline deteriorates.
- Whereas, thicker pipelines takes longer before causing an incident. Therefore, Sui Companies need to consider the thickness of its pipeline as per the applicable standards to protect their network from being corroded.

Contributing Factor 4 - Leakages (Cont.)

- For SNGPL pipeline wall thickness of its distribution network ranges from 0.113 to 0.312 inches. Whereas SSGC's distribution network (steel) in terms of its wall thickness is as follows:

Table L – 4 SSGC - Wall Thickness (Steel)

Inches	0.113	0.133	0.154	0.188	0.188	0.219	0.25	Above 0.25	Total
KMs	4421	3,208	1913	794	478	603	278	228	11,923

Source: SSGC Reported Information

II. Pipeline Coating

- Pipeline coating is an alternative tool for protection of pipelines, it can be metallic or nonmetallic, with either of these, the objective is to isolate the underlying pipelines from the corrosive environment.
- Majority of the Sui Companies' distribution network is coated with Coal Tar, Asphalt and 3PLE, tape coating and others.

III. Pipeline Ageing

- Aged pipelines are more susceptible to corrosion due to their additional exposure to adverse environmental conditions over the time.

IV. Material Grade

- The material grade of pipeline has an inherent corrosive behavior that can range from high to low corrosion resistance, however, it is more dependent upon the environment it is exposed.

- It is noted that 97% of SSGC's network consists of Grade B material.
- Whereas, SNGPL distribution network is of API-5L standard and grade-B material for steel pipes, for PE pipelines the company uses 'ASTM D-2513' Standard and 'Medium Density Pipe' up to 4" diameter and 'High Density Pipe' is used for 6" diameter.

IV. Depth of Cover

- The depth of pipeline cover is considered as an important line of defense for pipeline against external interference.
- For SNGPL, the pipeline cover of its distribution network ranges from 3.5 to 5 feet. Where as for SSGC, the distribution network in terms of its pipeline cover is as follows:

Table L – 5 SSGC Pipeline Cover

Detail	3.5 feet	4 feet	4.5 feet	5 feet	> 5 feet	Total
KMs	6,000	3,000	2,500	1,500	2,550	15,550

Source: SSGC Reported Information

Corrosion control

- As an initiative to reduce pipeline corrosion, Sui Companies have taken the following initiatives:
 - Established Cathodic Protection (CP) stations across the distribution network.
 - Introduced PE pipelines in the distribution network to reduce its exposure to corrosion.

Contributing Factor 4 - Leakages (Cont.)

a. Cathodic Protection

- Cathodic protection (CP) is an effective tool used to control pipeline corrosion through CP stations across the network, by passing electric current through it. This protects the pipeline from corrosion and other environmental affects.
- At present, SSGC claims that 93% and 45% of its supply mains and distribution mains are protected through CP stations respectively.
- Where as, in case of SNGPL 92% and 66% of its supply mains and distribution mains are protected through CP stations respectively.
- However, the CP activities of Sui Companies are subject to interruptions due to frequent power outage on buried steels.

Effect of Power Outage on Buried Steel pipes

- Cathodic protection is carried out using electric current, however the repeated power outage has adversely affected the CP process, as during the power outage interval, CP level of the network drops, making it exposed to corrosion and leakages.

b. Use of PE Pipeline

- During FY 2015, the total distribution network of SSGC and SNGPL consists of 15% and 28% of PE pipeline respectively. Although this shows an increasing trend towards PE pipeline, efforts are still required to reduce the network exposure to corrosion.

Table L – 6 Composition of Distribution Network

2015	SSGC		SNGPL	
	KMs	Percentage	KMs	Percentage
Steel	37,118	85%	69,945	72%
P.E	6,772	15%	27,355	28%
Total	43,890	100%	97,300	100%

Source: SSGC & SNGPL Reported Information

- It is argued that PE pipes are safer and economical than pipes made of steel. However, as per National Transportation Safety Board (NTSB) report, the number of plastic pipeline accidents investigated that cracked in a brittle-like manner, resulting from premature failure is considerably high.

3. Third Party damage

- Third party contractors working nearby natural gas network often cause damages to the Sui Companies pipeline network, resulting in gas losses.
- This can range from damage to the external pipeline coating causing accelerated pipeline leakages, to the extent of pipeline ruptures.

Table L – 7 Number of Third Party Damages

	SSGC		SNGPL	
	<i>Number of instances</i>			
2012		1,892		877
2013		3,013		100
2014		3,153		13
2015		3,076		19
2016		20,697		3,342

Source: SSGC & SNGPL Reported Information

Contributing Factor 4 - Leakages (Cont.)

- Table L-7 provides the number of third party damages to the network of Sui Companies. Although, Sui Companies have established procedures for inspection of third party damages to the network, necessary efforts are required to control the same.

The Impact of Leakages

- Based on the factors discussed earlier, leakages can be divided into the following two categories:
 - Overhead Leakages
 - Underground Leakages

Overhead Leakages

- Overhead leakages are mainly contributed by the domestic consumers, as the above ground pipelines are commonly exposed to the external environment.
- International better practices suggest that leakage volume can be determined through leakage factor taking into account the elements causing leakages.
- Based on a study carried out by SNGPL, average leakage rate of a single leak in a domestic connection is 0.95cft/hr. and an estimated loss due to aboveground leakages is estimated to be around 15-20% of the total gas loss.
- An average domestic connection comprises of at least 9 joints (potential leakage points). This creates a possibility of 1.8 leaks per domestic connection. (9 x 20%)

Underground Leakages

- Underground pipelines form a substantial portion of the total distribution network. Ageing of underground pipeline is an important factor affecting the network being prone to leakages owing to the factors discussed earlier.
- Normally, gas leakage is at a fairly constant rate and will increase gradually with time if not identified and repaired. Gas lost due to underground leakages is deceptive and at times can be very difficult to detect.
- Based on the results of surveys carried out by Sui Companies, the average leakage rate per kilometer for underground pipelines of SSGC and SNGPL is 4.9 and 2.2 leaks/Km, respectively. Refer Annexure N - Leaks per KM. The difference among the leakage rates of both Sui Companies, is due to the size of network coverage during the surveys conducted. SSGC's leakage rate is based on a survey of only 16,150 KMs out of 43,890 KMs of total distribution network. Whereas, in case of SNGPL the leakage rate of 2.2 leaks/ Km is based on the survey of 80,370 KMs out of 97,300 KMs of its total distribution network.
- However, considering international better practices, we noted that in Germany the average number of leaks per KM is 0.215. Whereas, in Massachusetts (USA) the average leaks/KM is 0.36 Leaks/KM.

Contributing Factor 5 - Measurement Errors

Overview

- A study conducted by US Department of Energy concluded that: *" You can't manage what you don't measure. If you don't measure it, you can't improve it".* Any weakness in measurement mechanisms is bound to aggravate the UFG problem.
- Measurement mechanism for natural gas is dependent on sufficient and accurate measurement infrastructure. If all key points of dispatch from source of natural gas to consumer are not metered, reconciling flow of gas across the network to identify and monitor losses in supply will not be possible. Accordingly, gas company will neither be able to relate and quantify losses to specific factors causing the losses to happen nor will be in a position to take focused control measures. This is apparently the case for continuously increasing UFG in distribution networks of both the utility companies. Table ME - 1 on next page highlights the existing measurement capacity of both the gas companies. We understand unless this is improved UFG cannot be controlled.
- In terms of accuracy, measurement of natural gas has a scientific relation to its temperature and pressure at any given point of time. Additionally, compressibility and quality (heating capacity) is also important to be measured accurately. Refer Annexure O – Measurement Errors for details.
- We understand that these parameters are, therefore, required to be measured and incorporated into the metering calculations to reflect correct natural gas supply and consumption.
- Table ME – 1 shows that transmission network is fully metered and there is negligible UFG in transmission, however, the distribution network is not fully metered.
- Internationally gas supply networks are precisely metered to allow visibility of gas supply across the network including the fluctuations and unusual consumer behavior at geographical or consumer class level.
- Unless gas companies have sufficient and accurate measurement of gas supply across the network UFG cannot be controlled.
- Currently, in the absence of meters at TBS level, gas supply at a single SMSs may not reconcile due to interconnected/looped network.

Contributing Factor 5 - Measurement Errors (Cont.)

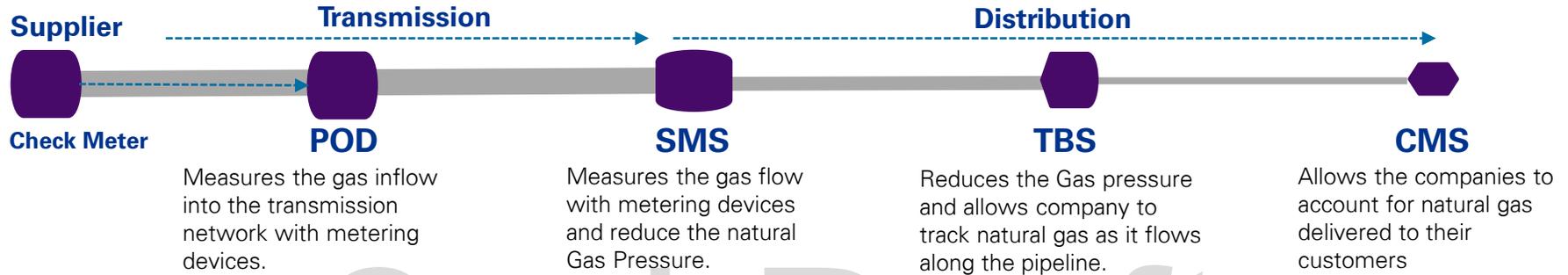


Table ME - 1

	SNGPL	SSGC	SNGPL	SSGC	SNGPL	SSGC	SNGPL	SSGC
Total	38	29	383	123	4,058	2,442	4,961,023	2,280,999
Metered	38	29	383	123	472	625	3,611,119*	1,519,895*
Percentage	100%	100%	100%	100%	12%	26%	73%	67%

* Net of minimum billed meters assumed to be sticky/PUG for the purposes of this analysis.

Source: SNGPL & SSGC Reported Information

Contributing Factor 5 - Measurement Errors (Cont.)

Network Segmentation

- Network segmentation bifurcates gas supply networks on pressure and demographic basis to end consumers. As per the current state, Sui Companies gas supply network have a weak network segmentation at distribution level which are as follows:
 - Table ME – 2 shows that around 45% of SNGPL’s network is currently looped with the highest percentage in Islamabad / Rawalpindi, Lahore, and Gujranwala. As multiple TBSs are still unmetered and not segmented, the extent of measurement error can not be determined along with other contributing factors of UFG. Non segmentation therefore, creates a barrier for reconciliation of UFG losses.
 - Table ME – 3 shows that SSGC’s network is currently looped with the highest percentage in South Region i.e.. 45%. Further, all three sub regions need to be isolated on priority basis to minimize and trace UFG level in South Region.
 - As per our understanding, government initiatives for gas supply and lack of strategic planning by Sui Companies have caused gas network to change into a spaghetti network.

Table ME - 2 SNGPL

Region	No. of TBSs/DRSs (As of 29 Jul 16)			Percentage of Network Looped
	Isolated	Looped	Total	Percentage
Abbottabad	48	20	68	29%
Bahawalpur	221	22	243	9%
Faisalabad	387	360	747	48%
Gujranwala	26	372	398	93%
Gujrat	180	24	204	12%
Islamabad/Rawalpindi	94	376	470	80%
Lahore	129	341	470	73%
Multan	393	169	562	30%
Peshawar	251	104	355	29%
Sahiwal	125	1	126	1%
Sargodha	189	32	221	14%
Sheikhupura	169	25	194	13%
	2,212	1,846	4,058	45%

Source: SNGPL Reported Information

Table ME – 3 SSGC

Region	No. of TBSs/DRSs (As of 29 Jul 16)			Percentage of Network Looped
	Isolated	Looped	Total	Percentage
Central	74	58	132	44%
Eastern	67	32	99	32%
Western	54	72	126	57%
Total South	195	162	357	45%
Hyderabad	852	21	873	2%
Nawabshah	505	4	509	1%
Sukkur	169	7	176	4%
Larkana	445	10	455	2%
Quetta	53	19	72	26%
Total North	2,024	61	2,085	3%
	2,219	223	2,442	9%

Source: SSGC Reported Information

Contributing Factor 5 – Measurement Errors (Cont.)

Metering Errors at Sui Companies

- Measurement errors at Sui Companies can be classified into two categories:
 1. Use of obsolete/incorrect equipment; and
 2. Use of defective measuring equipment
- Both of the above factors result in unmetered gas passing through the system causing unbilled quantity being used by the consumers. Consequently, there is an increment in UFG level of Sui Companies.
- **Use of obsolete equipment** may result in meters becoming slow or PUG. Standard technical specifications for equipment and material issued by the Authority in 2009 are applicable and all measurement equipment are required to be procured and installed in accordance with these specifications.

However, there are other factors that impair meters and equipment which include accidental damage, intentional tampering of the meter and/or regulators installed at the customer premises or varying characteristics of the gas beyond the defined parameters in the installed meter resulting in unmetered gas passing through the system (PUG meters).

- **Defective meters** can be broadly categorized into the following:
 - Passing Unregistered Gas (PUG) Meters are meters defected in such a way that gas passing through meter without being measured resulting in lower volumes of natural gas being billed to the customer than actually consumed.
 - Slow Meters are meters that become slow when meter dial is un-calibrated or is damaged, due to which meter dial moves at an increased or decreased RPM and becomes unable to provide an accurate meter reading resulting in an increase in the UFG levels.

Table ME – 4 Defective Meters

Year	SSGC			SNGPL		
	Slow/ Fast	PUG	Total	Slow/ Fast	PUG	Total
2011	19,156	44,723	63,879	7,698	2,344	10,042
2012	2,988	112,342	115,330	13,778	3,388	17,166
2013	2,130	100,887	103,017	13,987	4,111	18,098
2014	1,980	115,946	117,926	16,172	3,765	19,937
2015	2,467	94,574	97,041	23,141	3,367	26,508

Source: SSGC & SNGPL Reported Information

Contributing Factor 5 - Measurement Errors (Cont.)

- The table ME – 4 presents breakup of the total number of slow and PUG meters (meters 'Passing Unregistered Gas') of the SSGC and SNGPL respectively.
- In addition to above it also needs to be considered that the figures reflect the faulty meters that were identified and replaced in the said period; defective meters not identified have not been reflected in the statistics presented above and may also be a major cause of the rising UFG levels being faced by the companies.
- This can also be linked to the fact that around 1.3 million and 0.7 million consumers are billed at minimum by SNGPL and SSGC respectively. As discussed in the respective section, major reason behind minimum billing is defective meters.

Meters Ageing

Table ME – 5 and 6 shows the meter installed on Sui Companies network

Table ME – 5 SSGC - Meter Ageing

Age (Years)	SSGC			Total	Percentage
	Industrial	Commercial	Domestic		
Less than 1	319	2,312	189,542	192,173	6.9%
1 to 2	1,200	4,953	566,971	573,124	20.7%
2 to 3	725	1,645	214,987	217,357	7.9%
3 to 7	1,591	8,115	800,205	809,911	29.3%
7 to 10	329	6,035	966,278	972,642	35.2%
Total	4,164	23,060	2,737,983	2,765,207	100%

Source: SSGC Reported Information

As per international better practices, meters installed by utility companies for measurement of gas volume, has a defined policy for meter replacement that have gone beyond their useful life to avoid inaccurate meter readings. We were given to understand that there is no such documented policy available at SSGC. However, following table shows the meter replacement policy for SNGPL that we can apply to analyze SSGC situation also.

S. No.	Meter Type	Replacement Period (SNGPL)
1	Industrial	1 year
2	Commercial and Special Domestic	7 years
3	Domestic	16 years

- 26% of the total meters that pertains commercial sector have been in operation for 7-10 years which is in excess of the defined exemplary replacement period .
- Out of a total of 4,164 industrial meters installed, only 8% (319 meters) are less than a year old. The remaining 92% exceed the optimal replacement time period. This fact must be considered that industrial sector consume large volume of natural gas and without proper metering it can have a significant impact on UFG volumes.

Contributing Factor 5 – Measurement Errors (Cont.)

- The meter ageing analysis (Table ME -6a and 6b) of SNGPL shows the application of meter replacement policy by the company.

Table ME – 6a Meter Ageing

Age Years	SNGPL				
	Industrial		Age Years	Commercial	
	Meters	Percentage		Meters	Percentage
Upto 1	3,638	85.5%	Upto 7	46,214	96.9%
1 – 2	550	12.9%	7 – 10	957	2.0%
2 – 4	62	1.5%	10 – 15	483	1.0%
4 and above	3	0.1%	15 and above	27	0.1%
	4253	100%		47,681	100%

Source: SNGPL Reported Information

- Approximately 14.5% (615) of the industrial meters need to be replaced as their useful life has lapsed. If these are kept in operation any longer, the contribution to the UFG as a result of measurement errors may increase.
- Whereas, 74,714 domestic meters are over 20 years old and therefore need to be replaced with new meters to prevent any unbilled gas from being consumed by the customer, further contributing to a rise in UFG levels.

Table ME – 6b Meter Ageing

Age Years	SNGPL				
	Special Domestic		Age Years	Domestic	
	Meters	Percentage		Meters	Percentage
Upto 7	12,054	89.1%	Upto 16	4,886,483	95.4%
7 – 10	621	4.6%	16 – 20	160,170	3.1%
10 – 15	515	3.8%	20 – 25	55,211	1.1%
15 and above	340	2.5%	2 above	19,503	0.4%
Total	13,530	100%	Total	5,121,367	100%

Source: SNGPL Reported Information

Contributing Factor 6 – Other Contributing Factors

BTU Equivalence and 3rd Party Access

- As stated in “the Low BTU pricing policy, 2012”, the Low BTU gas contains large volume of undesirable contents of natural gases like carbon dioxide, nitrogen and hydrogen sulfide with low contents of methane.
- At present, SNGPL imports Re-gasified liquid Natural Gas(RLNG) to meet the natural gas demand of the existing consumers, where SSGC transports RLNG received in Karachi to SNGPL through its own network.
- As per third party access rules, the transporter of gas i.e.. Sui Companies are required to be paid for transportation charges for the contracted capacities in terms of volumes at the entry point and shall account for this gas in terms of equivalent energy value at exit point irrespective of the volumes. With existing transmission lines, probability of commingling of gas is higher and consequently affects the Gas Calorific Value (GCV) of the transmitted gas becomes low.
- In the absence of a dedicated transportation line for RLNG, currently SSGC swaps the gas from its indigenous sources to SNGPL and distributes RLNG into its own consumers. The swapped gas is of lower GCV and to compensate it in terms of energy, SSGC delivers extra volume to SNGPL. This difference of gas volume received at entry point and gas volume provided to SNGPL contributes to UFG level for SSGC.
- SSGC claims that the issue is temporary and a dedicated line for transportation of RLNG is under construction.

OGRA has allowed a provisional adjustment for this excess volume to be accounted for as deemed sales for UFG calculation purposes. The same excess received by SNGPL is treated as part of internal consumption.

Increase in Gas Price

- Increase in the cost of gas purchased from exploration companies is also considered as another factor contributing towards UFG level.
- Increase in cost of gas for Sui Companies results in an increase in the gas tariffs. Incremental gas tariffs with inadequate monitoring of gas networks encourage theft, meter tempering and other means to avoid gas expenses.

Shift from Bulk to Retail Sector

- As per the License¹ of Sui Companies § 1.2.2, “**Bulk or wholesale consumer means a consumer who purchases natural gas for resale**”. However, Sui Companies refer consumers with large volumetric purchases in heavy industrial sector viz. power, fertilizer, cement and steel as bulk sales; reason being special needs of their supply.
- Sui Companies consider gas resellers as special domestic customers. For the purpose of this report and simplification for our discussions we have considered bulk sale as sales made to large size industrial sector of the country.

Contributing Factor 7 - Impact of Bulk to Retail Shift

- To better forecast UFG levels and revenue / budgetary requirements, Sui Companies bifurcate their supply/sales mix into bulk sector (i.e.. power, fertilizer, cement & steel) and retail sectors (i.e.. Industrial, Commercial, CNG, Domestic and Special Domestic). Sui companies refer to this sale ratio between two sectors as Sales Mix.
- With the constant growth of companies and various interventions to address evolving needs of the country, the demand for gas supply has changed. Consequently, sales mix has also changed. Sales mix of bulk and retail sector for SSGC and SNGPL from FY 2004 to FY 2015 is provided in Table BR 1.

Table BR - 1 Bulk to Retail Sale Mix

Year	SSGC			SNGPL		
	Bulk G _{AFS}	Retail G _{AFS}	Bulk %age	Bulk G _{AFS}	Retail G _{AFS}	Bulk %age
	Volumes in BCF					
2004	178	163	52%	219	266	45%
2005	180	184	49%	259	317	45%
2006	188	196	49%	244	369	40%
2007	175	211	45%	199	426	32%
2008	178	231	44%	190	460	29%
2009	181	241	43%	157	496	24%
2010	173	266	39%	148	502	23%
2011	119	277	30%	162	503	24%
2012	108	298	27%	157	518	23%
2013	105	313	25%	134	504	21%
2014	102	321	24%	127	455	22%
2015	110	324	25%	116	405	22%

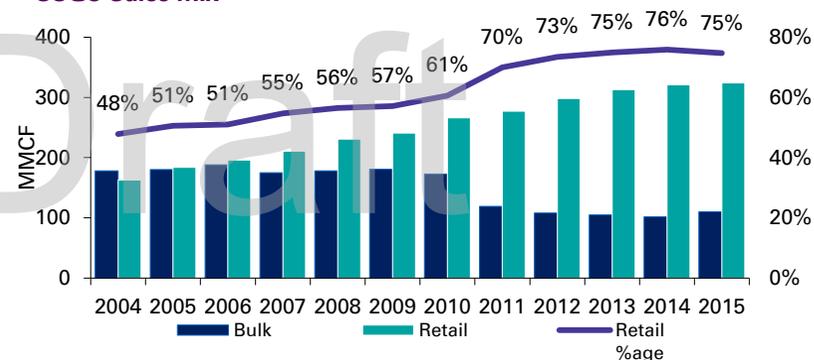
Source: SSGC and SNGPL Information Set [2016]

1 The License dated 3 Sep 2003 issued to SSGC and SNGPL by the Authority.

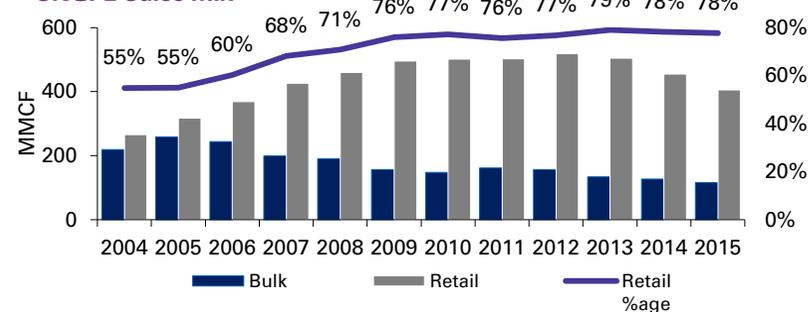
Sales Mix Analysis

- Sales mix or Gas Available For Sale (G_{AFS}) to Bulk Sector was SSGC: 52% / SNGPL: 45% in FY 2004 which gradually decreased and has plunged to SSGC: 25% / SNGPL: 22% in FY 2015. This shift is mainly because of the Socio-Economic agenda being pursued by Government of Pakistan (GoP) to provide gas to the masses across the country.

SSGC Sales Mix



SNGPL Sales Mix



Contributing Factor 7 – Bulk to Retail Shift (cont.)

- Sui Companies usually receive directives from GoP / Governmental bodies/ Public Representatives to lay networks in new towns, villages (including remote locations) for new gas connections. We were informed that Sui Companies have consistently documented their dissent for these new connections in remote locations where they claim that it is difficult to maintain and safeguard a mostly domestic network.
- Further, continuous reduction of gas input from indigenous gas sources is another constraint for SNGPL. Consequently, SNGPL has performed load curtailment of industrial customers within the Retail sector to meet the demands of existing as well as new domestic consumers.
- Also, Sui Companies are required to comply with the Gas Allocation Policy issued by the Authority in 2005 and its subsequent amendments. This policy sets the priority of gas allocation to various customer classes. The allocation has also contributed to the shift in bulk and retail sales. With these interventions for domestic supplies, the gas distribution network has grown considerably. Refer Table BR – 2 for growth analysis.
- Gas supply to bulk customers is mainly through dedicated lines designed to operate at high pressures and hence contribute minimum leakages and pilferages. Further, measurement errors of the meters of bulk sector are predominantly in the accuracy range of $\pm 1\%$.

Table BR – 2 Expansion in Retail

	SSGC		SNGPL	
	Distribution Network	Domestic Consumers	Distribution Network	Domestic Consumers
Year	KMs	Million	KMs	Million
2004	24,339	1.71	38,258	2.26
2005	25,752	1.77	42,192	2.44
2006	27,542	1.84	46,964	2.64
2007	29,830	1.92	52,394	2.87
2008	31,930	2.05	59,951	3.10
2009	34,282	2.13	67,449	3.36
2010	36,785	2.22	75,653	3.61
2011	39,253	2.34	81,828	3.84
2012	40,905	2.46	87,796	4.15
2013	42,360	2.55	93,646	4.39
2014	43,090	2.62	95,855	4.67
2015	43,890	2.68	97,300	4.91
CAGR	5.51%	4.16%	8.86%	7.32%

Source: SSGC and SNGPL Information Set [2016]

- Monitoring & maintenance of bulk metering is controllable because of a manageable clientele. Refer Annexure Q.1 & Q.2 for list of bulk clientele with volumes for past 5 years.

Impact of Changes in Sales Mix on UFG Levels

- Bulk sector with controllable clientele and close monitoring has insignificant gas losses. Therefore, UFG level in bulk sector is around 0.5% of Gas_{AFS}.

Contributing Factor 7 – Bulk to Retail Shift (cont.)

- Whereas, UFG level in retail sector vis-à-vis bulk sector is considerably high due to various reasons such as gas theft, gas leakages, measurement errors and spaghetti networks etc. These contributing factors are relatively controllable in bulk sector.
- The new domestic connections provided in pursuance of the “Gas Allocation Policy” and governmental reforms have increased the network length in the last decade as shown in Table BR-2. The expanded networks in retail sector are susceptible to gas pilferages, leakages and measurement errors.
- This growth in distribution networks requires improved monitoring and measurement mechanism. Apparently, efforts made by Sui Companies to improve maintenance, control and monitoring mechanism for this exponential growth was not sufficient; which has exacerbated the UFG level in the recent years. Sui Companies claim that the management and monitoring of these complex networks is cumbersome and expensive.
- The tariff mechanism of Sui Companies is designed in a way that that cost of maintenance and upgrading the network is passed on to the consumers by including it in the gas prices. However, increasing tariffs was also not conducive for Sui Companies being against socio-economic objectives of the government.
- Further, regular upgrades require extensive work which is not only expensive but needs coordination and approvals of various government departments and bodies. Therefore, Sui companies contend that the companies are handicapped due to coordination and approval issues.
- As discussed in Background section of the report, OGRA initially stipulated a benchmark rate in FY 2004 to control UFG level having considerations to the then UFG level of Sui Companies. Sui Companies are of the view that the dynamics of the business are now changed resulting in adverse operating conditions and undesirable shift in Sales Mix. With a plea that the shift from bulk to retail over the years was beyond their control mainly because of government interventions, Sui Companies on various occasions requested government representative committee viz. Economic Coordination Committee to comprehend the issue.
- As mentioned ECC advised OGRA to provisionally allow volumes as deemed gas sales volumes against impact of change in Bulk to Retail ratio on UFG, using the base year 2004.
- Subsequently the Authority in FRR of Sui Companies of FY 2013, FY 2014 & FY 2015 partially allowed volumes against gas volume pilfered by non-consumers and gas losses in law affected areas. The Authority however, did not allow volumes claimed against impact of change from Bulk to Retail and was made subject to the recommendations of the UFG study.



Analysis of UFG Disallowance

2nd Draft

Effect of UFG Disallowance

Effect of UFG Disallowance on tariffs

- For the purpose of Annual Revenue Requirement calculation, UFG disallowance¹ is subtracted from the “Cost of gas sold” which affects the “increase / decrease requested in average prescribed price”. Sui Companies are required to account for the UFG disallowance. Refer Table RR 1 for details.
- In recent years reported UFG has shown an increasing trend. However, due to stay order from the honorable High Court the Authority has allowed UFG to the extent mentioned in the stay order and provisional adjustment for theft by non-consumer and for claim relating to law and order affected areas.

Table RR 1- Revenue Requirement	
Particulars	PKR. / MMBTU
Cost of gas sold	XXX
UFG disallowance	(XXX)
Transmission & distribution and Elements ²	XXX
Cost of service / prescribed price	XXX
Current average prescribed price	XXX
Inc. / (Dec) req. in avg. prescribed price	XXX
Revenue Requirement	XXX

(Refer Annexure G - Revenue Requirement)

Sensitivity to Financial Position of Sui Companies

- The effect of UFG disallowances on the financial outlook of Sui Companies is provided on the following pages where we have endeavored to analyze the impact of varying UFG disallowance rates on the net equity of the Companies.
- It is evident that an immediate financial improvement action is required to provide the companies a breathing space and time to consolidate and augment their measurement capacities as well as help them in implementing controls over continuously increasing UFG.
- In the past five years Sui Companies have faced a constant reduction in its annual reported profits, as a result the company's' net equity has also deteriorated to a significant extent. In the event that this trend continues the companies could face situation where validity of going concern assumption may be questioned for the preparation of financial statements.
- To demonstrate this impact the current effective UFG allowance of 8.5% and 7% is assumed to prevail in the future for SSGC and SNGPL respectively. This effective rate includes the existing UFG benchmark rate and the other allowances currently being granted to the Sui Companies as deemed sales adjustment.

1 – UFG disallowance is the excess of total UFG over UFG Allowed by the Authority.

2 – Operational Elements are Shortfall of previous year plus depreciation, return on net average operating fixed assets and Subsidy for LPG Air-Mix Project less other incomes.

Effect of UFG Disallowance

- The proposed roadmap, which spreads over a period of five years, addresses the measures that companies need to take to improve their existing predicament.
- To enable the companies to implement these measures it is necessary to provide Sui Companies with time period in which they work on improving the UFG control measures without facing further losses/ going bankrupt. For this purpose a favorable rate, at which the Companies' deteriorated equity can be recovered, needs to be allowed to the companies temporarily and this has been presented in the analysis as follows.
- For our recommendation regarding the allowance to be granted please refer the chapter 'Our Recommendations'.

Key Assumptions to the Analysis

- The following assumptions have been used in the preparation of the financial projections:
 - Non-current assets are assumed to grow at 6.28%/ 6.35% annually for SSGC and SNGPL respectively in line with the growths observed in the past five year.
 - Non-current assets are assumed to grow at 4.93%/ 6.22% annually SSGC and SNGPL respectively in line with the growths observed in the past five year.

- Estimated WACOG growth is expected to be:

2016	2017	2018	2019	2020
<small>Million PKR/MMCF</small>				
320.2	268.3	282.01	295.7	310.4

- The values for Gas_{AFS} is based on the Sui Companies provided projections.
- Working Capital is the difference of projected current assets and current liabilities, which balances the projected statements.
- UFG levels of SSGC and SNGPL are assumed to remain constant at 15%, 13% p.a. during the period beginning 2016 and ending 2020 i.e.. optimism that UFG will not be let to grow further.
- Equity and reserves remains constant throughout the period of the forecast as shareholders and investors may not choose to put their money at stake in current situation.

Sensitivity Analysis - SSGC

SSGC - Financial Position	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	<i>Amounts in PKR Billion</i>									
Non-current Assets	60.79	67.52	71.07	73.46	77.54	82.41	87.58	93.08	98.92	105.12
Non-current Liabilities	(34.83)	(39.86)	(45.50)	(42.34)	(42.21)	(44.29)	(46.48)	(48.77)	(51.17)	(53.69)
Working Capital - Net	2.07	0.71	0.79	(8.05)	(17.44)	(22.03)	(25.04)	(28.09)	(31.24)	(34.52)
Net Assets	28.03	28.37	26.37	23.06	17.89	16.08	16.06	16.22	16.50	16.91
Equity and Reserves	11.57	13.77	13.80	13.84	13.96	14.05	14.05	14.05	14.05	14.05
Surplus on Rev. of Fixed Assets	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25
Accumulated Profit / (Loss)	6.21	4.34	2.32	(1.13)	(6.32)	(8.22)	(8.24)	(8.08)	(7.80)	(7.39)
Net Equity	28.03	28.37	26.37	22.96	17.89	16.08	16.06	16.22	16.50	16.91
Equity with UFG Allow. 15% - 4.5%						(0.17)	0.63	0.53	0.50	0.57
15% - 5%						0.58	1.27	1.21	1.22	1.33
15% - 6%						2.08	2.57	2.57	2.66	2.86
15% - 7%						3.58	3.87	3.93	4.10	4.38
15% - 8.5%	17.78	18.11	16.12	12.71	7.64	5.83	5.81	5.97	6.25	6.66
15% - 9%						6.58	6.46	6.65	6.97	7.42
15% - 10%						8.08	7.76	8.01	8.41	8.94
15% - 4.5%						15.74	13.61	14.27	15.09	15.96
15% - 5%						14.99	12.96	13.59	14.37	15.20
15% - 6%						13.49	11.67	12.23	12.93	13.68
15% - 7%						11.99	10.37	10.87	11.49	12.16
UFG Disallowance - Current / 8.5%	2.47	3.88	1.92	9.94	10.28	9.75	8.43	8.84	9.34	9.88
15% - 9%						9.00	7.78	8.16	8.62	9.12
15% - 10%						7.50	6.48	6.80	7.18	7.60
Gas Available for Sale (Bcf)	396.16	405.74	418.20	422.70	433.80	468.24	483.15	481.99	485.86	489.77
Gas Sales (Bcf)	358.81	361.91	376.37	357.46	367.86	398.00	410.68	409.69	412.98	416.30
UFG Volume Total (Bcf)	37.35	43.83	41.83	65.24	65.94	70.24	72.47	72.30	72.88	73.47
UFG Total %	9.43%	10.80%	10.00%	15.43%	15.20%	15.00%	15.00%	15.00%	15.00%	15.00%

Sensitivity Analysis - SNGPL

SNGPL - Financial Position	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Amounts in PKR Billion										
Non-current Assets	91.3	95.1	100.9	106.8	116.8	124	132	140	149	159
Non-current Liabilities	(69.6)	(74.4)	(69.3)	(74.0)	(88.6)	(94.1)	(99.9)	(106.1)	(112.7)	(119.7)
Working Capital - Net	(3.0)	0.5	(21.6)	(26.8)	(24.6)	(26.5)	(26.0)	(24.5)	(21.2)	(16.5)
Net Assets	18.7	21.2	10.0	6.1	3.6	3.6	6.1	9.8	15.4	22.6
Equity and Reserves	10.1	10.4	10.9	10.9	10.9	11.0	11.0	11.0	11.0	11.0
Surplus on Rev. of Fixed Assets										
Accumulated Profit / (Loss)	8.6	10.9	(0.9)	(4.9)	(7.4)	(7.4)	(4.9)	(1.2)	4.4	11.6
Net Equity	18.7	21.2	10.0	6.1	3.6	3.6	6.1	9.8	15.4	22.6
Equity with UFG Allow. 13% - 4.5%						(0.4)	2.8	6.6	12.6	20.1
13% - 5%						0.4	3.4	7.2	13.1	20.6
13% - 6%						2.0	4.8	8.5	14.2	21.6
13% - 7%	19	21	10.0	6.1	3.6	3.6	6.1	9.8	15.4	22.6
13% - 8%						5.2	7.4	11.1	16.5	23.6
13% - 9%						6.8	8.8	12.4	17.6	24.7
13% - 10%						8.5	10.1	13.7	18.8	25.7
13% - 4.5%						13.7	11.3	10.9	9.6	8.6
13% - 5%						12.9	10.7	10.3	9.0	8.1
13% - 6%						11.3	9.3	9.0	7.9	7.1
UFG Disallowance - Current / 7%	7.18	6.52	13.6	12.3	11.6	9.7	8.0	7.7	6.8	6.1
13% - 8%						8.1	6.7	6.4	5.6	5.1
13% - 9%						6.5	5.3	5.1	4.5	4.1
13% - 10%						4.8	4.0	3.8	3.4	3.1
Gas Available for Sale (Bcf)	665.24	674.87	638.08	581.96	521.53	504.25	496.91	454.92	382.11	327.62
Gas Sales (Bcf)	581.9	597.28	552.62	506.42	450.84	438.70	432.31	395.78	332.44	285.03
UFG Volume Total (Bcf)	83.34	77.59	85.46	75.54	70.69	65.55	64.60	59.14	49.67	42.59
UFG Total %	12.53%	11.50%	13.39%	12.98%	13.55%	13.00%	13.00%	13.00%	13.00%	13.00%



Conclusion to the Situational

Assessment

2nd Draft

Conclusion to the situational assessment

Conclusion to the situational assessment

Theft

- Albeit various reasons may be associated with theft of natural gas in Pakistan but the key drivers which we identified as significant impediments are:
 - continuous growth of the gas distribution network,
 - insufficient and delayed legislative support for recovery of detected cases,
 - inadequate monitoring and maintenance efforts of Sui Companies; and
 - Expectation of free supply in gas producing areas.
- The responsibility to detect, monitor and prevent theft is of Sui Companies and disconnection of gas pilferers is the right of Sui Companies. The number of cases detected by both utilities as a percentage of their total customer base in 2015 is less than 1%, this demonstrates that efforts need to be improved as theft contributes a major portion of overall UFG
- Existing procedures provided by OGRA may be appropriate to provide basic guidance in handling and recording of gas volumes relating to theft cases detected. Increased efforts are still required by Sui Companies to curb gas theft and overall UFG losses which requires time and dedicated resources.
- The process of allowing claims of theft by non-consumers is prone to errors as volumes are based on judgments and hypotheses. There is no validation mechanism at OGRA for independent verification of such claims.
- Theft by consumers or non-consumers once detected can be accounted for and may not be considered as UFG.
- A detected theft case when recorded is a claim to be recovered from the consumer or non-consumer, with or without a legal recourse using gas company's efforts and resources. If not recovered or is no more recoverable it becomes an issue of debtors management. Either the claim is reversed by writing it off or is provided for till it is recovered or confirmed to be non-recoverable.
- The volume pilfered not detected is what remains in overall UFG volume and is perceived to form a significant portion of it. The more the volume of pilfered gas is detected the less is the UFG.
- For UFG allowance purpose the key information is how much out of the total theft volume is beyond the control of Sui Companies. For this purpose, first all measures need to be in place to quantify theft volumes and then certain volumes need to be claimed out of it as undetectable / controllable. From the analysis it is clear that in the existing situation such information is not available. Therefore, we suggest that under UFG control program, efforts should be made by Sui Companies to build capacity to track and measure theft by non-consumer.

Conclusion to the situational assessment

- However, owing to factors listed above and other complexities in retail supply of gas, arguments for non-controllability of theft by Sui Companies carries weight and needs to be addressed

Law and Order Affected Areas

- The premise that due to law and order issues gas companies cannot carry out its billing and recovery activities in certain areas and hence the volume of gas supplied to such areas should be allowed, carries critical implications at national level.
- If gas companies cannot operate in such areas then there should be an evidence that other utilities and state machinery was also unable to carry out their operations in those areas.
- ECC acceptance to the issue is provisional.
- Only the Federal Government can declare an area as “law & order affected” where Sui companies can claim any relief on losses. However, there is a remote a chance that Federal Government may declare such areas as law & order affected accepting no writ of the Government.
- The claims of SSGC and SNGPL against gas losses in the law and order affected areas have grown by approximately 80% and 200% over the last five years and need to be curbed to restrict the growing levels of total reported UFG of the Sui Companies.

Minimum Billing

- Customers may be subject to minimum billing due to following reasons:
 - The consumer has in actual consumed less than the notified minimum consumption (40M³); or
 - The metering errors (slow, PUG, sticky, etc.) have resulted in less volumes being metered than the consumer’s actual consumption which may be higher or less than the notified minimum consumption(40M³)
- No segregation was made available as to what extent these minimum billed consumers represent the actual less than 40M³ consumption and how many of the consumers were billed at minimum owing to measurement errors.
- As in cases of malfunctioned meters the difference between meter reading and minimum volume may not reflect the actual gas supplied and hence that may remain un-accounted. Quantifying such volumes at company level is only possible where malfunctioned meters are fully identified which is not the case.

Leakages

- Leakage (overhead and underground) as a result of the size and age of network, corrosion and third party damage is also a major contributor to overall UFG levels of Sui Companies.
- As discussed earlier the leak rate as per the studies conducted by Sui Companies are 4.9 and 2.2 leaks/ km for SSGC and SNGPL.

Conclusion to the situational assessment

- As at the financial year ended 2015, 35% and 22% of SSGC and SNGPL's distribution network respectively was over 20 years of age. In contrast, during the corresponding year rehabilitation activities were carried out on just 0.21% and 0.24% of the distribution networks of the companies, respectively.
- Similarly, CP over the distribution network currently extends to 45% and 66% of SSGC and SNGPL's network (steel); this is a major reason for corrosion of the steel pipes resulting in leakages.
- The above statistics reflect weaknesses of Sui Companies to implement proper controls for the reduction of gas losses due to leakages. We understand that there is substantial room for improvement and the average leakage rate could be reduced to an acceptable level and in line with international practices.

Measurement

- UFG has always been closely associated with data and meter errors. Improved metering capacity at Sui Companies is a concern to curb overall UFG losses.
- Deficiencies exist in current measurement capacity at both Sui Companies as TBSs metered with EVCs installed for SSGC and SNGPL are only around 24% and 12% respectively. This needs to be brought to 100% metering in the near future in line with better practices, increasing visibility of the network and ensuring that gas passing through every point in the system is accurately measured,

reconciled and accounted for.

- Furthermore, the network of both Sui Companies is not segmented properly, hence, gas is supplied to areas through looped TBSs, which acts as a hindrance in reconciling UFG losses for specific areas.
- In order to effectively monitor and measure gas supply, network must also be segmented to identify area wise gas sale and consumption.

Bulk to Retail

- We have discussed in detail the claims of the Sui Companies pertaining to the impact of the change in sales mix on UFG and the reasoning behind those claims in the chapter 'UFG contributing factors'.
- As per Provision of Rule No. 20 of NGRA Licensing Rules, 2002 – Obligation of licensees, Sui Companies with the consent of the Authority, are allowed not to provide transmission or distribution service or make sales of natural gas in the areas where it is not commercially / financially viable unless GoP provides special financial arrangements to Sui Companies.
- In addition Terms and Condition 13.1 and underlying sub conditions of the Licenses of Sui Companies provides a corridor to provide services to persons/consumers who are technically and economically viable.
- Since 2003 Sui Companies have grown their networks exponentially, majorly on the basis of government elevation programs, without considering or confronting on grounds of the financial viability of the expansions.

Conclusion to the situational assessment

- On the other hand, we understand that it is the responsibility of Sui Companies to develop capabilities to cater expansion and the growing clientele. Contesting expansions without accepting incongruous measures adopted by Sui Companies over the period is not balanced.
 - In the past decade the reported UFG of SSGC and SNGPL has increased by the 75% and 63% respectively. However this increase is not proportionate to the shift in sales mix over the corresponding period.
 - Also, we understand that the definition of bulk as prescribed and the definition interpreted or commonly used by Sui Companies and the Authority together is different. To eliminate ambiguity from these definitions, we recommend OGRA to rearticulate all definitions relating to UFG especially law and order affected areas, bulk sector sales and retail sector sales.
 - Albeit the assertions of the of Sui Companies in this regard are correct to some extent but the solution lies in strengthening of the infrastructure and implementation of improved UFG control measures to reduce gas losses as a result of measurement errors, theft and leakages.
- Overall Conclusion**
- Sui Companies do not have appropriate control over constantly growing UFG levels resulting from the various contributing factors as discussed in our situational assessment.
 - This may result in significant risk to financial & operational losses and erosion of equity for both the companies. If the existing trend continues the companies could face a situation where financial statements may be prepared without a valid going concern assumption.
 - Based on the assessment of the existing operating environments of Sui Companies and impact analyses of UFG disallowance performed on the information received, we understand that there are areas of the companies' operational and strategic plans that require immediate improvement for the resolution of UFG issue.
 - Currently Sui Companies' strategy for UFG management is reactive rather than preventive. Sui Companies have not implemented sufficient measures/ controls that can help companies deal with the UFG issue in a sustainable manner, rather temporary relief is sought in the form of allowances to reduce annual losses. We understand that failure to control gas losses stems from the absence of a mindset that owns this problem and that puts a cohesive and coordinated short to long term strategy in place to address the root causes of UFG.
 - We recommend that Sui Companies should focus their efforts on developing a long term UFG management and control program divided into numerous medium to short term objectives aimed at reducing the UFG levels to an acceptable level in the long run in line with the international better practices. We have proposed objectives in section III of the report.



Section II

Our Recommendations

2nd Draft

Our Recommendations

Based on our assessment of the existing practices and infrastructure of the Sui Companies in relation to UFG, we recommend the following UFG control measures:

100% Metering

UFG has always been closely associated with data and meter errors. Increased visibility of the network leading to metering at all possible levels should be ensured so that the gas passing through every point in the system is accurately measured, reconciled and accounted for. This will reduce deficiencies in the existing measurement mechanism and lead to reduced gas losses and future gas sustainability. Internationally, this is the most used UFG monitoring better practice.

Network Segmentation

In order to effectively monitor and measure gas supply, the gas network must be segmented, making it easier to identify and pinpoint susceptible area and if required, cut gas supply of identified areas with precision where gas is being pilfered. Lack of proper segmentation of the gas supply network will act as a barrier in reconciling UFG and their respective factors to the overall gas losses.

Cylinder Model

Bottled (cylinder) LPG is the perfect option for homes that do not have access to a piped network "OnGas-Newzealand". This is an easy solution to provide gas to areas where metering and segmentation is not possible.

Cylinder model is easy to operate as only a flick of a switch or the press of a button, gas will be at the doorstep of the consumers. LPG Cylinders can be refilled from dedicated stations or delivered to the end consumer.

The cylinders can also be equipped with auto-change regulators having a visual indicator to show the consumers when a cylinder is empty and needs to be replenished. A bottle (cylinder) contains 45kg of gas when full, which equals 2250 mega joules or 625 kilowatts of energy, "OnGas-Newzealand". A feasibility study can be conducted for implementing such model locally initially on pilot basis, then for difficult areas where pipeline based supply is difficult to manage and is expensive.

Cost differential of the two models can be analyzed and subsidized as appropriate.

Key Monitoring Indicators

To effectively streamline the UFG reduction plan and assist the Sui Companies and the Authority to monitor and control the UFG reduction, a set of quantifiable KMIs must be implemented and achieved annually over a period of five (5) years, aligned to the overall UFG reduction strategy. This will allow the utilities to compare their performance in terms of meeting their strategic and operational goals. Further, UFG allowance will be directly linked to the achievement of these KMIs. The same is discussed in detail in Section III of the report.

Our Recommendations (Cont.)

Regional UFG Management

The responsibility of UFG control should be assigned to regional UFG teams. The regional teams shall be assigned annual UFG reduction targets for their specific regions and their performance evaluated accordingly. This regional accountability will drive management to peak performance that can be incentivized according to achievement of region specific annual UFG reduction targets.

Two-Yearly Meter Inspections

The Sui Companies to conduct meter inspections of all the connection over the network every two years. The inspection will include an inspection of the meter and associated equipment for evidence of theft and tempering etc. This approach will help utilities assess the state of their network metering, deter the consumers from tempering them, additionally all slow/sticky meters will also be rectified.

Technological Advancement

Technological advancements within the system at all possible avenues will bring in an efficient mechanism to control UFG losses, measures can be sought in all avenues including but not limited to:

- Increased installation of meters with EVCs.
- Remote meter reading thorough GPRS based systems.
- Establish separate data cells for analysis of the EVC data.

- Roll out of Smart Meters which will have a positive impact on reducing gas theft.
- This will also lead to removal of existing temper, give tempering alerts and provide detailed and accurate consumption data.

Cost of Service Study

Determine actual cost of transporting gas to the end consumer based on individual cost drivers for each consumer class, spread geographically across the network.

This will lead to revision of tariffs and further identification of new consumer classes. This will enable differential pricing based on cost of service for specific customer segments and geographies.

Detect, Monitor and Control

It is the responsibility of Sui Companies to detect, monitor and prevent theft, however, the Sui Companies have a reactive approach rather a proactive one to control it. Improved arrangements to detect and prevent theft, designed to deter consumers from committing an offence are expected to have a positive impact on reduction of theft and overall UFG losses.

- Disconnection of gas pilferers shall be the right of Sui Companies.
- A validation mechanism/ special audit is recommended for an independent verification of gas volumes claimed and to protect consumers from any unjust claims made by the Sui Companies.

Our Recommendations (Cont.)

Ring Fencing

Particular monitoring of areas susceptible to gas pilferage will involve isolating the susceptible and affected area. The boundary of the area shall be defined and the gas passing through the region shall be measured through the installation of a bulk/ check meters

Use of bulk meters

Bulk meters are specialized meters with the capacity to operate at a pressure level higher than the normal operating pressure of the domestic meters enabling them to accurately measure the gas passing through the distribution main.

These bulk meters may be installed in the law and order affected areas at the last operational point of the region and gas passing into the area shall be measured in order to ensure that volume is quantified. This shall ensure verification of the gas claimed as deemed sales under the head 'Law and Order Affected Areas' in the UFG computation by the Sui Companies.

Leakage Management Plan

A leakage management plan will be implemented focused on replacing deteriorating parts of the underground pipelines, leading to increased rehabilitation of the network and increased follow up on all customer leak complaints through establishment of a dedicated customer hotline to report the same.

Recommendation on UFG calculation and treatment

- Based on our analysis of the existing UFG calculation methodology along with reservation made by Sui Companies and considering the international better practices for calculating UFG. We recommend that the Authority may allow the following formula for the UFG calculation purpose.

$$\text{UFG \%} = \frac{(\text{Gas Received} - \text{Gas Delivered}) - \text{Adjustments}}{\text{Gas Received}}$$

Where,

Gas Received, is the natural gas volume metered as received by the licensee during a financial year;

Gas Delivered, is the volume of natural gas metered as having been delivered by the licensee to its consumers; and

Adjustments, is the natural gas used for self consumption by the licensee for the purpose of its regulated activity and such other quantity as may be allowed by the Authority for use by the licensee in the operation and maintenance of its regulated activity.

Our Recommendations (Cont.)

Recommendations relating to UFG Allowance

- As per the European Regulators' Group for Electricity and Gas (ERGEG) the determination of network losses can be done only if the network has been metered adequately. Robust measurement of network losses is possible in networks with continuous metering systems installed and operating at full capacity.
- Nevertheless, approaches for measurement adopted by regulators internationally for UFG quantification are possible when the gas network is fully metered and is isolated, i.e.. the number of gas receipt points or delivery points are metered and finite. Within the large pipeline system, an isolated system simplifies the quantification of gas within the network segments at any particular time.
- However, we identified that currently Sui Companies do not have measurement mechanism installed at full capacity on their networks. Consequently, actual UFG level for a particular network segment cannot be quantified precisely (i.e., from SMS to TBS, TBS to CMS or assigned to any underlying factor like leakage, theft or measurement error).
- We believe that Sui companies with their existing measurement mechanism are unable to measure the actual difference between the volume received and dispatched for a particular network segment. Accordingly, with the existing setup it is not possible to identify actual gas losses associated with each contributing factor in UFG.
- Albeit, Sui companies present their UFG volumes in terms of contributing factors but the basis of these presentations are hypothetical assumptions rather than actual measurements.
- To enable robust UFG benchmarking based on the UFG contributing factors, the existing measurement capacity needs to be augmented to the extent which enables the measurement of the UFG volumes for a particular network segment.
- Consequently, benchmarking of UFG based on its contributing factors is not appropriate and a one go rehabilitation attempt to augment the financial outlook of Sui Companies is challenging.

Model for incremental improvement for UFG control

- Interventions at strategic and operational levels of the Sui Companies are required for the resolution of UFG issue. Failure to control gas losses stems from the absence of a mindset that owns this problem and puts a cohesive and coordinated strategy to address the same.
- In this regard, UFG Control framework with an objective of "Enhanced UFG Control" is proposed.
- This framework requires improvement in the following four areas of the Sui Companies:
 - Network Measurement and Visibility;
 - Network Rehabilitation;

Our Recommendations (Cont.)

- Theft Control; and
- Research & Development.
- To better ensure implementation of the UFG control framework, the implementation is translated into a UFG Benchmark formula used for calculating UFG Allowance which is explained under the below caption.

UFG Benchmark and Control Formula

- We propose a two component formula for calculating UFG Allowance viz. Technical Component and Local Operating Conditions Component.

$$UFG_{Allowance} = Gas_{AFS} \times (Rate_1 + Rate_2 \times \beta)$$

- **UFG Allowance** is the total UFG Allowance, **Gas_{AFS}** is the Gas Available for Sale in any year and **β** denotes the cumulative score of Key Monitoring Indicators (KMIs) based on achievement of mutually-agreed Key Performance Indicators (KPIs) in a financial year.

Technical Component based on international benchmarks

- **Rate₁** is the benchmark rate based on international practices for technical losses usually inherent to the supply network.

- Based on our study of the UFG Allowances as applicable in various international regulatory jurisdictions we have identified country wise UFG allowances and demographical indicators shown in the Table R -1.
- We recommend that fixed component of UFG allowance for Sui Companies may be used by the Authority in line with internationally accepted UFG benchmarks considering the dynamics and demographics as applicable in Pakistan.
- UFG allowances are commonly set in correlation with the gas consumptions and network lengths. For instance in Australia UFG allowance rates varies w.r.t. consumption patterns and network size. For AGNL Queensland UFG allowance is 0.5% whereas for Multinet it is 4.03%. However, in New Zealand a UFG Rate of 2.45% is defined as a blanket rate.
- Keeping in view the gas consumption of around 41.2 BM³ and a network size of 141,190 Kms in Pakistan along with the demographical challenges that the country is facing, we suggest that a fixed component of UFG benchmark rate should be relaxed for next five years to enable Sui companies consolidate and augment their measurement capacities.
- The table R-2 provides the total population of the reference countries that we have used for the purpose of our analysis.
- Finding comparable countries remained a challenge, however, based on nearest matches maximum allowance provided by regulators is 5% and we suggest the same to be applied by the Authority taking a moderate approach.

1 The approved UFG reduction plan is an annual plan submitted by the Sui Companies to the Authority encompassing activities and targets to make necessary efforts to reduce UFG.

Our Recommendations (Cont.)

Table R – 1 - International UFG Allowances

Countries	Population	Urban Population%	Area (Km ²)	Density (P/Km ²)	Network (Km)	Consumption BM ³	UFG Benchmark
USA	324,118,787	82.7%	9,155,898	35	2,225,032	759.4	1.41% - 5% **
Canada	36,286,378	81.9%	9,071,595	4	100,000	104.4	2.65%
Germany	80,682,351	77.2%	348,520	232	34,327	77.5	2.16%
United Kingdom	65,111,143	81.7%	241,959	269	39,778	70.2	1.00%
Turkey	79,622,062	71.9%	769,295	104	15,641	48.5	4.20%
Russia	143,439,832	73.2%	16,299,981	9	259,913	409.2	5.00%
Australia	24,309,330	89.2%	7,596,666	3	580,000	38.8	0.5% - 4.03% *
Ukraine	44,624,373	69.5%	579,537	77	45,597	33.8	2.60%
Bangladesh	162,910,864	34.9%	130,172	1252	20,804	22.9	5.00%
New Zealand	4,565,185	87.8%	263,884	17	15,000	5.4	2.45%
Croatia	4,225,001	59.5%	55,960	76	3,020	2.8	3.30%
Pakistan	192,826,502	38.9%	770,998	250	141,190	41.2	-

Source: Central Intelligence Agency (CIA), The world fact book and KPMG Data Bank.

The information presented above is based on facts and figures publicly available and recent statistics of the countries.

The dates of these statistics varies and are between 2013 - 2015.

* 0.5% is the UFG Benchmark for AGNL Queensland and 4.03% is for Multinet.

** 1.41% is the UFG Benchmark for Atlanta and 5% is for Texas.

Our Recommendations (Cont.)

Table R – 2 - Total population

Country	2010	2011	2012	2013	2014	2015
	<i>in Million</i>					
Australia	22.16	22.54	22.91	23.27	23.62	23.97
Bangladesh	151.62	153.41	155.26	157.16	159.08	161.00
Canada	34.13	34.50	34.87	35.23	35.59	35.94
Germany	80.44	80.42	80.48	80.57	80.65	80.69
New Zealand	4.37	4.40	4.44	4.47	4.50	4.53
Turkey	72.31	73.52	74.85	76.22	77.52	78.67
USA	309.88	312.4	314.80	317.14	319.45	321.77
UK	62.72	63.16	63.57	63.96	64.33	64.72
Ukraine	45.65	45.48	45.32	45.17	45.00	44.82
Croatia	4.32	4.31	4.29	4.28	4.26	4.25
Pakistan	170	174	177	181	185	189

Source: The world metering Report [August 2016]

- Further, to embark a journey reducing UFG to an acceptable level, Sui companies need adequate UFG allowance to make necessary efforts to reduce UFG while sustaining their financial outlook.
- The study recognizes that Sui Companies have to operate under local challenging conditions as compared to the world at large. Accordingly, additional allowance factor is provided to cover impact of gas losses because of factors like Law and Order situation, bulk to retail shift and theft by non-consumers.

Local operating Conditions Component

- Rate₂** is the allowance for local challenging conditions as compared to the world at large. This factor is suggested to cover impact of gas losses due to shift in the sales mix from bulk towards retail consumers expanding the network and making it more prone to theft, leakages and data/meter errors. Additionally, impact of factors like non-recovery of gas bills from law and order affected areas is included.
- Allowance for these challenging conditions is suggested to be 4.05% based on the past 4 years UFG claims made by the Sui Companies against above mentioned factors.
- However to ensure, appropriate efforts are directed towards reducing UFG over the agreed term of five (5) years, the local challenging conditions component is linked to the achievement of certain KMIs. Refer table R-3.

Our Recommendations (Cont.)

Table R -3 UFG Relief Working – Claimed Volumes

SNGPL	2012	2013	2014	2015	Average (4 Years)	% of GAS (4 Years Average)	Total Relief
	Quantities in mmcf						
Law & Order affected areas	3,377	8,124	10,803	10,048	8,088	1.34%	3.96%
Impact of change in Sales Mix from Bulk to Retail	16,774	17,493	15,416	13,539	15,806	2.62%	
Gas Available for Sale	674,868	638,076	581,961	521,533	604,110		

SSGC	2012	2013	2014	2015	Average (4 Years)	% of GAS (4 Years Average)	Total Relief
	Quantities in mmcf						
Law & Order affected areas	1,286	1,950	2,279	2,355	1,968	0.47%	4.15%
Impact of change in Sales Mix from Bulk to Retail	14,208	15,479	16,249	15,927	15,466	3.68%	
Gas Available for Sale	405,737	418,396	422,735	433,798	420,167		

Average 4.05%

Our Recommendations (Cont.)

Performance Factor

- **β (Beta)** denotes the cumulative efficiency score as determined by OGRA of Key Monitoring Indicators (KMIs) based on a mutually-agreed UFG control program for a financial year. (*refer KMIs in Section III- Way forward*)
- The allowance for the challenging conditions is made subject to ensuring adequate UFG control efforts are made by the Sui Companies.
- KPIs and KMIs have been devised in consultation with the leadership of Sui Companies and the Authority to achieve improvement in the identified four areas of UFG Control framework:
 - Network Measurement and Visibility;
 - Network Rehabilitation;
 - Theft Control; and
 - Research & Development
- All KPIs, together with their respective KMIs, are provided with scores aggregating to a total of 100%. The incentive factor enables additional relief of 4.05% for contributing factors representing local conditions, subject to the achievement of KMIs.
- Going forward, OGRA is suggested to monitor performance of Sui companies and achievement of KPIs vis-à-vis agreed KMIs periodically, at least annually especially before approval of Final Revenue Requirement (FRR). UFG control framework aims to bring year on year improvement in UFG levels. Albeit specific funds and resources will be required to achieve these KPIs and augment controls over UFG but the benefits expected to be derived in the form of reduced overall UFG levels will be exemplar.
- The performance of Sui Companies against agreed KMIs shall be validated through an annual review/ assessment by the Authority itself or through an independent expert.
- Our recommendations will be applicable for the next five (5) years as required under our scope of work in the contract, subsequent to which the Authority is advised to review the mechanism and revise the UFG Allowance, if deemed appropriate. However, during the interim revision period, the recommended UFG model may remain valid.
- For the current year, the Authority may review the efforts made by the Sui Companies against their approved annual UFG reduction plans and may provide appropriate allowances to the Sui companies based on their performance against their respective annual UFG reduction plans.
- For the FY 2013, 2014, 2015 and 2016 , the Authority may review its earlier (provisional) UFG Allowances in the FRR, in line with the proposed UFG Control Framework to help ensure appropriate relief is granted to the Sui Companies.

Our Recommendations (Cont.)

A common form calculation to demonstrate the proposed UFG Allowance is as follows:

UFG ALLOWANCE ANALYSIS						
Based on 1000 MMCF	2015	2016	2017	2018	2019	2020
Gas Available for Sale (mmcf)	1,000	1,025	1,051	1,077	1,104	1,131
UFG (mmcf)	152	155	151	144	139	137
UFG Percentage	15.2%	15.1%	14.3%	13.4%	12.6%	12.1%
UFG Allowance						
Rate1 @ 5%	50	51	53	54	55	57
Rate2 @ 4.05%	41	42	43	44	45	46
Beta Factor @ 80%						
UFG Volume Allowance	82	84	87	89	91	93
Effective Allowance %	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%
UFG Disallowed % age	70 7.0%	71 6.9%	64 6.1%	55 5.1%	48 4.3%	43 3.8%
Beta Factor @ 60%						
UFG Volume Allowance	74	76	78	80	82	84
Effective Allowance %	7.43%	7.43%	7.43%	7.43%	7.43%	7.43%
UFG Disallowed % age	78 7.8%	79 7.7%	73 6.9%	64 6.0%	57 5.2%	53 4.6%
Beta Factor @ 40%						
UFG Volume Allowance	66	68	70	71	73	75
Effective Allowance %	6.62%	6.62%	6.62%	6.62%	6.62%	6.62%
UFG Disallowed % age	86 8.6%	87 8.5%	81 7.7%	73 6.8%	66 6.0%	62 5.5%

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Section III –

Way Forward

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Way forward

UFG Management and Control Strategy

- The previous sections of the report discuss the historical trends, contributing factors and impact that rising levels of UFG have on the Sui Companies. To address the latter issue, a structured UFG management and control strategy has been formulated after thoughtful consultation by both the utilities.
- To streamline UFG reduction plan and assist the Sui companies and the Authority in monitoring the UFG reduction progress we have devised a set of KMI's. These KMI's are a set of quantifiable outcomes / results that Sui Companies will use to compare their performance in terms of meeting their strategic and operational goals and if required, take corrective measures thereof.
- Furthermore, the annual UFG allowances as per our recommendations is directly linked to the achievement of these KMI's. The accomplishment of the annual targets monitored by the KMI's will make Sui Companies eligible for the annual UFG allowance in lieu of local challenging conditions to operate.

Proposed Long term plan: *Consolidate and Reduce UFG level to 5.0% by FY 2021.*

Increased Network Visibility	Network Rehabilitation	Theft Control	Research & Development
<p>Reduce Data & Metering Errors</p> <ul style="list-style-type: none"> • Increase network visibility via installation of stringent measurement facilities and enhanced meter witnessing throughout the network. 	<p>Reduce Leakages and Gas Losses</p> <ul style="list-style-type: none"> • Ensure periodic and extensive maintenance of the company network to reduce gas lost as a result of leakages and network deterioration. 	<p>Detect, Monitor & Control</p> <ul style="list-style-type: none"> • Curb gas losses as a result of pilferage of gas by registered and non-consumers through stringent monitoring and vigilance activities. 	<p>Improve and enhance capacity</p> <ul style="list-style-type: none"> • Build capacity of the organization by investing in resources to ensure long term and sustainable improvements in the company operations.

Key Monitoring Indicators achievement will be spread over a period of 5 (five) years according to the agreed UFG Reduction strategy

For each category, action points are proposed and these are discussed in the following pages.

Way forward - Metering

Reduce Data & Metering Errors

Increase visibility of the network by ensuring gas passing through the company's network is accurately measured and accounted for via the installation of stringent measurement facilities throughout the network

Strategy	Corrective Actions	Key Monitoring Indicators (Annual)	Target
Increased Network Visibility	Ensure installation of measurement facilities/ meters at all TBSs/ DRSs (100% metering) Install EVC/ Modem facilities on all meters at TBSs/ DRSs.	Twenty five (25) % of Un Metered TBSs Metered along with EVCs/ Modems per annum (P.a.).	FY 2021
	Segment/ Isolate all TBSs to identify, measure and control supply of gas to areas susceptible to pilferages and losses. (100% Segmentation) Further, Identify areas with gas pilferages and install bulk meters for such areas to enable monitoring of UFG in that particular area.	Twenty (20) % of Un Segmented TBSs segmented/ reconciled P.a.	FY 2022
	Inspect all meters (domestic, commercial, special domestic and industrial) within a 5 year cycle for identification of malfunctioning meters; at least 20% meters inspection annually. Further, Identify customers being minimum billed and ensure it is brought to an acceptable limit of <5% of the total domestic connections	Inspection of all industrial consumer meters over the network once every month.	On-going
		Inspection of all commercial consumer meters over the network once every three (3) months (Quarterly).	On-going
		Inspection of twenty (20) % of all domestic consumer meters over the network annually. (Hundred (100) % meter inspection over a period of five (5) years.	FY 2021
		No. of defected Industrial meters replaced as a % of total defective Industrial meters reported/notified P.a.	On-going
	Identify and replace defected (slow/ PUG/ sticky) meters and bring it to an acceptable level of < 5% of total connections.	No. of defected Commercial meters replaced as a % of total defective Commercial meters reported/notified P.a.	On-going
		No. of defected Domestic meters replaced as a % of total defective Domestic meters reported/ notified P.a.	On-going
	Incorporate in the existing system relevant features or acquire a system with built in features of analyzing the system data and identifying malfunctioning meters on the basis of anomalies identified.	Industrial meters replaced as a % of total Industrial meters qualifying scheduled replacement criteria . Commercial meters replaced as a % of total Commercial meters qualifying scheduled replacement criteria. Domestic meters replaced as a % of total Domestic meters qualifying scheduled replacement criteria.	On-going On-going On-going

Way forward - Rehabilitation

Reduce Leakages and gas losses

Ensure periodic and extensive maintenance of the company network to reduce gas lost as a result of leakages and network deterioration.

Strategy Corrective Actions	Key Monitoring Indicators (Annual)	Target
Replace overage underground distribution network, increase annual rehabilitation of ageing pipelines to control leakages and corrosion.	Length of the underground distribution network replaced (KMs) as a % of total company's annual network replacement target as advised by the Corrosion Control Department.	On-going
Acquire tools with improved features for underground leakage detection and reduce the underground leak per Km to less than 1 leak/ Km.	Reduce present level of 2.2 underground leaks/km gradually to less than 1 leak/km.	FY 2021
Carry out surveys for leak identification and extensive leak rectification of the overhead leakages and reduce it to less than 1 leak/ connection.	Survey twenty (20) % total Domestic connections annually and ratification of detected aboveground leak connections.	FY 2022
Establish additional Cathodic Protection Stations to ensure 100% Cathodic protection over the network to control corrosion.	No. of CP stations installed/refurbished as a %age of CP stations selected for installation/renovation.	On-going
Ensure availability of alternative source power supply at all CP stations.		

Network Rehabilitation

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Way forward - Theft Control

Detect, Monitor & Control

Curb gas losses as a result of gas pilferage by registered and non-consumers through stringent monitoring and vigilance activities.

Strategy	Corrective Actions	Key Monitoring Indicators (Annual)	Target
Theft Control	Enhance/ develop system capabilities to enable automated analysis of billing data and identification/ of gas pilferers on the basis of anomalies identified. During the transition period establish a Special Cells/ units to manually analyze CC&B data to detect abnormal consumer behavior for identification of gas theft.	No. of disconnections in respect of theft as a % of total consumer base of the period.	FY 2019
		Re-inspection of 100% disconnected industrial consumers annually.	On-going
	Re-Inspect all meters disconnected to prevent gas pilferage through reconnections by the disconnected consumers.	Re-inspection of 50% disconnected commercial consumers annually.	On-going
		Re-inspection of 20% disconnected domestic consumers annually.	On-going
	Increase the Turnaround Time (TAT) of the resolution of gas theft complaint applications received during the year.	No. of gas theft/Leakages complaints resolved as a % of actual complaints lodged in the same year.	On-going
	Improve/ Increase the channels for theft complaints available to the general public such as online complaint registration system etc.		

Way forward - Research & Development

Increase and Enhance Capacity

Build capacity of the organization by investing in resources to ensure long term and sustainable improvements in the company operations.

Strategy Corrective Actions	Key Monitoring Indicators (Annual)	Target
Conduct mandatory technical training programs for employees of all levels.	Number of training hours per employee per year.	N/A
Ensure the attendance of employees in seminars/ workshops pertaining to the gas industry, both national and international.		
Establish dedicated research and development cells with the aim to identify/ develop tools for increased efficiency cost reduction.	Improved capability of cost effective construction, maintenance and emergency repairs.	FY 2019
Conduct periodic environmental audits to identify and rectify issues in a timely manner.	Number of environmental issues rectified during the year/ Amount of penalties paid as a result of violation of environmental laws.	FY 2019
Hire environmental experts.		
Improve data quality and timeliness for system, operation, planning and regulatory acceptance.	Volume of data quality issues identified during the	FY 2019
Develop/ acquire systems capable of managing company data year and generating timely reports as and when needed.		
Attend/ organize periodic meetings/ joint sessions with other gas companies in and outside Pakistan for the exchange of ideas/ knowledge sharing.	Number of knowledge sharing meetings/ joint sessions attended/ organized during the period.	N/A

Research & Development

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Way forward Key Monitoring Indicators (KMIs) - Weightage

Key Monitoring Indicators			Beta (β)
S.No.	Strategy	Key Monitoring Indicators (KMIs)	Weightage %
1		Twenty five (25) % of Un Metered TBSs Metered along with EVCs/ Modems.	12.00%
2		Twenty (20) % of Un Segmented TBSs segmented/ reconciled.	8.00%
3		Inspection of all industrial consumer meters over the network once every month	3.00%
4		Inspection of all commercial consumer meters over the network once every three (3) months (Quarterly)	4.00%
5		Inspection of twenty (20) % of all domestic consumer meters over the network annually. (Hundred (100) % meter inspection over a period of five (5) years	6.00%
6	Increased Network Visibility	No. of defected Industrial meters replaced as a % of total defective Industrial meters reported/notified	3.00%
7		No. of defected Commercial meters replaced as a % of total defective Commercial meters reported/notified	4.00%
8		No. of defected Domestic meters replaced as a % of total defective Domestic meters reported/notified	6.00%
9		Industrial meters replaced as a % of total Industrial meters qualifying scheduled replacement criteria	2.00%
10		Commercial meters replaced as a % of total Commercial meters qualifying scheduled replacement criteria	3.00%
11		Domestic meters replaced as a % of total Domestic meters qualifying scheduled replacement criteria	4.00%
12	Network Rehabilitation	Length of the underground distribution network replaced (KMs) as a % of total company's annual network replacement target as advised by the Corrosion Control Department	8.0%

Way forward Key Monitoring Indicators (KMIs) - Weightage

Key Monitoring Indicators			Beta (β)
S.No.	Strategy	Key Monitoring Indicators (KMIs)	Weightage %
13	Network Rehabilitation	Reduce present level of 2.2 underground leaks/km gradually to less than 1 leak/km	8.0%
14		Survey twenty (20) % total Domestic connections annually and ratification of detected aboveground leak connections	5%
15		No. of CP stations installed/refurbished as a %age of CP stations selected for installation/renovation	5%
16	Theft Control	No. of disconnections in respect of theft as a % of total consumer base of the period	4%
17		Re-inspection of 100% disconnected <u>industrial</u> consumers annually	1%
18		Re-inspection of 50% disconnected commercial consumers annually	2%
19		Re-inspection of 20% disconnected domestic consumers annually	2%
20		No. of gas theft/Leakages complaints resolved as a % of actual complaints lodged in the same year	5%
21	Research & Development	Number of training hours per employee per year	1%
22		Improved capability of cost effective construction, maintenance and emergency repairs	1%
23		Number of environmental issues rectified during the year/ Amount of penalties paid as a result of violation of environmental laws	1%
24		Volume of data quality issues identified during the year.	1%
25		Number of knowledge sharing meetings/ joint sessions attended/ organized during the period.	1%
Total %			100%



Annexure

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Annexure A - Notice to the Reader

Limitations

- This engagement was carried out from 22 April 2016 to 17 August 2016 and the data and information relevant for this report was gathered during that period. We have not sought to update the data, information or report for events or circumstances after that date.
- We have relied on the documents, MIS reports, extracts and information provided to us by the management of Sui companies and the Authority and have not verified these from independent sources except wherever deemed necessary.
- The information gathering generally included meetings with key management personnel of the Sui companies and the Authority and desk-based research. Our fieldwork was conducted at the premises of SSGC and SNGPL and desktop searches and data analytics were made at KPMG Karachi office.
- Our study is also based on the information and studies available publicly at research portals, specialized institutes and KPMG knowledge base.
- In preparing our report, our primary source has been the information provided to us by the Sui companies and the Authority, local internal management information and representations made to us by management of the Sui companies. Details of our principal information sources are set out in Bibliography.
- The views expressed in this document are based on our understanding of current laws and regulations and the best practice followed by the companies. Whilst every effort has been made to ensure reasonable accuracy of the views and information provided in this report, no responsibility for any loss sustained to any institution acting or refraining from action as a result of the above views, can be accepted by KPMG.
- The report should not be considered as absolute assessment of UFG related practices of the Sui companies and is subject to the guidelines, instructions and regulations issued by the Authority from time-to-time and/or any other regulatory/competent authority.
- We have not conducted any audit, review or assurance engagement, thus have not provided any opinion on the performance or operational efficacy of the Sui companies and/or the Authority or any other organization associated to them. The recommendations provided in this document are based on our understanding of the current regulatory environment and the operations of the Sui Companies.
- Our analysis on theft by both registered and non-registered consumers does not consider the implication of IFRS 15 on financial statements of both the Sui companies.
- Our conclusions are based on the completeness and accuracy of the facts, assumptions and representations provided to us. If any of the information provided to us is not entirely complete or accurate, it is imperative that we be informed immediately, as this could have a material affect on conclusions.
- Our interpretation of the regulations and comments are not binding on the authorities and hence there can be no assurance that the authorities will not take a position contrary to our comments.
- We have relied upon the relevant information provided by the Sui companies and the administrative interpretations thereof. These practices may be subject to change, retroactively and prospectively, and any such changes could affect the validity of our conclusions. We are not responsible for updating our advice for changes in law or interpretation after the date hereof. We are not acting in the capacity of legal advisors of the Authority and Sui Companies. The comments provided herewith, therefore, do not constitute any legal opinion.
- Any advice in this document is not intended or written by KPMG to be used, and cannot be used, by a client or any other person or entity for the purpose of (i) avoiding penalties that may be imposed by any competent authority or (ii) promoting, marketing or recommending to another party any matters addressed herein.
- The limitations and constraints as to the availability of the information on the quantification and relating to the measurement of UFG contributing factors viz. gas theft, pipelines leakages together with and including incapability of Sui Companies regarding measurement metering plausibly limits us to propose a single benchmark UFG. Hence, we have studied and provided with UFG Allowance formula for the Sui companies in our study.
- We have considered UFG allowance rates applied internationally by developing and developed countries' regulatory authorities. Since there is no direct comparability of Sui Companies with any other company due to size and unbundling of company operations, we have proposed a relaxed allowances to reflect and translate demographical challenges and constraints of the country.
- We believe that the maintenance of adequacy and completeness of the information and related controls is the responsibility of the management of Sui companies. Due to inherent limitations in information management and internal controls, errors or fraud may occur and not be detected.
- Also, information and controls found to be accurate and functioning at a point in time, may later be found deficient because of the performance of those responsible and maintain them, and there can be no assurance that information and controls currently in existence will prove to be adequate and complete in the future as changes take place in the companies.
- The findings in our report are the result of performing the scope of work as defined in our Contract for Services "UFG Study", and based on information made available to us. We might have become aware of further information that could be relevant to the present report should additional work have been included in the scope of our terms of references, or additional information was made available to us.

Annexure A - Notice to the Reader (cont.)

- Where our report makes reference to statements of any individual, those statements are clearly indicated as such.
- Our work has not taken into consideration any tax, legal, civil or criminal law implication arising from the assessment carried out and reported in this document.
- The content of our report has not been reviewed by Sui Companies employees/ BOD / other officials.
- We have satisfied ourselves, so far as possible, that the information presented in our report is consistent with other information which was made available to us in the course of our work in accordance with the terms of our contract for services "UFG Study" and have relied on the documents and information provided to us by the management of the Sui companies and the Authority. We have not, however, sought to establish the reliability of the sources by reference to other evidence and have not verified these from independent sources except wherever deemed necessary.
- This document has been prepared specifically to provide an independent study of the UFG and TORs as described in our Contract; and accordingly should not be used for any other purpose.
- This document is confidential and for the internal use of the Authority. Accordingly, the circulation of this document should be restricted and should not be distributed to any person other than the management of the Authority or referred to or quoted, in whole or in part, without our prior written consent except as specifically provided in terms and conditions annexed to our contract.
- In the event KPMG is requested pursuant to subpoena or other legal process to produce its documents relating to this engagement for the Company in judicial or administrative proceedings to which KPMG is not a party, the Authority shall reimburse reasonable expense incurred in responding to such requests.

- Limitations exist regarding availability of demographical information for the comparable countries and UFG related information relating to Pakistan and comparable countries which inter alia include YoY increase in gas pipelines, per capita consumptions, historical trends of gas consumer, change in networks from urbanized to rural network, etc. Had such additional information been available to us, our recommendations to the study might have differed from the one provided in the report.

Confidentiality

- This report addresses factual issues and does not consider legal issues. We have undertaken the work described in accordance with the objectives of this report. In light of this, the report should therefore not be regarded as suitable for any other purpose and, to the extent that other persons choose to rely on the report, they do so at their own risk. We will accordingly accept no responsibility or liability in respect of it to persons other than OGRA.
- This report, is private and confidential, is for your information only, and has been prepared solely in connection with TORs set out in our Contract for services on "UFG Study" dated 21 April 2016. For the avoidance of doubt our report may not be disclosed, copied, quoted or referred to in whole or in part to anyone as permitted above without our prior written consent.
- Such consent, if given, may be on conditions, including without limitation an indemnity against any claims by third parties (and/or the signing of "hold harmless" letters by those 3rd parties) arising from the release of any part of our report.
- In addition, we have no obligation to update our report or to revise the information contained herein because of events or transactions occurring subsequent to the date of the completion of our fieldwork up to 17 August 2016.

Legal Advice

- Although our report may contain references to relevant laws and legislation, we do not provide legal opinion on the compliance with such laws and our findings in this report are not to be construed as providing legal advice. Our discussion of the relevant laws is intended solely to facilitate the determination of applicable facts which may be relevant to the interpretation and/ or application of such laws. Should such interpretation require legal advice, we recommend that independent legal advice be obtained.
- We have not assessed legal and other risks which might arise for the Authority and / or Sui companies as a consequence of the events and facts described in this report.

Annexure B - Key Terminologies Used

Access Arrangement	An arrangement between transporter and shipper or between transporter and other connected system operator as approved by the Authority.
AHA	[A homogenous area which means a part of the gas pipeline transportation system within which the same quality of gas is received or delivered, over a specified time period.
Available capacity	The difference between the technical capacity and contracted capacity.
Base Conditions	[Volume and gross calorific value which shall be measured at base conditions of 14,65 PSIA and 60 degree Fahrenheit, however, calorific value calculation shall be as defined in Gas processing Association (GPA), American Society for Testing Materials (ASTM) or ISO relevant standard.
Bulk / wholesale consumer	A consumer who purchases natural gas for resale
Capacity allocation	Maximum daily quantity (MO) in MMCFD of gas which can be delivered at a certain entry point and exit point, in accordance with relevant access arrangement
Common Carrier	Facility declared to be available by transporter to provide service to all shippers which discrimination.
Connected System	A natural gas transmission or distribution system or a natural gas production facility or a LNG terminal or a natural gas storage facility that is interconnected with transporter's gas pipeline transportation system.
Consumer	means and includes a person who receives a supply of gas under contract with a Gas Utility Company for the specific purpose of consumption and a premises that is connected to a gas pipeline for the purposes of obtaining supply of gas and includes a successor in- interest of a consumer and includes Compressed Natural Gas (CNG) Stations which receive gas for their own consumption and resale for vehicular use.
Contracted Capacity	Firm capacity that the transporter committed with gas producers, its consumers, aggregated volume contracted with other shippers for transportation or connected system operator at the time of capacity declaration in volumetric terms on daily, monthly or yearly basis under an access arrangement.
Custody transfer measuring facility	A facility which measures the quantity (in terms of volume and energy) and quality of natural gas for transfer of custody from one shipper to transporter.

Annexure B - Key Terminologies Used (cont.)

Entry Point	The flange at downstream of the meter at which the gas delivered by shipper or by connected system operator, is injected into the gas pipeline transportation system of the transporter.
EVC	An Electronic Volume Corrector, which corrects gas volume registered by the meter at line conditions to the base or contracted pressure and temperature values as stipulated in a gas supply contract between a Gas Utility Company and a consumer.
Exit Point	The flange at downstream of the meter at which the gas is withdrawn from the gas pipeline transportation system of the transporter.
Gas main	A distribution line that serves as a common source of supply of natural gas for more than one service line.
Gas pipeline transportation system	All transmission and distribution pipeline, spur pipelines, associated facilities downstream of gas producer's processing plant or shipper's delivery point, re-gasification terminal which are used for transportation of natural gas from one point to another, but shall not include the gas processing plant and re-gasification terminal pipeline within the battery limit of isolation valves of the plant or terminal.
Houseline	Pipes and fittings, approved and tested by the Gas Utility Company, on and located within any property boundary wall for which gas sale and purchase agreement has been executed or perimeter used for the purposes of receiving the supply or the consumption of gas.
Line pack	The volume of gas in segment of gas pipeline transportation system at a certain point of time at a defined gas specification, temperature and pressure.
Natural Gas	Hydrocarbons or mixture of hydrocarbons and other gases which at 60 degrees Fahrenheit and atmospheric pressure are in the gaseous state (including gas from gas wells, gas produced with crude oil and residue gas and products resulting from the processing of gas) consisting primarily of methane, together with any other substance produced with such hydrocarbons.
Negative Imbalance	The imbalance created by the shipper if the shipper off-takes more quantity of gas from the gas pipeline transportation system than injected into it. Shipper shall be allowed a negative imbalance of one percentage of contracted capacity as tolerance limit. Any negative imbalance over the tolerance limit shall be liable to charges as agreed in access arrangement, in addition to transportation charges.
Nomination	Notification process between the shippers and the transporter to schedule shipper's daily delivery and off-take quantities relating to each entry point and exit point, agreed in the access arrangement.

Annexure B - Key Terminologies Used (cont.)

Positive Imbalance	Imbalance created by the shipper if he off-takes less quantity of gas from the gas pipeline transportation system than injected into it. Shipper shall be allowed a positive imbalance of two percent of contracted capacity as tolerance limit and any positive imbalance over the tolerance limit shall be liable to charge as agreed in access arrangement, in addition to transportation charges.
RLNG	Natural gas obtained after gasification of liquefied natural gas (LNG) conforming to RLNG specifications as set out in Schedule III.
Sale	Sale of gas to consumers of gas including gas internally consumed by a Gas Utility Company in connection with its regulated activity.
Transportation Loss	The quantity of gas, which is unaccounted for by reasonable and prudent operator including but not limited to measurement uncertainty, blow downs, venting or releases during regular operation and maintenance of the gas pipeline transportation system used as common carrier. The volume of such gas would be calculated on the basis of past three years historical data of actual losses in defined transmission pipeline network distribution or supply main network or segment. In case the historical data is not available the same shall be agreed upon by transporter and shipper through the access arrangement and shall be approved by the authority.
Transportation Tariff	The charges payable by shipper to transporter, as approved by the authority from time to time, for transporting unit volume of gas including fixed charges under the access arrangement.
Unaccounted For Gas	In respect of a financial year, the difference between the total volume of metered gas received by a licensee during that financial year and the volume of natural gas metered as having been delivered by the licensee to its consumers excluding therefrom metered natural gas used for self consumption by the licensee for the purpose of its regulated activity; and such other quantity as may be allowed by the Authority for use by the licensee in the operation and maintenance of its regulated activity.
Unauthorized use of gas	Means and includes the acts of receiving, consuming or providing a supply of gas from a pipeline or a meter of a Gas Utility Company other than that contracted for by any person, the unauthorized receipt of more gas than is registered by the meter or other measurement device, tampering to increase metering pressure, unauthorized enhancement of gas loads other than contracted for, consuming gas through by-passing of a meter or other measurement device and gas usage by direct tapping to the gas supply of a Gas Utility Company.
Theft	Theft of natural gas means use / consumption of gas in unauthorized / un-lawful manner for which the user / consumer has neither been billed nor he/she has paid for such consumption.

Annexure C - Chronology of Events

Over the course of the UFG study exercise, without compromising our independence, we have been actively involved in consultations with all the relevant stakeholders including both the Sui Companies and OGRA at multiple intervals in order to get their viewpoints and observations on our report and findings. Further to our meetings and comments thereof provided by OGRA and the Utilities, where necessary, we have reflected and made changes to our second draft report. Details of the meetings/consultative sessions is as follows

Date	Location	Event	Attendees
31 Dec 2015	OGRA Office Islamabad	<ul style="list-style-type: none"> Proposal Submitted by KPMG provision of advisory services related to UFG benchmarking. 	
2 Feb 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> KPMG presented its proposal for UFG Benchmarking to the Authority involving its approach, methodologies and relevant credentials. 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives
19 April 2016	SSGC Karachi Office	<ul style="list-style-type: none"> SSGC presented its stance/ position to KPMG 	<ul style="list-style-type: none"> SSGC Management KPMG Team
21 April 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> Project Kickoff meeting. 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives SNGPL Management SSGC Management
21 April 2016 to 30 Sep 2016	SSGC Karachi Office	<ul style="list-style-type: none"> On- Field Project Execution 	<ul style="list-style-type: none"> KPMG Team SSGC Management
17 July 2016 To 21 July 2016	SNGPL Lahore Office	<ul style="list-style-type: none"> On- Field Project Execution 	<ul style="list-style-type: none"> KPMG Team SNGPL Management
27-Jul-16	SNGPL Lahore Office	<ul style="list-style-type: none"> Meeting on the stance/ position of the Sui Companies on the UFG issue. 	<ul style="list-style-type: none"> KPMG Team Mirza Mahmood Baig

Annexure C - Chronology of Events (Cont.)

Date	Location	Event	Attendees
11 Aug 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> Meeting on Project progress and way forward 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives SNGPL Management SSGC Management
16 Aug 2016	Karachi	<ul style="list-style-type: none"> KPMG Team attended OGRA Public Hearing. 	<ul style="list-style-type: none"> OGRA Representatives Public KPMG Team
08 sept 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> Meeting on Project progress and way forward 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives
20 sept 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> KPMG submitted the 1st draft of the UFG study report 	
	OGRA Office Islamabad	<ul style="list-style-type: none"> KPMG presented the 1st draft of the UFG study report to the Authority. 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives
29 Dec 2016	OGRA Office Islamabad	<ul style="list-style-type: none"> KPMG discussion with Sui Companies and the Authority on the 1st draft of the UFG study report. 	<ul style="list-style-type: none"> KPMG Team OGRA Representatives SNGPL Management SSGC Management

Annexure D – Key Persons Interviewed

Key person Interviewed

No.	Name	Designation	Department	Company
1	Amin Rajput	Acting Managing Director	-	SSGCL
2	Board UFG Committee	-	Board Committee	SSGCL
3	Fasih Uddin Fawad	Acting Chief Financial Officer	Regulatory Affairs	SSGCL
4	Muhammad Kamran	Acting Deputy General Manager	Research and Development	SSGCL
5	Samad Lakhani	Head of UFG department	UFG	SSGCL
6	Abdul Wadood		UFG	SSGCL
7	-	SGM Distribution – North	Distribution	SSGCL
8	Nadeem Qayoom	General Manager	Distribution	SSGCL
9	Hussain Qazi			SSGCL
10	Mahmood Jilani	Deputy General Manager	Transmission	SSGCL
11	-	General Manager	Billing	SSGCL
12	Haneef Ghazi		Billing	SSGCL
13	Nawab Ali Shah		Customer Relationship	SSGCL
14	Kashif Qadeer		Customer Relationship	SSGCL
15	Muhammad Taj	Deputy General Manager	Measurement	SSGCL
16	Qadir Bux	Chief Engineer	Measurement	SSGCL

Key person Interviewed

No.	Name	Designation	Department	Company
17	Arshad Qazi	Deputy General Manager	Meter Repair Shop	SSGCL
18	Muhammad Zubair		Measurement	SSGCL
19	Khuram Nayar	Engineer - Gas Quality	Measurement	SSGCL
20	Amjad Lateef	Managing Director	-	SNGPL
21	Mirza Mehmood Ahmed	Board Member	Director	SNGPL
22	Muhammad Kamran Akram	Chief Accountant	Finance department	SNGPL
23	Abdul Aziz	General Manager	UFG department	
24	Qaiser Masood Khan	Chief Engineer	UFG department	SNGPL
25	Jamshed Riaz	Engineer	UFG department	SNGPL
26	Kahif Javed	Deputy Chief Accountant	Regulatory Affairs	SNGPL

Annexure E - Key information/documents reviewed

Following are key documents/information that came to our consideration during our study:

S.No.	Documents
1	National Gas Tariff Rules, 2002
2	OGRA Ordinance, 2002
3	Natural Gas Regulatory Authority (Licensing) Rules, 2002
4	Sui companies Licenses
5	Criminal Law Amendment Act, 2011
6	Theft Control Ordinance 2014
7	Procedure for dealing with theft, 2005
8	Natural Gas Third Party Gas Access Rules 2012
9	Low BTU Gas Pricing Policy, 2012
10	Natural gas Allocation & Management Policy, 2005
11	Natural Gas Consumer Price Notifications
12	Standard technical Specification for Equipment and Material used in Transmission & Distribution.
13	Audited Financial Statements of the Sui Companies
14	Annual Reports of the Oil and Gas Regulatory Authority
15	Estimated Revenue Requirement of the Sui companies from 2003 to 2015

S.No.	Documents
16	SSGC's UFG Committee presentations
17	Revised Estimated Revenue Requirement of the Sui companies from 2003 to 2015
18	Final Revenue Requirement of the Sui companies from 2003 to 2015
19	Economic Coordination Committee Decisions
20	Petitions filed by the Sui companies
21	International UFG studies
22	Judgments / Decisions by the Civil Courts

Annexure F - Revision of Method for calculating UFG

Revision of Method for Calculating UFG

Annex-2

- Following formula is presently being used by OGRA for calculation of %age UFG:

$$\% \text{age UFG} = \frac{\text{Gas Available for Sale} - \text{Gas Sold}}{\text{Gas available for Sale}} \times 100$$

whereas 'Gas Available for Sale' is arrived at by deducting from Gas Input, the volume of gas used by the company for operation and maintenance of its regulated activity.

i.e.

Gas available for Sale =

$$\left\{ \text{Gas Purchased from Sources} \right\} - \left\{ \text{Volume of gas used by the Company for operation and maintenance of its regulated activities} \right\}$$

- The above formula is not in line with the definition of UFG given in the Rule (2) (1)(m) of 'Natural Gas Tariff Rules, 2002':

"Unaccounted for natural gas" means, in respect of a financial year, the difference between the total volume of metered gas as received by a licensee during that financial year and the volume of natural gas metered as having been delivered by the licensee to its consumers excluding there from metered natural gas used for self consumption by the licensee for the purposes of its regulated activity and such other quantity as may be allowed by the Authority for use by the licensee in the operation and maintenance of its regulated activity."

- Based on above definition given in Rule No. Rule (2) (1)(m) of 'Natural Gas Tariff Rules, 2002', the UFG must be calculated by considering:

Unaccounted for natural gas i.e. UFG = (A - B) - C

Where:

A = Receipts = Total volume of metered gas as received by a licensee during that financial year = Gas received by the company during that financial year

B = Deliveries = Volume of natural gas metered as having been delivered by the licensee to its consumers/customers

C = Metered natural gas used for self consumption by the licensee for the purposes of its regulated activity and such other quantity as may be allowed by the Authority for use by the licensee in the operation and maintenance of its regulated activity

$$\begin{aligned} \text{Unaccounted for natural gas i.e. UFG} &= (A - B) - C \\ &= A - B - C \\ &= A - (B + C) \end{aligned}$$

$$\% \text{Age UFG} = \frac{A - (B + C)}{A} \times 100$$

The above formula for UFG Calculation is in exact accordance with the definition of UFG given in the Rule (2) (1)(m) of 'Natural Gas Tariff Rules, 2002' so %AGE UFG must be calculated on the basis of 'Gas Input' from sources as Denominator, instead of 'Gas Available for Sale'.

The above formula for UFG Calculation is also in conformity to the international practices, as is evident from the following examples:

1. UFG calculation methodology adopted by AGA (American Gas Association), which is as under:

"LAUF i.e. Loss-and-Unaccounted for gas (also called LUAF, L&U, LUG, LUF, UFG) is the difference between the gas measured into a system and the gas measured out of a system or otherwise accounted for, including the change in volume of gas contained by the system (also known as 'System pack' or 'Line Pack')"

2. Formula used by M/s Chevron, USA for UFG calculation is as under:

$$\text{UFG} = \frac{\text{Deliveries} - \text{Receipts} + \text{Closing Inventory} - \text{Opening Inventory}}{\text{Receipts}}$$

where

Receipts	=	Gas received in the system
Deliveries	=	Volumes Sold + Volume Consumed
Inventory	=	Line fill adjusted to standard conditions.

Annexure G -Revenue Requirement

A. Final Revenue Requirement for FY 2011-12

Particulars	Rs. in Million		
	The Petition	Adjustment	Determined by the Authority
Gas sales volume BBTU	343,761		343,761
A Net Operating Revenues			
Net sales at current proscribed price	127,835	-	127,835
Meter rentals	643	-	643
Amortization of deferred credit	387	-	387
*Sale of gas condensate	37	-	37
Gas transportation charges	10	-	10
Revenue from JJVL	1,742	-	1,742
Other operating income	907	-	907
*Late payment surcharge (LPS)	-	-	-
*Meter manufacturing profit (MMF)	-	-	-
*Royalty income from JJVL	-	-	-
Total Operating Revenue *A*	181,581	-	181,581
B Less: Operating Expenses			
Cost of gas	117,885	-	117,885
UFG Adjustment	(2,084)	(2,385)	(4,469)
UFG Adjustment pertaining to FY 2007-08	-	(98)	(98)
Transmission and distribution cost	9,789	(451)	9,338
Gas internally consumed	233	-	233
Depreciation	3,578	-	3,578
Other charges including (W.P.F.F)	1,437	(154)	1,303
Total Operating Expenses *B*	130,859	(8,088)	127,771
C Operating profit (A-B)	723	3,088	3,811
Return required on net operating fixed assets:			
Net operating fixed assets at beginning	44,785	-	44,785
Net operating fixed assets at ending	48,071	-	48,071
Average net assets (I)	46,428	-	46,428
Meter manu. Plant asset at beginning	37	-	37
Meter manu. Plant asset at ending	34	-	34
Average net assets (II)	36	-	36
LPG air mix project asset at beginning	479	-	479
LPG air mix project asset at ending	507	-	507
Average net assets (III)	493	-	493
Deferred credit at beginning	5,519	-	5,519
Deferred credit at ending	5,336	-	5,336
Average net deferred credit (IV)	5,428	-	5,428
D Average (I-II-III-IV)	40,472	-	40,472
E 17% return required	6,880	-	6,880
F Shortfall in return required (C-E) (Gas Operations)	6,158	(3,088)	3,070
G Additional revenue requirement for Air-Mix LPG Project	279	(24)	251
Total Shortfall (F+G+H)	6,433	(3,112)	3,321
Increase in average proscribed price effective (Rs./MMBTU) w.e.f July 01, 2011	18.71	(9.04)	9.66
Estimated revenue requirement (B+E+G)	138,014	(3,112)	134,902
Average Prescribed Price (Rs. per MMBTU)	390.58	(9.05)	381.53
Increase allowed in avg. PP to the extent of shortfall of Rs. 1,663 million (Rs./MMBTU)			4.84
Remaining shortfall to be adjusted in FRR for FY 2012-13			1,658

* Sale of gas condensate, LPS, MMF and Royalty from JJVL has been treated as non-operating income in line with the decision of Sindh High Court.

Table 15: Calculation of UFG

Particulars	MMCF	
	The Petition	Determined by the Authority
Gross Purchases	406,551	406,551
Gas Consumed Internally - metered	549	549
(Inc.)/Dec. Gas in pipeline	32	32
Loss due to sabotage activity / ruptures - unmetered	233	233
<i>Sub-total</i>	<i>814</i>	<i>814</i>
Gas Available for Sale (A)	405,737	405,737
Gas billed volumes	353,834	353,834
Minimum Billing (Domestic)	9,803	5,816
Gas Theft claims - disconnected registered consumers	773	-
Gas Sales (Total)	364,409	359,649
Add:		
Unbilled pilfered volume in law & order affected areas	1,286	-
Pilfered volume detected against non-consumer	2,059	-
Un-acknowledged gas theft claims - registered consumer	126	-
Gas Shrinkage at LPG Plant (JJVL)	2,164	2,164
Gas Shrinkage at LHF & Others	103	103
Total Gas Sales (B)	370,146	361,916
Gas Unaccounted For (A - B)	35,591	43,821
Gas Unaccounted For (%)	8.77%	10.80%
UFG at 7%	28,402	28,402
Disallowed volumes - MMCF	7,189	15,420
Disallowed volumes - MMBTU	6,780	14,541
WACOG - Rs per MMBTU	307.34	307.34
Disallowed value over & above UFG targets - Rs Million	2,084	4,469

Annexure H - Procedure for Dealing with Theft of Gas Cases

PROCEDURE FOR DEALING WITH THEFT OF GAS CASES

Definition: Theft of natural gas: -

Theft of natural gas means use / consumption of gas in unauthorized / un-lawful manner for which the user / consumer has neither been billed nor he/she has paid for such consumption.

A. FOLLOWING ARE POSSIBLE INSTANCES OF ACTS WHICH TENTAMOUNT TO THEFT: -

- Tempering with the meter, volume corrector and recording instruments (flow, pressure and temperature recorders).
- Reverse installation of meter by the consumer i.e. inlet at outlet and vice versa.
- Securing gas by removing meter and connecting inlet/ outlet by rubber pipe or other tubing or using unmeasured gas through by pass point before meter.
- Using gas without obtaining gas connection or reconnection of a disconnected gas supply connection by the consumer.
- Suction of gas from disconnected gas service lines by mechanical device or illegally restoring the service.
- Increasing pressure of gas from pre-set setting / value by tampering with the pressure regulator or securing gas online pressure by removing regulator.
- Taking un-authorized "off-take" from the distribution supply main.
- Reversing of meter reading by back flow of air using a blower / tempering index of meter or by other mechanical means.
- Using un-metered gas by taking off-take before meter inlet coupling/spud.
- Tempering / blocking of sensing elements of volume correctors for less registration of corrected volume.
- Increase in load by the consumer resulting in meter becoming under capacity and consequential under /short billing. Tempering of meter's / regulator's seals to secure more gas than registered by the meter /Tempering of meters / regulators seals to secure more gas than registered by the meter.
- Installation of stolen / unauthorized meter by a disconnected consumer or an unregistered consumer.
- Using un-metered gas by removing meter index.
- Illegally restoring gas supply by damaging / breaking of company's installed disconnection lock.
- Using gas in category of tariff not allowed by the utility.

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- Cutting cage of CMS for any kind of tampering and then re-welding.
- Any other mode not specified herein above.

B. INFORMATION: -

Any information from company's own sources, outside sources, consumers, members of the public, telephone calls regarding theft, unauthorized and unlawful use of gas by any consumer, person or premises shall be duly registered by designated officials of the company as an important information, which shall be maintained confidentially and will not be ignored and appropriate action for detection, confirmation and recovery shall immediately be initiated.

C. BASIS OF SUSPICION: -

One or more of the following events and / or circumstances shall form the basis for suspicion of theft: -

- Index of meter found stuck-up for movement or recording slow and / or meter bearing evidence of such tempering which may allow the meter to pass gas without being registered on the index counter. Seals of the meter found tampered or broken.
- "Gas Pressure regulator" bearing such indication and / or evidence of tampering which may cause flow of gas at higher pressure than pre-set value or that contracted for /Seals of regulators found tempered or broken.
- Unauthorized connection from main/ upstream of meter.
- Gas flowing to the consumption units without being registered on the meter.
- Deliberately taking more than contracted volume over and above rated meter capacity causing wear and tear and consequential slowing/ stoppage of meter.
- Gas flowing to a premises where existence of a legitimate metered connection is not observed / evident.
- Any other reasonable cause not mentioned herein above.

D. ACTION OF THE COMPANY: -

- The company may in association with local and provincial government, acquire services of Magistrate or a judicial officer and police and / or personnel from the Army / Paramilitary establishment (as an alternative to police force) for conducting raids on suspected consumers.
- Meter testing workshops/mobile-testing workshops shall be established at all regional head quarters as far as possible keeping in view operational requirement, but not later than two years with effect from July 01, 2005.
- In case of strong evidences leading to confirmation of the act of theft, the company will disconnect the gas supply of the consumer /

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Annexure H - Procedure for Dealing with Theft of Gas Cases (cont.)

defaulter immediately and will remove all devices which can facilitate the consumer/ defaulter in illegal restoration of gas supply.

Following procedure shall be adopted while undertaking disconnection:-

- Physical / visual appearance of the meter and / or pressure regulator shall be documented preferably in the presence of a representative of the defaulter consumer.
- The disconnected meter and / or regulator shall be taken into personal custody by a responsible designated official of the company who shall place the equipment in a bag / container which shall be sealed at the site. Time and date shall be logged.
- The observations made at the time of disconnection shall be logged / documented and signed by all the members of the disconnection team. The document on which the said observations are recorded will be enclosed in the box / container in duplicate with copies to Head of department and local Regional General Manager. The company shall send a quarterly report to OGRA giving addresses of premises where acts of theft are confirmed, as well as brief description of mode of theft.
- The suspected equipment shall be dispatched to the "Local / nearest Testing Workshop/ Laboratory" within two working days of disconnection.
- Safe and secure handling of the equipment shall be ensured during transportation / transit to protect against possible damage.
- The official taking charge of the equipment in testing workshop / laboratory shall break open the seal of the bag in the presence of the person delivering the equipment. Moreover, out of two, one copy of the document accompanying the meter in the container shall be endorsed by the official receiving it and returned to the one delivering it for handling; over the same to General Manager / Incharge of the Region to which the meter pertains and would also confirm the physical / visual condition of the equipment as recorded by the inspection/raiding team. *Testing of internal parts / operation of meter and flow proving shall be carried out in the laboratory and reported to the G.M of the region within five working days, in case of industrial category and ten working days, in case of commercial / domestic category after the receipt of meter.*
- The meter will be tested if desired by the customer in his presence or otherwise the absence of the customer will be noted.

E. DETECTION AGAINST DIRECT TAPPING / UNAUTHORIZED PRESSURE ENHANCEMENT:-

- The direct tapping including 'Self-reconnection / connection' cases shall be checked by company's vigilance team on receipt of any information, preferably in association with a Magistrate or judicial officer and Police/ Army / Paramilitary Personnel.

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- The physical evidence shall be documented and photographs of means of direct tapping or ' Self-reconnection / connection' of disconnected premises shall be taken.
- As far as possible the evidence shall be witnessed by the accompanying Magistrate or judicial officer and police contingent / Army /Paramilitary Personnel.
- The cases of un-authorized enhancement in pressure over and above pre-set approved metering / billing pressure shall be substantiated with available evidences , authenticated in the site reports.
- Disconnect the consumer/person / premises using gas un-authorizedly and removed devices /installations used for the purpose.
- Take appropriate action including invoking of Section 27 of Chapter V of OGRA Ordinance, 2002.

F. ASSESSMENT OF VALUE OF GAS STOLEN AND RECOVERY:- Meter Tempering Cases:-

When any consumer is established to be involve in a gas theft using gas through tampering with the meter or instruments installed / mounted on or along the meter (i.e. volume corrector, or pressure- temperature recorder), or any act mentioned in clauses "A", "C" or "G" the volume of gas stolen by consumer shall be assessed taking into consideration the following:-

1. Period / duration of suspected theft will be assessed on direct and circumstantial evidence taking into accounts the reports of previous checking / inspection of site by company's technical staff / officer, checking of meter by metering workshop officials. Unless the circumstances specifically necessitate, the period of suspicion shall be counted from the period the consumption behavior of the consumer has shown decline over the normal / connected load or consumption pattern of the past period till the date of raid / confirmation of pilferage. The assessed volume / BTUs shall be compatible with highest consumption of corresponding months in previous three years or on subsequent replaced meter's consumption, provided that the suspected period shall not exceed 12 months.
2. Connected load (connected load shall be based on appliances actually installed and taking load of each in comparison to predetermined load of each appliance). The connected load will be assessed by three members committee comprising of one representative each from Engineering, Sales and Billing Sections.
3. Working hours (the assessed working hours shall be based on type of business. Reference of sales survey report specifying number of hours may be made). The working hours will also be assessed by a three members committee comprising of one representative each from Engineering, Sales and Billing Sections.

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Annexure H - Procedure for Dealing with Theft of Gas Cases (cont.)

4. The Gas flow rate shall be recorded as registered by the installed meter which will latter be flow proved at Metering Workshop to determine the accuracy of measurement, within two weeks.
5. Assessed period of consumption through tempered meter (the assessment will be made taking into consideration the prominent "dips" in billed volume / BTUs, the period of claim will be last three / five years. In case the period of pilferage is determine more than 12 months, the period of claim will be restricted up to 12 months.)
6. The amount to be charged for previous period shall be based on the prevalent sale prices.
7. Flow proving report / meter inspection report in meter testing shop
8. The reconnection of a registered consumer shall be carried out when recovery of at least 25% of the amount levied has been made along with "reconnection charges" as well as written agreement between the company and consumer on the amount agreed upon and mode of payment.
9. An in-house committee headed by a Senior General Manager and comprising Senior level representatives from Finance / Billing, Audit, Distribution, Measurement and Theft Control Department shall be constituted to review the appeals of the consumers charged for theft of gas. The alleged consumer shall have the right to be present before the review committee for presentation of his case.

In case of domestic consumers, the available record alone shall not form basis of recovery because in domestic consumption weather / seasonal affects have significant bearing, therefore consumption of the corresponding months too shall be considered for assessing charges to be claimed for the period as is determinable, however, not exceeding 12 months.

G. TAMPERING OF METERS NOT DETECTED AT SITE BUT LATER DETECTED / PROVED AT COMPANY'S METER SHOP.

Where tampering of meter is not detected at site but later proved in the Central Meter Shop / Regional Meter Shop which inspection shall be carried out within time limit i.e. for industrial 3 weeks, for commercial 6 weeks and for domestic consumers 12 weeks, the basis of assessment of value of gas stolen and recovery of amount from defaulting consumer shall be the same as per clause 'F'. However, the company shall not claim such charges later than six months after removal / replacement of meter at the site. The recoveries shall have to be evaluated and finalized by the in-house committees within stipulated time frame of 06 months.

- LPS/GST will also be recovered as applicable.

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- The cost of meter and other damaged or affected ancillaries / equipment may also be recovered from the consumer.

H. PROCEDURE FOR RECOVERY OF GAS THEFT CHARGES FROM NON-CONSUMERS

Gas theft charges shall be determined as per procedure, and legal notice will be served to the defaulter for depositing the gas theft charges to the company, as per provisions of CGRA Ordinance and Rules / Regulations made there under.

Draft

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Annexure I - Amendment in Procedure for Dealing with Theft


OIL & GAS REGULATORY AUTHORITY
OGRA 6(10)-3/2013

IN THE MATTER OF

SUI NORTHERN GAS PIPELINES LIMITED (SNGPL)
&
SUI SOUTHERN GAS COMPANY LIMITED (SSGCL)'s

REQUESTS FOR AMENDMENT IN PROCEDURE FOR DEALING WITH
THEFT OF GAS CASES

UNDER

OIL AND GAS REGULATORY AUTHORITY ORDINANCE, 2002

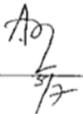
AND

OIL AND GAS REGULATORY AUTHORITY NATURAL GAS TARIFF
RULES, 2002

DECISION

JULY 03, 2014

Saeed Ahmad Khan, Chairman
Sabar Hussain, Member (Oil)/Vice Chairman
Amir Naseem, Member (Gas).

54-B, Fazal-e-Haq Road, Blue Area, Islamabad, Pakistan.
Tel: +92-51-9221715-18, Fax: +92-51-9221714
Website: www.ogra.org.pk

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DECISION

- Oil and Gas Regulatory Authority established under the OGRA Ordinance, 2002 and in exercise of its powers conferred by Section 22 of the Ordinance and Rule 3(3) of the Natural Gas Regulatory Authority (Licencing) Rules, 2002 granted the licences to Sui Northern Gas Pipelines Limited (SNGPL) and Sui Southern Gas Company Limited (SSGCL) for Transmission, Distribution and Sale of Natural Gas on 03-09-2003. Both licencees, under their Licence Condition No.20 are obligated to submit and seek approval of the Authority regarding policies and procedures for dealing with Theft of Gas cases. The Authority has approved the "Procedure for Dealing with theft of Gas" for both the licencees in 2005 and conveyed the same to both licencees on 16-08-2005.
- Sui Northern Gas Pipelines Limited (SNGPL) vide its request dated 15-07-2013 submitted that a large number of theft / pilfered cases are being detected which are more than a year old while the company remains constrained in the booking recovery of theft cases only upto a maximum of 12 months as per said Procedure. Accordingly the company can only book theft volumes for the period not exceeding one year which is contributing towards lesser recovery of revenues as well as contributing to higher UFG volume. SNGPL has requested the Authority to amend the relevant clause of the said procedure allowing the actual recovery of theft volumes regardless of time period involved, in order to discourage large scale theft of gas by the various categories of gas consumers while the gas companies are unduly being penalized in respect of higher UFG.
- SSGCL also agreed with the proposal given by SNGPL in the subject matter and suggested that "cut off" period (say for 36 months) may be provided so as to avoid any controversy.
- The Authority, keeping in view the request of the petitioner, admitted the petition and decided to conduct Public Hearing u/s 10 of OGRA Ordinance, 2002.
- The Authority invited all consumers, interveners, general public and interested / affected persons and parties to furnish their comments / interventions / views, if any, on the petition filed by the petitioner through publication of the notice in the leading newspapers on 28-12-2013 within 14 days from the date of publication of the same.
- In response thereto, the Authority received following intervention requests:-
 - All Pakistan Textile Processing Mills Association, Faisalabad
 - Mr. Muhammad Aslam Chaudhry, Lahore
 - All Pakistan CNG Association
 - Mr. Ayub Harrood, Faisalabad
 - Mr. Muhammad Arif Bilvani, Karachi
 - Energy Department, Govt. of Sindh
 - CNG Owners Association
 - Karachi Chamber of Commerce & Industry, Karachi
 - Mr. Abdul Sami Khan, Chairman, CNG Dealers Association

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Annexure I - Amendment in Procedure for Dealing with Theft (cont.)

7. The Authority held Public Hearing on 15-01-2014 at Lahore and 23-01-2014 at Karachi in which representatives of the petitioner made presentation and interveners / participants presented their arguments.

8. The following participants also made participation in the Public Hearing and submitted their valuable comments:-

a) Engr. S.T Hussain, Chairman, Consumer Awareness & Welfare Association
 b) Mr. Ghulam Qadir Awan, Lahore

9. The Authority, after detailed scrutiny of the petition and hearing valuable comments / viewpoints of the interveners and participants concludes that the interveners and the participants had strongly objected the petitioners' request and submitted that enhancement in the period for booking theft charges against consumer by both petitioners would amount to arbitrary booking of pilferage charges and unduly condemning the consumers. Most of the interveners and participants were of the view that existing 12 months may be reduced to six months in order to curb the theft of gas.

10. In view of the petitioner's request and taking into account the comments of the interveners during the public hearing the Authority decides as under:-

10.1 There are approximately 7000 Nos. industrial consumers in the franchise area of SNGPL and are monitored by the regional staff on regular basis, the suspected industrial consumers are visited / monitored at fixed intervals and in some cases even on weekly / daily basis. Modern technologies like remote meter reading, bypass detection equipment, Electronic Volume Correctors etc. are employed / installed at majority of the industrial CMSs. Moreover, various clauses of the industrial, commercial and domestic contracts, between the gas companies and the gas consumers, approved by OGRA, empower gas companies for vigilant inspection of consumer premises and disconnection of gas supply in case of meter tempering or direct use of gas. As per the contracts, the gas companies also have the right to cross check the connected load of the consumers and to inspect the house/line when ever deemed necessary. The relevant provisions of Ordinance, distribution standards and contracts empowering gas companies for vigilant inspection of consumer premises is reproduced hereunder:-

a) Section-11 of OGRA Ordinance, 2002

"Right of access.—Subject to the terms of its licence, licensees shall have the right upon not less than twenty-four hours notice and at reasonable times, to enter premises or property for the purposes of inspection, repair and maintenance of all facilities, equipment and apparatus relating to the regulated activities, the collection of payments, lawful disconnection, and the examination of the suitability of property for construction or the installation of facilities, equipment or apparatus relating to the regulated activities:

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Provided that no such notice will be required to be given if such entry is necessary to respond to, and remedy, a situation endangering public safety caused by a regulated activity."

b) Clause 7.2 of distribution standard leakage survey

"In addition to all above requirements, every service line must be visually inspected for signs of leakage, such as dead vegetation and gas smell in the air from buried pipe or above ground piping at the meter, at the time of every meter reading by the Meter Reader. All suspected leaks shall be reported to the Company the same day."

c) Clause -9 of all Contracts

"The Company's authorized representative(s) shall have free access at all reasonable times to inspect, adjust, or exchange the meters or other fittings or appurtenances without let or hindrance."

d) Clause -18 (v) of domestic and clause 17 (d) of industrial and commercial Contract

"This Contract shall be subject to cancellation by the Company at any time for any Violation of or default in compliance with any of the terms and conditions of this contract."

10.2 Abundant manpower is available for inspection of the consumers, particularly industrial and commercial. In case of domestic consumers, each premises is visited by a meter reader once a month and by technical staff whenever required. In view of the above, the company's stance is not sustainable. Theft of gas is criminal act and limitation laws/ rules provide that limitation is foreign to the administrative to the Criminal justice. Notwithstanding, right under the Limitation Act should be claimed in a reasonable time and onus of right is always upon who claims it, and delay of wilful negligence lashes the limitation. In view thereof, prima facie time period of twelve months in clause under reference is more realistic, however to ascertain any further long period may led it to the criminal negligence thereby fixing responsibility against those who failed to indicate the report of such pilferage in time.

10.3 However, in the cases of theft of gas by direct bypass, sub clause (i) & (ii) shall be added to clause F(1) of the Procedure for Dealing with Theft of Gas Cases, 2005 shall be added as under:

F (1) ASSESSMENT OF VALUE OF GAS STOLEN AND RECOVERY
Meter Tempering Cases / Direct Bypass

F(1)(i)

"The period of theft in the cases of direct bypass shall be assessed only subject to the provision of concrete physical / circumstantial and documentary evidence which may authenticate the actual period of theft of gas. The company will be

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Annexure I - Amendment in Procedure for Dealing with Theft (cont.)

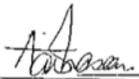
responsibility for correct assessment of the theft period through a Head Office Detection Evaluation Committee headed by an officer of DMD level of the concerned Gas Utility Company. However, impugned period may not exceed more than three (03) years, in accordance with the spirit of Limitation Act, 1908:

FC(II)

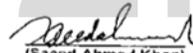
In the cases, where actual period of theft of gas through direct bypass could not be assessed due to non-provision of any credible documentary / physical / circumstantial evidences by the licencees, then the period of claim shall be restricted to (12) twelve months only.

11. Keeping in view above, the Authority hereby rejects the requests of the petitioners and disposes off the case to the extent of addition in Procedure for Dealing with Theft of Gas Cases, 2005 as given at Para 10.3 above, accordingly.

Dated: July 03, 2014


(Aamir Naseem)
Member (Gas)


(Sabar Hussain)
Member (Oil)/Vice Chairman


(Saeed Ahmaf Khan)
Chairman

Annexure J - Theft Raid

Gas Theft Raid - SSGC | Mehran Town

- The UFG Project team along with SSGC's Customer Relationship Department (CRD) task force headed by Mr. Nawab Ali Shah (CRD), conducted a raid being as part of continued operations against illegal usage of gas. The operation was conducted in May 2016 at Merhan Town situated in Korangi with the support of designated Sindh Police task force further to information received that the area residents have illegally plugged the distribution main.
- The gas theft was skilfully planned as the underground line was plugged and connections were spread through out the area through under/over ground pipes leading to a vast amount of Gas theft.



CRD Team **accounted** for the **Gas Theft** and **Disconnected** illegal **Gas Supplies** by removing **Rubber Pipes and Underground Connections.**

Annexure J - Theft Raid (cont.)

Gas Theft Raid - SSGC | Mehran Town

- The team found around multiple houses using gas illegally by injecting rubber pipes in SSGC's main distribution pipeline network. SSGC crew immediately removed all clamps, accessories and rubber pipes and took all these goods in its custody. The officers and staff of SSGC police station, Utilization and Distribution Maintenance Departments and UFG Consultants were also present at operation site.
- It must be noted that SSGC's crew had already disconnected these illegal connections in the same area couple of times during the current year, however, the culprits usually re-install their illegal connections some time after SSGC's operations. The involvement of internal contractor was highlighted by resident of the area.



Team Cutting illegal Pipes



Resident during interrogation



Underground Pipelines removed



Household with illegal Gas Pipes



Team inspecting Underground leaks



Team cutting Underground Pipes

Annexure K - ECC decision

No. DGO(AC)5(426/2012-13 Vol II Pt. I)
 Government of Pakistan
 Ministry of Petroleum and Natural Resources
 (Policy Wing)
 Directorate General of Gas,
 21-F, Huma Plaza Blue Area,
 Islamabad, the 11th December, 2014

Managing Director
 SNGPL No.
 Date: 11/12

12 DEC 2014
 7148

The Chairman,
 Oil & Gas Regulatory Authority,
 Fazal-e-Haq Road
 Blue Area,
 Islamabad

Managing Director,
 Sui Northern Gas Pipelines Ltd.
 21-Kashmir Road,
 Lahore

Managing Director,
 Sui Southern Gas Company Ltd.
 Street No. 4/B, Block 14,
 Sir Shah Suleman Road,
 Gulshan-e-Iqbal, Karachi

Subject - POLICY GUIDELINES UNDER SECTION 21 OF OGRA ORDINANCE 2002 (DETERMINATION OF REVENUE REQUIREMENTS OF GAS UTILITY COMPANIES)

Dear Sir,

I am directed to enclose herewith a decision of the ECC of the Cabinet vide Case No. ECC 154/25/2014, dated 20.11.2014, on the above subject for your information and further necessary action.

Yours Sincerely,
 (Muhammad Ashiq)
 Deputy Director (F&P)
 Ph# 9204587

Copy to:
 (Mr. Sana Ullah)
 Joint Secretary (Committees),
 Cabinet Secretariat, Cabinet Division
 Government of Pakistan
 Islamabad

(with reference to above referred letter dated 26.11.2014)

Handwritten notes:
 c/o PL use - also part of PL
 V.V. Dip
 Govt (RO)
 Pl prepare note for Board
 21/12/14 file

SECRET

Case No. ECC-154/25/2014
 Dated: 20th November 2014

POLICY GUIDELINES UNDER SECTION 21 OF OGRA ORDINANCE, 2002 (DETERMINATION OF REVENUE REQUIREMENTS OF GAS UTILITY COMPANIES).

DECISION

The Economic Coordination Committee of the Cabinet considered the Summary, dated 15th November, 2014 submitted by the Ministry of Petroleum and Natural Resources on "Policy Guidelines Under Section 21 Of OGRA Ordinance 2002 (Determination Of Revenue Requirements Of Gas Utility Companies" and decided as under:

- i. To provisionally allow following volumes as deemed gas sales volumes for the purpose of revenue requirements of gas companies:
 - a. Volume pilfered by final consumers but detected and determined by the companies in accordance with OGRA procedure as provided in Rule 30 of Natural Gas Licensing Rules, 2002;
 - b. Volume consumed in law and order affected areas; and
 - c. Impact of change in Bulk Retail Ratio on UFG using the base year as 2003-04.
- ii. Approved that 'provision for doubtful debts' may also be determined at a minimum of 1% of the sales.
- iii. Approved that the issue of treatment of incomes from non-core activities (LPS, Meter Manufacturing Plant, Royalty from JVL and Sale of Condensate/LPG) may be dealt with at the time of finalization of new tariff regime.
- iv. UFG study should be completed as soon as possible. The above provisional arrangement must not contravene judgment of the Lahore High Court in the matter nor it should adversely affect the on-going investigations in OGRA scandal in pursuance of the directions of the Supreme Court.

Annexure K - ECC decision (cont.)



Reference: RA-TAR-14-15(F)-021

Date: March 16, 2016

Director General (Gas),
Ministry of Petroleum & Natural Resources,
Government of Pakistan,
First Floor, Petroleum House,
Sector G-5/2, Attaturk Avenue,
Islamabad.

*CE (UFG-C-5)
JW/RA/OS*

Subject: **IMPLEMENTATION OF ECC POLICY GUIDELINES DATED NOVEMBER 20, 2014 IN RESPECT OF LAW AND ORDER AFFECTED AREAS**

Dear Sir,

Please refer to the Oil and Gas Regulatory Authority's (OGRA) determinations of Final Revenue Requirements (FRR) for FY 2012-13, FY 2013-14 and FY 2014-15 dated November 5, 2015, November 6, 2015 and November 27, 2015 respectively. It is submitted that OGRA has only allowed 75 % of the volume claimed in respect of Law and Order affected areas while it has been stated that the remaining claimed volumes/amounts be paid by the Federal Government as subsidy or from the Royalty of concerned Province. This alone has already adversely affected Sui Northern Gas Pipelines Limited (SNGPL) to the tune of Rs. 2,454 million over a period of 3 years (i.e from FY 2012-13 to FY 2014-15).

It is submitted that Chief Minister, Khyber Pakhtunkhawa vide letter No. PSCM/SNGPL/KPK/1-1/2013/9390 dated December 19, 2013 (copy enclosed) has already acknowledged that the gas losses in Oil & Gas producing areas of KPK are not due to inefficiency of SNGPL but due to prevailing worst law and order situation of the area.

In view of the above narrated situation and dilapidated financial position of the Company, it is requested to advise OGRA to allow entire Law & Order related claimed volumes / amounts in totality in respect of the period FY 2012-13 to FY 2014-15 onwards, since Law & Order is a Provincial and not a Federal Government subject.

Your immediate intervention in the said matter is solicited which will go a long way in resolution of this long standing issue.

Yours Sincerely
Sui Northern Gas Pipelines Ltd.

(Signature)
(SYED JAWAD NASEEM)
General Manager (RA)
for Managing Director

Encl: As above.
Cc: Executive Director (Gas), OGRA
Registrar, OGRA

30/03/2016 11:22 +92519201561

OG GAS ISLAMABAD

PAGE 01

Mr. General Manager D.Sc.Jth
30 MAR 2016
E.M.N. No. 2540
Sui Northern Gas Pipelines Ltd

No. DGO (AC)-5(26)/14-15-Vol-I-Pt
Government of Pakistan
Ministry of Petroleum & Natural Resources
(Policy Wing)
Directorate General of Gas
First Floor, Petroleum House, G-5/2

Managing Director
SNGPL No.
Date: 30/3

RA DEPARTMENT
30 MAR 2016
Diary No. 1872

Islamabad, the 30th March, 2016

The Chairman,
Oil & Gas Regulatory Authority,
Islamabad.

Subject: **IMPLEMENTATION OF ECC POLICY GUIDELINES DATED NOVEMBER 20, 2014 IN RESPECT OF LAW AND ORDER AFFECTED AREAS**

Dear Sir,

Further to this Ministry's letter of even number dated 25.03.2016 on the above subject, I am directed to state that there is no such mechanism nor subsidy head available with the Federal Government to fund claims made by the gas utility companies in the respect of Law and Order affected areas. Further utilization of the Royalty post disbursement is the prerogative of the Provincial Government(s) under the respective Petroleum Policy and hence Federal Government may not be in a position to advise the concerned province to subsidize the aforesaid claim of gas utilities through Royalty.

2. In view of above, OGRA is kindly requested to consider the request of M/s SNGPL regarding claim of remaining gas volume in Law & Order affected in pursuance of subject ECC decision already conveyed vide this Office's letter No. DGO(AC)-5(26)/2012-13-Vol-II-Pt dated 11.12.2014.

GPT (UFG)
SM (S)
P. deal further.
CE (UFG-C-5)

Yours truly,

(Signature)
(Abdul Rasheed Johio)
Director (Tech.)

C.C:

- i. The Managing Director, SNGPL, Lahore
- ii. The Managing Director, SSGCL, Karachi
- iii. SPS to Secretary Petroleum & NR
- iv. SPS to Addl. Secretary (A&D) Petroleum & NR
- v. PA to DG (Gas) Petroleum & NR

cc: MD.

DMD(S)

SGM(S)

SGM(LT)

CF&

CA(RA)

SGM(D-NIS) | GPT(UFG)-C(NIS)

For your kind information pl.

30/3

DAIRY
(Signature)

Annexure L - Gas price notification

OIL AND GAS REGULATORY AUTHORITY

Islamabad, the 1st September, 2015

NOTIFICATION

S.R.O. (I)/2015. - In exercise of the powers conferred by sub-section (3) of Section 8 of Oil and Gas Regulatory Authority Ordinance, 2002 (XVII of 2002), and in supersession of Oil and Gas Regulatory Authority's notification No. S.R.O. 876(I)/2015, dated 31st August, 2015 to the extent of natural gas sold to Bulk Domestic consumers, Commercial consumers, Special Commercial (Roti Tandoors) and Ice Factories, by Sui Northern Gas Pipelines Limited and Sui Southern Gas Company Limited, the Authority is pleased to notify the following sale price and minimum charges, for purposes of the said Ordinance, with immediate effect, as under:-

I. Domestic Sector:

a) Standalone meters
b) Mosques, churches, temples, madrassas, other Religious Places and Hostels attached thereto;

Sale price:	Rs./MMBTU
Upto 100 M ³ per month	
All off-takes at flat rate of	110.00
Upto 300 M ³ per month	
All off-takes at flat rate of	220.00
Over 300 M ³ per month	
All off-takes at flat rate of	600.00

Minimum charges Rs. 148.50 per month

c) Government and Semi-Government Offices, Hospitals, Clinics, Maternity Homes, Government Guest Houses, Armed Forces Messes, Langars, Universities, Colleges, Schools and Private Educational Institutions, Orphanages and other Charitable Institutions along-with Hostels and Residential Colonies to whom gas is supplied through bulk meters including Captive Power.

Sale price:
All off-takes at flat rate of Rs. 600.00 per MMBTU

Annexure M -Minimum Consumption

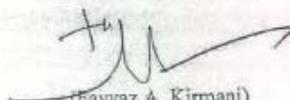
 **DEPARTMENT OF CHEMICAL ENGINEERING**
University of Engineering and Technology, G.T Road, Lahore, 54890 (PAKISTAN)

Ref. No. Chem.Engg. 1231
Dated: 25-09-2012

The Senior General Manager
Distribution (North & South)
Sui Northern Gas Pipelines Ltd.
21-Kashmir Road
Lahore

Subject: Gas Consumption by Standard Domestic Burner

The test to calculate gas consumption by standard domestic burner has been carried out for one hour operation at outlet pressure of 6.0 inch w.c.
The gas consumption for one hour operation was found 12 ft³


(Fayyaz A. Kirmani)
Supervisor


(Prof. Dr. Ing Naveed Ramzan)
Testing Incharge


(Prof. Dr. Nadeem Feroze)
Chairman

2nd Draft

Annexure N - Leaks per KM

SNGPL

Underground Leakages per Km

Network Surveyed during July 12 to May 16

Region	Length of network surveyed (Km)	Leak Detected (No)	No of Leaks per Km
Gujranwala	6016	12091	2.01
Gujrat	3177	8549	2.69
Islamabad	7428	10044	1.35
Rawalpindi	3797	5976	1.57
Peshawar	9209	36541	3.97
Abbottabad	2608	4723	1.81
Sargodha	3489	4876	1.40
Faisalabad	6934	11402	1.64
Sheikhupura	6092	16406	2.69
Lahore	15226	26216	1.72
Sahiwal	4523	5059	1.12
Multan	8491	25911	3.05
Bahawalpur	3380	9062	2.68
Overall Company	80370	176856	2.20

SSGCL

Underground Leak Survey Statistic FY 2011-12 to 2015-16

FY	Length (KMs)	Leak Spots	Average Spots/KM
South			
2011 - 12	991	5,946	6.00
2012- 13	1,103	8,608	7.80
2013 - 14	1,266	11,654	9.21
2014 - 15	2,290	16,548	7.23
2015 - 16 (11 M)	2,644	11,591	4.38
	8,294	54,347	6.55
North			
2011 - 12	1,462	3,005	2.06
2012- 13	1,947	4,684	2.41
2013 - 14	1,090	2,662	2.44
2014 - 15	1,704	3,914	2.30
2015 - 16 (11 M)	1,653	3,975	2.40
	7,856	18,240	2.32
Total	16,150	72,587	4.49

Annexure O - Measurement Errors

The key parameters that effect the calculated gas volume are provided below. These parameters are measured with standard equipment and adjusted accordingly for calculation purposes.

- 1) Temperature
- 2) Pressure
- 3) Compressibility Factor
- 4) Natural gas Components (Gas Quality)

Affect of Temperature on Volume of Natural Gas:

In different geographical locations temperature significantly varies and must be accounted for adjustment factor in measuring natural gas transmission.

In accordance with Charles Law for temperature, gas expands as the temperature increases and contracts as decrease in temperature occurs (Refer Annexure A).

Simple Correction Factor:

We can calculate simple correction factor (Ft):

$$Ft = (Base Temp + 460) / (Flow Temp + 460)$$

As per contract agreements utility companies always agree on a base temperature to either sell or purchase gas. Whenever there is a slight deviation from base temperature, the change should be accounted as per agreement. The following example reflects the correction factor calculation:

Calculation at 40 °F :

$$Ft = (60 + 460) / (40 + 460) = 1.040$$

For this example we have used 40 °F temperature as our flow temperature. As per calculations, our answer is 1.0400. So to correct our volume for temperature we would multiply our Actual cubic foot (Acf) volume by this factor. Since the temperature has caused the gas to contract we can fit more gas into the same space.

Calculation at 80 °F:

For calculation at 80 °F hold everything constant except change the flowing temperature to 80 deg F.

$$Ft = (60 + 460) / (80 + 460) = .9629$$

For this example our answer would be .9629. So to correct our volume for temperature we would multiply our Acf volume by this factor. Since the temperature has caused the gas to expand we can fit less gas into the same space.

Affect of Pressure on Volume of Natural Gas:

Due to varying compressor capacities and geographical conditions atmospheric pressure significantly varies from transmission lines to distribution end system.

As per Boyle's Law, for a fixed amount of ideal gas for a fixed temperature, pressure and volume are inversely proportional. This means that pressure is doubled the volume is halved.

Annexure 0 - Measurement Errors (Cont)

Simple Pressure Factor

Using the basic principle of Boyles Law we can easily calculate a simple pressure factor (Fp) to be used for calculating changes in volume caused by increase or decrease in pressure.

$$Fp = \frac{\text{Gauge Pressure} + \text{Atmospheric Pressure}}{\text{Base Pressure}}$$

Before performing calculation we should understand the basic difference between gauge pressure, atmospheric pressure and base pressure.

Base Pressure (Pb):

It refers to the pressure that we have agreed to base all purchases and sales on for the contract area. For our example, we will use 14.65 psi as our base pressure.

Atmospheric Pressure:

It refers to the standard atmospheric pressure for the region. In gas sale/purchase contracts, atmospheric pressure is part of the basic condition. For calculation purposes, we will use 14.7 atmospheric pressure.

Gauge Pressure: (psig):

Gauge pressure refers to the reading obtained from meter with an accurate gauge. We will use .25 psi in our example.

Calculation at .25 psi:

$$Fp = (.25 \text{ gauge} + 14.7 \text{ atm}) / 14.65 \text{ base} = 1.020$$

For this example we would multiply our Acf volume by 1.020 to know the approximate affect on volume of gas.

Calculation at 3 psi:

$$Fp = (3 \text{ gauge} + 14.7 \text{ atm}) / 14.65 \text{ base} = 1.20$$

Net impact: From our calculations with two different pressures the net impact on gas volume can be derived. For deriving net impact we are taking 100 cubic feet as exemplary volume.

@.25 psi: $100 * 1.020 = 102$ cubic feet

@3 psi: $100 * 1.20 = 120$ cubic feet

Net impact on volume = $120 - 102 = 18$ cubic feet or approx. 18%

Compressibility Factor:

Practically all gases deviate slightly from Boyles Law. Theoretically, the standard volume of gas varies with standard change in pressure. However, the volume of gas changes significantly at higher pressures as compared to theoretical pressure. This factor is important at high pressures and low temperatures. For gas volume measurement, this factor is addressed and adjusted in the adjusted volume calculations.

Natural Gas Components (Gas Quality):

Natural gas consist of nine basic components with methane the largest volume based component. Natural gas is extracted from different fields which impacts gas composition. Gas components determine gas quality (the heating capacity) therefore it is essential to measure the components. Further, market sales of natural gas require some specifications already set by the authority in its licensing condition no. 15 of SNGPL and SSGC regarding natural gas quality, this impacts billing mechanism to the consumer.

Annexure P - Metering Technology

Annexure (Source: Study by US Department of Energy "Metering Best Practices")							
Goal	Positive Displacement	Orifice	Venturi	Annubar	Turbine	Vortex Shedding	Fluid Oscillation
Accuracy	Good	Moderate	Good	Good	Good	Good	Good
Turndown Ratio	10:1	<5:1	<5:1	10:1	10:1	20:1	100:1
Repeatability	Good	Good	Good	Very Good	Low	Very Good	Good
Installation Ease	Easy	Easy	Moderate	Easy	Challenging	Moderate	Easy
Pressure loss	Moderate	Moderate	Low	Low	Moderate	Low	Low
Recalibration needs	Infrequent	Frequent	Infrequent	Infrequent	Frequent	Infrequent	Infrequent
Capital cost	Low	Low	Moderate	Low	Moderate	Moderate	High
Installed Cost	Moderate	Low	Moderate	Low	Moderate	Moderate	Low
Maintenance Cost	Low	High	Moderate	Low	Moderate	Low	Low

Annexure Q.1 – List of Bulk Customers

SSGC – Bulk Customers

Sr. No.	Sector	Customer	2011	2012	2013	2014	2015	
1	FERTILIZER	FFBQL	Feed	19,607	15,770	14,776	12,932	13,227
		Fertilizer Total		19,607	15,770	14,776	12,932	13,227
2	STEEL	Pakistan Steel		11,951	10,125	9,826	8,420	7,623
		Steel Total		11,951	10,125	9,826	8,420	7,623
3	POWER	WAPDA						
		WAPDA Guddu		323	1,126	-	-	-
4		WAPDA Kotri		5,530	3,228	3,320	2,145	3,702
5		WAPDA Sukkur		-	-	-	-	-
6		WAPDA Jamshoro		7,226	881	2,105	623	5,009
7		WAPDA Quetta		1,558	1,765	1,744	1,556	1,692
		Sub Total		14,638	7,000	7,169	4,324	10,403
		OTHERS						
8		Habibullah Coastel Total		6,843	5,957	5,950	5,950	6,296
9		KE Total		57,186	61,883	59,946	62,275	62,523
10	FFBQL	Power	4,493	4,187	4,008	4,015	4,037	
	Sub Total		68,522	72,026	69,904	72,240	72,856	
	Total Power		83,160	79,027	77,073	76,563	83,259	
11	CEMENT	Attock Cement		67	75	109	76	58
12		Dewan Cement		426	178	235	232	444
13		Javedan Cement		-	-	-	-	-
14		Thatta Cement		265	119	13	13	8
15		Lucky Cement		1,482	1,568	2,547	2,334	2,111
16		Lucky Cement		1,195	1,244	2,215	2,095	2,110
17		Anwar Zaib Cement		42	-	-	-	-
	Cement Total		3,477	3,184	5,119	4,752	4,731	
	GRAND TOTAL		118,195	108,106	106,794	102,667	108,841	

Annexure Q.2 - List of Bulk Customers

SNGPL – Bulk Customers

Sr. No.	Sector	Customer		2011	2012	2013	2014	2015
				MMCF	MMCF	MMCF	MMCF	MMCF
1		PAK-ARAB	Feed	10,372	7,880	1,298	3,194	616
			Fuel	3,122	2,557	843	1,669	487
2		DHCL	Feed	9,171	4,286	1,629	1,523	1,094
			Fuel	1,782	845	365	392	312
3	FERTILIZER	PAK-AMR	Feed	5,894	4,184	3,019	3,544	2,082
			Fuel	791	726	605	571	820
4		PAK-CHINA	Feed	-	-	-	-	-
			Fuel	-	-	2	-	-
5		H/PHOSPHATE		69	62	52	52	32
6		ENGRO CHEMICALS	Feed	7,377	9,142	4,886	3,927	11,461
			Fuel	3,749	3,780	1,049	1,880	920
Fertilizer Total				42,327	33,462	13,748	16,752	17,824
POWER								
7		WAPDA						
		NGPS MULTAN		12	4	-	-	-
8		TPS-M/GARH		381	312	334	316	186
9		MESCO		-	-	-	-	-
10		GUDDU POWER		20,267	36,400	45,835	33,499	31,558
11		SPS-FSD		38	61		814	140
12	POWER	GTPS-FSD		2,038	441	408	1,798	394
			F/CHG	-	-	-	-	-
13		GTPS-LHR		-	-	-	-	-
14		RENTED POWER - SKP		-	-	-	-	-
15		RENTED POWER - BHIKKI		-	-	-	-	-
Sub Total				22,736	37,218	46,577	36,427	32,278

Annexure Q.2 - List of Bulk Customers (Cont.)

SNGPL – Bulk Customers

Sr. No.	Sector	Customer	2011	2012	2013	2014	2015
			MMCF	MMCF	MMCF	MMCF	MMCF
	OTHERS						
16	POWER	KAPCO	4,656	4,576	1,805	3,398	2,661
17		RPL	26,483	24,007	22,156	24,125	21,426
18		OGDCL-FKPCCL	6,337	5,617	5,307	6,118	4,743
19		ORIENT POWER	8,035	3,462	2,963	2,280	709
20		SAIF POWER CO. (PVT) LTD	8,405	3,353	3,265	2,249	725
21		SAPPHIRE ELECTRIC CO LTD	6,110	3,392	3,084	2,264	752
22		Hallmore Power	1,883	3,312	2,572	2,182	814
23		LIBERTY POWER	12,814	14,205	8,635	9,041	11,842
24		ENGRO ENERGY	18,045	20,309	20,355	17,498	17,681
25		ALTERN ENERGY	1,722	1,724	1,863	1,889	1,664
26	Davis Energen			4	598	703	
		Sub Total	94,490	83,957	72,009	71,642	63,720
		Total Power	117,226	121,175	118,586	108,069	95,998
27	CEMENT	KOHAT CEMENT		188	157	154	223
28		LUCKY CEMENT	1,988	1,728	1,830	2,260	2,078
29		MUSTEHKAM CEMENT	161	290	5	5	12
30		BESTWAY CEMENT	413	521	61	36	86
31		Garib Wal Cement	3				
		Cement Total	2,565	2,727	2,053	2,455	2,399
		GRAND TOTAL	162,118	157,364	134,387	127,276	116,221

Annexure R - KPK Letter

Pakhtunkhwa House
S.A.Q. Road,
Peshawar Cantt.

CHIEF MINISTER

NO.PSCM/SNGPL/KPK/1-1/2013/19390.
Dated: 19.12.2013

Subject: GAS LOSSES IN OIL AND GAS PRODUCING AREA OF KHYBER PAKHTUNKHWA AND HEAVY REVENUE LOSSES TO SNGPL

It has been reported that approximately 1000 MMCF/month, gas is being lost at various locations of Khyber Pakhtunkhwa, which is adversely affecting the profit of the SNGPL. The loss in quantum of gas is continuously on the rise due to illegal extensions by locals through unconventional means. SNGPL has been warning off and on the locals of gas producing districts that leaking gas lines not only cause loss to the Company but has a huge potential risk to life and property.

2. As a part of strategy to reduce these losses, SNGPL tried to insert the block valves at the downstream of SMSs Ichangiri and Chakora from where more than 55 villages had taken illegal off-shoots. Consequently, flows from both the SMSs has been considerably brought down. But the villagers threatened the district administration with processions and protests by blocking the Indus Highway. They even took out the blanking plates from the specially installed block valves. Due to these actions of SNGPL the law and order situation suddenly went out of control. The Government of Khyber Pakhtunkhwa is extending all out support to SNGPL through Local Administration to curb continuous increase in gas losses but due to prevailing worst law and order situation in the Province. The situation has become very complex which is badly hampering all administrative measures. The Provincial Government through its Local Administration is trying its level best to convince the locals to get gas connections as per set procedure.

Pakhtunkhwa House
S.A.Q. Road,
Peshawar Cantt.

CHIEF MINISTER

3. The locals feel that since their areas are producing oil and gas, as such it is their right to consume free gas. The Provincial Government is in close contact with SNGPL in curbing the menace because it is fully cognizant of the fact that the country is not only facing severe energy crises but at the other end this wastage has a huge negative impact on National Exchequer. Furthermore, a road map and possible amicable solutions have been discussed with Managing Director SNGPL in a recently convened meeting held on 04-12-2013.

4. In the meeting, another issue of OGRA's disallowance of lost volumes was highlighted by the Management of SNGPL, to which the Provincial Government is in agreement that the gas losses in oil & gas producing areas of KPK are not due to inefficiency of SNGPL but due to prevailing worst law and order situation of the area it could not be controlled even through administrative measures of Provincial Government. But Government is fully committed to make all out efforts to improve this situation. It has also been transpired that SNGPL is losing its profit due to factors beyond their control.

5. In order to deliberate on this complex issue and to find amicable solution, a meeting of all stake holders is to be convened shortly. You are requested to make it convenient to attend this meeting for which date & time will be intimated accordingly.

Profound regards.

Pervez Khattak
(Pervez Khattak)

Mr. Saeed Ahmad Khan,
Chairman,
Oil & Gas Regulatory Authority,
Blue Area, Islamabad

Annexure S.1 - SNGPL Comments



SUI NORTHERN GAS PIPELINES LIMITED

GAS HOUSE, 21 KASHMIR ROAD, P.O. BOX 56, LAHORE (PAKISTAN)

Ref: RA-UFG-003-17

January 16, 2017

Mr. Rana Nadeem Akhtar,
Partner Advisory, KPMG Taseer Hadi & Co.
Chartered Accountants,
Sheikh Sultan Trust Building No. 2,
Beaumont Road,
Karachi.

Thru: Fax / Courier
021-35685095

Subject: **UFG BENCHMARK STUDY REPORT - CONSULTATIVE SESSION WITH M/s SSGC ON KMIs**

Dear Sir,
السلام عليكم

This refers to meeting held at OGRA Office on 29-12-2016 and letters No. OGRA-9(379)/2015 dated 03-01-2017 and 06-01-2017 (copies attached) whereby the Authority directed SNGPL and SSGC to jointly discuss the KMIs and arrive at a conclusion so that KMIs of both Sui Companies are same. In this regard, team comprising of Senior Officers of M/s SSGC visited SNGPL Head Office on 12-01-17 to 13-01-2017 and detailed discussions were held on the issue of KMIs.

The basic objective of the KMIs should be to facilitate the downward trend of UFG, keeping in view all the technical, financial and logistical hurdles being faced by SNGPL. The Company is of the firm opinion that execution of KMIs cannot be a time specific activity as experience has revealed that efforts to control UFG require continuous efforts on annual basis to curtail the menace. The Company is already successfully executing "UFG Reduction Plan", duly approved by the Authority, which includes crucial UFG control activities, envisaged in view to target the key UFG contributing factors.

We understand that the gas companies, having vast experience in the natural gas sector, are in a better position to identify their core issues affecting UFG and accordingly plan the corrective actions. Moreover, since UFG reduction is the job of gas companies, so the gas companies should be authorized to select the UFG control activities to be incorporated as KMIs along with appropriate weightage for more productive results.

It is again highlighted that the execution of activities defined in the KMIs will require specific budgetary provisions on an annual basis, along with additional provisions in HR benchmark to be allowed by OGRA, leading to a consequential rise in tariff which will have to be borne by the gas consumers.

The gas companies after considering the relevant UFG contributing factors and thorough mutual discussions have finalized the KMIs which are given in table below:

KMI No.	Description of KMI	% Age Weightage
1	Inspection of each industrial consumer once every month	Industry 8%
	Inspection of each commercial consumer on quarterly basis	Commercial 7%
	Inspection of 20% of total domestic consumers (all consumers will be inspected in 5 years period)	Domestic 5%
	Sub Total	20%
2	Number of connections disconnected as a % age of connections due for disconnection in respect of gas theft	4%
	Inspection of disconnected consumers as follows: Industry = 100% , Commercial = 25% & Domestic = 10%	Industry 2% Commercial 2% Domestic 1%
3	Sub Total	5%
	Total Gas Theft Control	29%
4	Number of Defective Industrial meters replaced as a % age of total defective Industrial meters reported/notified	Industry 8%
	Number of Defective Commercial meters replaced as a % age of total defective Commercial meters reported/notified	Commercial 7%
	Number of Defective Domestic meters replaced as a % age of total defective Domestic meters reported/notified	Domestic 5%
	Sub Total	20%
5	Industrial meters replaced as a % age of total Industrial meters qualifying Schedule Replacement Criteria	Industry 7%
	Commercial meters replaced as a % age of total Commercial meters qualifying Schedule Replacement Criteria	Commercial 5%
	Domestic meters replaced as a % age of total Domestic meters qualifying Schedule Replacement Criteria	Domestic 3%
6	Sub Total	15%
	Total Measurement Errors Resolution	35%
7	Underground network replaced as a %age of total annual network replacement target as recommended by Corrosion Control Department	8%
	Present level of 2.2 underground leaks/Km is to be reduced gradually	8%
	Survey of 15% of total domestic connections annually and rectification of detected aboveground leak connections	5%
	Number of CP stations installed/renovated as a %age of CP stations selected for installation/renovation	5%
12	Number of gas leakage complaints resolved as a % age of actual number of such complaints received by company	5%
	Total Gas Leakage Control	31%
13	Misc (Trainings, knowledge Sharing, Meetings etc)	5%
	Grand Total	100%



SUI NORTHERN GAS PIPELINES LIMITED

GAS HOUSE, 21 KASHMIR ROAD, P.O. BOX 56, LAHORE (PAKISTAN)

SNGPL would like to highlight that the above KMIs have been proposed, keeping in view the current situation. However, it will be appropriate and prudent to review these KMIs as well as their weightage annually through more consultative process between OGRA and SNGPL, at start of each financial year and necessary amendments, where required, may be made accordingly. It is so because, one activity may be important and necessary during the current year but may be less productive during next coming years and there might be a need to include an altogether new activity, keeping in view the prevailing business dynamics.

We would also like to further augment earlier response/comments of the Company on following issues regarding 1st Draft of "UFG Study Report" furnished through earlier letter No. RA-UFG-11-16 dated 04-11-2016:

1. Volumetric impact against Bulk Retail ratio, considering 2003-04 as base year:

The consultant while calculating the volumetric impact of Bulk Retail ratio has used Retail UFG % age of FY 2003-04 instead of using the Retail % age UFG of respective year, pertaining to which volumetric impact is being calculated (e.g. if volumetric impact of bulk retail of FY 2014-15 is to be calculated, the Retail % age UFG of FY 2014-15 should be used, instead of Retail % age UFG of FY 2003-04) because the Retail % age of current year (in this example i.e. FY 2014-15) is the actual representative of current behavior of losses in Retail sector.

2. Allowance against the β factor:

The Company's performance against the KMIs should be incentivized through introduction of another fixed parameters. It is proposed that fixed UFG allowance may be revised upward or beta (β) should be considered from 0.5 to 1.5 instead of 0 to 1, e.g. If the consolidated performance of Company against KMIs works out 0.4, then effective β should be 0.5+0.4 = 0.9. It is necessary to safeguard the interest of the company by providing due advantage to Company against changes in Bulk to Retail, which is due to pursuance of socio-economic agenda of GoP, in line with guidelines of ECC of Cabinet to OGRA, which have been ratified by the Federal Cabinet in its meeting held in September, 2016.

We would also like to refer to requisition of Consultant M/s KPMG to provide the copies of correspondence referred by our Mr. Saqib Arbab, General Manager (Peshawar) during the consultative session held at OGRA Office on 29-12-2016. In this regard, the requisite documents are attached as **Annex-1** (containing 472 pages) for ready reference.

This is for your information and further necessary action.

Yours Sincerely,
Sui Northern Gas Pipelines Ltd

(Signature)
(KAMRAN AKRAM)
GENERAL MANAGER (RA)
for MANAGING DIRECTOR

Encl: As above
CC: Mr. Shalzad Iqbal,
Executive Director (Gas),
Oil and Gas Regulatory Authority, Islamabad.

Annexure S.2 - SSGC Comments



Ref: RA/53
January 16, 2017

Mr. Rana Nadeem Akhtar,
Partner Advisory, KPMG Taseer Hadi & Co.,
Chartered Accountants, Sheikh Sultan Trust Building No.2,
Beaumont Road,
Karachi

CONSULTANT FIRST DRAFT UFG BENCHMARK STUDY REPORT

Dear Sir,

This refers to OGRA Letter No. OGRA-9[379]/2015, dated 6 January 2017 and joint meeting in OGRA Office dated 29 December 2016 regarding response of the Sui Companies on "First Draft UFG Benchmark Study".

As advised by OGRA, both Sui Companies after detailed deliberations have finalized unified KMI's with same weightages on each KMI that are enclosed for your kind consideration.

Please feel free to contact us if you need any clarifications in this regard.

Regards,

Shouab Ahmed
Shouab Ahmed
GM (Regulatory Affairs)
For Managing Director

cc : Mr. Shahzad Iqbal,
Executive Director (Gas)
OGRA, Islamabad

Sui Southern Gas Company Limited

Key Monitoring Indicators

- The Report has recommended Key Monitoring Indicators spread over a period of 5 Years, after which UFG rate of 5% is to be achieved by FY 2021.

UFG factors and its weightages are kept changing based on various policies and economic conditions. It is suggested that these KMIs should be reviewed annually with UFG reduction Targets under Annual Estimated Revenue Requirement of the Company. Both Sui Companies worked out similar KMIs after detail discussion on each KMI as given below:

	Act	Rev
Network Visibility:		
Segmentation, Metering on TBS/ Area wise, Meter Inspection, Replacement of Defective Meters, Reduction in Minimum Billing	54%	55%
Network Improvement:		
Rehabilitation, Underground/ Overhead Leak Repairs, CP Coverage	23%	26%
Theft Control:		
Detection, Disconnection & Complain	18%	14%
Research & Development:		
Training, Capability Enhancement, HSE, Data Quality, Knowledge Sharing	5%	5%
Total	100%	100%

- The weightages allotted to these KMIs are proposed as follows:

SSGC's Observations on Key Monitoring Indicator (β Working)

	Beta (β)	
<u>Network Visibility</u>	Act	Rev
Number of TBSs Metered with EVCs/Modems Installed as a % of total TBSs.		
The purpose of installing TBS is to reduce the pipeline pressure required in system and most of TBS are located in remote areas where there is no provision of a measurement facility. For network visibility, Segment wise Gas Volume Reconciliation is suggested where one segment covers 100% customers.		
1 The Company has already developed a segmentation plan for large cities where network is interconnected and small towns where cluster of TBS and PRS would be treated as one segment under SMSs.	20%	0%
The Company realize its importance and segmentation efforts have been expedited to identify high UFG areas and strategize UFG reduction activities accordingly. However, it is proposed that these segmentation should not be part of KMIs as there will be many difficulties in creating additional segments and its reconciliation of Gas Purchase and Sales Figures. This is only be required for internal controls.		

Annexure S.2 - SSGC Comments

Sui Southern Gas Company Limited

		Beta (β)	
	Number of Meters Inspected (Consumer Wise) annually as a % of total metered connections.		
	Vigilance of all categories of consumers is integral part of UFG Reduction Plan. The performance should be measured separately for each customer class based on following schedule:		
2		3%	20%
	a) 100% Industrial Consumers on Quarterly Basis	3%	
	b) 100% Commercial Consumers on Semi-Annually Basis	7%	
	c) 20% of Domestic Consumers (around 600,000) annually	8%	
	Number of Bulk Meters Installed annually area wise.		
	The precise quantification of losses at SMSs feeding these areas prone to gas pilferage is available on month wise as well as year wise basis and in no case involves any estimation. Moreover, it may not be possible for the company to install bulk meters feeding different pockets in these areas.	3%	0%
3	This KMI should not be made part of KMIs.		
	Number of total defected (Slow & PUG/Sticky) meters replaced as a % of total meters.		
	Replacement of meters is a continuous ongoing activity and it cannot be ensured that after 3 years and no further meters will become defective or require replacement.		
4	The performance should be measured against identified defective meters (instead of Total Meters) separately for each customer class based on following schedule:	3%	20%
	a) Industrial Meters	3%	
	b) Commercial Meters	7%	
	c) Domestic Meters	8%	
	Number of TBSs segmented as a % of total no. of TBSs.		
5	TBS wise Segmentation may be difficult to achieve in big Cities, this KMI should not be made part of KMIs.	10%	0%
	Number of Minimum billed consumer as a % of total number of domestic consumers.		
	The minimum billed consumers fall due to actual low consumption or measurement issues in meters. The consumers cannot be forced to increase their consumption.	3%	0%
6	The minimum billed customer %age varies between 22% to 35% depending on the seasonal consumption that are surveyed on selected criteria and it is observed that only 13 % meters are identified as slow/ PUG.		

Page 3 of 8

Sui Southern Gas Company Limited

		Beta (β)	
	This KMI should be measured against survey as % of Minimum billing customers and merged with KMI 2.		
	Number of total defected meters identified as a % of total meters.		
7	The performance should be measured against identified defective meters.	3%	0%
	This KMI should be merged under KMI 4.		
	Number of meters replaced as a % of total number of meter eligible for replacement.		
	This is a continuous ongoing activity to be carried out annually. The performance should be measured separately for each customer class based on following schedule:		
8	a) Industrial Meters after 3 Years*	4%	
	b) Commercial Meters after 7 Years	3%	3%
	c) Domestic Meters after 16 Years	6%	15%
	* Instead of Industrial Meter replacement, SSGC carries out meter proving/ testing at field (Field Proving at meter installation site) and at workshop. Any meter found outside accuracy limits is replaced immediately.		
	Network Improvement		
	Length of the distribution network rehabilitated (KMs) as a % of total length of distribution network.		
	This is a continuous ongoing activity to be carried out annually based on extreme requirement to avoid unnecessary wastage of funds.		
9	The Target of Rehabilitation is around 300 KMs per annum (based on previous actual results).	10%	8%
	The performance may be compared against Targets in revised UFG Reduction Plan (instead of total length of network).		
	Number of underground Leaks rectified per KM as % of the total leakage rate per KM.		
	This is a continuous ongoing activity to be carried out annually and rate of average leaks per KM varies area to area, it is difficult to reduce the per km leakage drastically because new leakages develop in the network because of damages and soil conditions, it will be very difficult to reduce the per km leakages drastically.		
10		3%	8%
	The performance may be compared against Targets in revised UFG Reduction Plan (instead of total leakage rate per KM).		

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Annexure S.2 - SSGC Comments

Sui Southern Gas Company Limited

		Beta (β)	
Number of overhead leak rectified as a % total number of domestic consumers.			
11	<p>This is a continuous ongoing activity to be carried out annually, the performance may be based on both surveyed and rectified of 15% of total domestic connection annually.</p> <p>The performance may be compared against Targets in revised UFG Reduction Plan (instead of total number of domestic consumers).</p>	4%	3%
Number of KMs with Cathodic protection coverage as a % of total No. of KMs of distribution network.			
12	<p>At present, Out of 85% Steel Pipelines Network consists of 28% Supply Mains (SMS to TBS) that are almost protected (around 90%) and remaining 72% Distribution Mains and Services that are not well protected (around 30%).</p> <p>Overall Steel Pipelines is surveyed on quarterly basis and magnesium anodes are installed on small Dia Pipelines where CP Stations are not feasible, Battery Backup Systems are installed at CP Stations to ensure pipeline protection level in absence of electricity.</p> <p>It is practically impossible to ensure 100% cathodic protection of distribution network due to various constraints such as Power outage, Third party damage, no right of ways, pipeline coating service life / pipeline aging, soil condition and difficulties to carryout operational work in large cities.</p> <p>This is very important aspect and it is proposed that the performance may be measured as % of steel larger Dia Pipeline instead of total distribution network. The proposed KMI will as follow:</p> <p>Number of CP stations installed/renovated as a %age of total target CP stations selected for installation/renovation.</p>	4%	3%
Theft Control			
Number of theft cases detected-against registered consumers.			
13	<p>CR Department received around 30,000 theft cases p.a. from following sources:</p> <ul style="list-style-type: none"> a) Billing Department b) Surveillance & Monitoring c) CRD Field Staff d) SSGC complaint center (1199) e) Media 	4%	0%

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Sui Southern Gas Company Limited

		Beta (β)	
The company will explore new sources to increase reporting of number of theft cases, however, this KMI should be measured against performance i.e; disconnections of reported cases.			
It is proposed to merge under KMI 15.			
Number of theft cases detected against non-registered consumers.			
The companies, through constant vigilance, identify and disconnect as many instances of theft by non-consumer that they can. The theft of gas by non-consumers (i.e. persons not registered on the company's network) is difficult to identify, quantify and approach.			
14	<p>New Gas Theft Act deals with instances of gas theft only, the companies are not provided with the security to recover the amounts lost.</p> <p>CR Department detected around 125,000 theft cases against non- registered customers in FY 2015-16.</p> <p>These efforts may further be increased if OGRA appreciate and reward allowance against this particular factor. This KMI may be included subject to its treatment.</p>	4%	0%
Number of disconnections in respect of theft as a % of total consumer base of the period.			
These illegal connections are disconnected wherever detected despite resistance of people, however, these connections are immediately reconnected by rapturing pipeline from another point. As a result, pipeline is deteriorated with high rate of leakages and corrosion.			
15	<p>CR Department will attempt/ disconnects around 100% theft cases against non-registered customers detected in Karachi Region whereas the theft cases in Interior Sindh and Baluchistan cannot be attempted/ disconnected due to resource constraints in managing large scattered areas as well as reluctance of lodging FIRs by the local police stations at all regions.</p> <p>The performance may be measure against detected cases (instead of total customers)</p>	4%	4%
Number of gas theft/ leakages complaints received per 100,000 consumers annually.			
16	<p>CR Department receives around 45,000 leakage complaints during FY 2015-16. Complaint resolved against received may be utilized as performance indicator. This KMI should be merged under KMI 17.</p>	3%	0%

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Annexure S.2 - SSGC Comments

Sui Southern Gas Company Limited

		Beta (β)	
17	Number of gas theft/Leakages complaints resolved per 100,000 consumers annually. CR Department resolves 100% leak complaints received. This KMI should be based on Complaint resolved against received as performance indicator (instead of 100,000 customers)	3%	5%
It is proposed to add survey of disconnected customers as it is experienced that most of theft cases are reported at locations where gas supply was disconnected.			
The performance should be measured separately for each customer class based on following schedule:			
		0%	5%
	a) 100% Industrial Disconnected Consumers annually	2%	
	b) 30% Commercial Disconnected Consumers annually	1%	
	c) 20% Domestic Disconnected Consumers annually	2%	
Research & Development			
18	Number of training hours per employee per year.	1%	1%
19	Improved capability of cost effective construction, Maintenance and emergency repairs	1%	1%
20	Number of environmental issues rectified during the year / Amount of penalties paid as a result of violation of environment laws.	1%	1%
21	Volume of data quality issues identified during the year.	1%	1%
22	Number of knowledge sharing meetings / joint sessions attended / organized during the period.	1%	1%
Total		100%	100%

Sui Southern Gas Company Limited

Summary of Proposed Key Monitoring Indicators (KMIs)

	#	Description of KMI	%age
Gas Theft/Resolution	1	Vigilance of all categories of consumers.	
		a) 100% Industrial Consumers on Quarterly Basis	5%
		b) 100% Commercial Consumers on Semi-Annually Basis	7%
		c) 20% of Domestic Consumers (around 600,000) annually	8%
	2	Number of disconnections in respect of theft cases identified for the period.	4%
Gas Theft/Resolution	3	Survey of disconnected customers	
		a) 100% Industrial Disconnected Consumers annually	2%
		b) 30% Commercial Disconnected Consumers annually	1%
		c) 20% Domestic Disconnected Consumers annually	2%
Measurement Errors Resolution	4	Number of total defected (Slow & PUG/Sticky) meters replaced as a % of identified defective meters.	
		a) Industrial Meters	5%
		b) Commercial Meters	7%
		c) Domestic Meters	8%
Measurement Errors Resolution	5	Number of meters replaced as a % of total number of meter eligible for replacement.	
		a) Industrial Meters after 3 Years	4%
		b) Commercial Meters after 7 Years	5%
		c) Domestic Meters after 16 Years	6%
Gas Leakages Rectifications	6	Length of the distribution network rehabilitated (KMz) as a % of Targets in UFG Reduction Plan	8%
	7	Number of underground Leaks rectified per KM as % of Targets in UFG Reduction Plan	8%
	8	Number of overhead leak rectified as a % of Targets in UFG Reduction Plan	5%
	9	Number of CP stations installed/ renovated as a %age of total target CP stations selected for installation/ renovation.	5%
	10	Number of gas leakage complaints resolved as a % age of actual number of such complaints received by company	5%
Misc	11	Training, Capability Enhancement, HSE, Data Quality, Knowledge Sharing	5%
Total			100%

Annexure T - Response to the Comments on 1st Draft | UFG

In response to our 1st draft of UFG study report dated 21 September 2016 submitted, the Authority circulated the report to the Sui Companies for necessary consultation and feedback. Thereafter, Sui Companies have provided their comments as annexed to this report (Refer Annexure T.1 - SNGPL response on 1st draft and Annexure U - SSGC response on 1st draft).

We have considered the observations raised by Sui Companies and the Authority and have incorporated the required changes / observations in the 2nd draft report.

The major comments are relating to the factual accuracy of the data presented in the report, the UFG formula, comparison made with International practices, impact of bulk to retail shift and Key Monitoring Indicators.

We understand that the formula proposed in our 1st draft needs simplification and accordingly we have simplified the UFG Benchmark Formula.

Our study recognizes that Sui Companies have to operate under adverse operating conditions as compared to other similar utility companies across the globe. Accordingly, additional allowance factor is suggested to cover impact of gas losses. This factor is suggested to cover impact of gas losses due to shift in the sales mix from bulk towards retail consumers expanding the network and making it more prone to theft,

leakages and data/meter errors. Similarly, impact of factors like non-recovery of gas bills from law and order affected areas is included.

Allowance for these challenging conditions is suggested to be 4.05% based on the past 4 years UFG claims made by the Sui Companies against above mentioned factors.

We have updated KMIs and their scores based on the proposed KMIs of the Sui Companies. Also, we have attempted to incorporate the affect of the Contributing factors that are uncontrollable.

Sui Companies have requested to rearticulate a range of the Incentive factor i.e. "Beta" to 0.5 – 1.5. However, we believe that Beta is an incentive factor as well as a driving tool for the Sui Companies to keep them motivated to execute their pre-agreed plans to control UFG. The success of achievement of KPIs will guide OGRA in providing a UFG allowance top-up which is the sprit of this formula and should remain within the range of 0.0 – 1.0.

We have also suggested OGRA a modus operandi relating to UFG allowance for the previous and current years along with the frequency and timing of annual review to evaluate and monitor KMIs.

Annexure T.1 - SNGPL response on 1st draft

DRAFT COMMENTS/RESPONSE REGARDING **1ST DRAFT OF "UFG STUDY REPORT" BY M/s KPMG**

1 EXECUTIVE SUMMARY

1. The company has gone through the draft of the 'UFG Benchmark Study Report' (the "Report"), prepared by the consultants M/s KPMG (the "Consultants"). While we sincerely appreciate the efforts of the Consultants in preparation of the Report, we believe that certain aspects have been missed out in the Report. The Consultants have made comparisons of SNGPL with some of the international best practices in certain cases, but it should be acknowledged that it may not be realistic due to dissimilar operating conditions. Such a comparison would only have been relevant if those companies had similar dynamics as SNGPL with respect to:
 - a. Working/operating conditions, especially with respect to supply & demand gap
 - b. Consumer base
 - c. Gas Sales Mix
 - d. Size of network
 - e. Law and order situation
 - f. Tendency of gas theft both by registered and unregistered consumers
 - g. Impact of power outages on integrity of distribution network
 - h. Impact of increased load curtailment
 - i. Gas Allocation & Management Policy of the Government in pursuance of Socio- Economic agenda of Government of Pakistan etc.

None of above highlighted issues are dominant in case of international gas companies which operate on the basis of commercial viability whereas for SNGPL such operating conditions are not available. Furthermore, financial implications of added requirements/steps to be taken by the Company appear to have been ignored in the UFG Study Report since it fails to consider the fact that the operating cost per consumer of SNGPL, which is currently considerably low as compared to companies operating on commercial considerations, will significantly increase.

2. Furthermore, it appears that the Report has misunderstood certain issues, such as the issue of measured loss in law and order affected areas of KPK Province, and the same needs review as maintenance of law and order is a provincial subject, in line with the 18th amendment to the Constitution whereas recommendations/conclusions of the Report on this particular issue are contrary to the provisions of the Constitution. Therefore, the Provinces would be the appropriate authority to declare an area as law and order affected and in this particular case, the Report does not appreciate that the Chief Minister of KPK himself has written to the Authority accepting inability of Provincial Government to control the law and order situation. The interference of the locals in these areas has increased to such an extent that now with political support, they increase the delivery pressures of SMSs at their own, which may not only result in increase of losses at these SMSs but may also cause any untoward situation. This bleak law and order situation has also been reported in the print media and its evidences were provided to the Consultants. Similar issues are being faced by Oil and Gas, Exploration and Production (E&P) Company M/s MOL, Pakistan working in these areas, whereby its production was suspended due to protests by locals. Instances have also been reported by M/s

Annexure T.1 - SNGPL response on 1st draft (Cont.)

MOL Pakistan in which the locals attempted to sabotage/pilfer their 'gathering system' in TAL, block area. So this particular factor is beyond the company's control.

3. The Report, despite recognizing on Page No. 57 thereof that **"...owing to factors listed above and other complexities in retail supply of gas, argument for non controllability of theft by company carries weight and needs to be addressed"**, concludes the issue of theft by non-consumers in a manner contrary to established facts and against the provisions of OGRA Ordinance and applicable laws. Therefore, the same needs to be reviewed and allowances have to be made by the Authority in gas losses in this regard.
4. The technical, financial and logistical hurdles being faced by the Company have not been given due weightage, especially while giving KMIs to be achieved by the Company in the Report. Execution of activities defined in the KMIs will require specific budgetary provisions on an annual basis, along with additional provisions in HR benchmark, leading to a consequential rise in tariff which will have to be borne by the gas consumers. The Report presumes that execution of certain KMIs in next five years will permanently bring down UFG to 5 %, whereas, in reality, the execution of different UFG control activities is a continuous ongoing activity which has to be carried out regularly irrespective of any specified time period.
5. The ECC of Cabinet was cognizant of the situation and has issued policy guidelines to Authority, considering complexity of the issue, to allow the volumes claimed by the company against following factors beyond its control:
 - a. Gas Volume pilfered by Non-consumers
 - b. Gas Losses in Law & Order affected areas
 - c. Impact of change in Bulk Retail Ratio on UFG, using the base year 2003-04
6. The Report has recommended replacing the underground network, without giving reference of international practices in this respect, which needs to be elaborated. On the contrary the company has adopted very scientific approach to reduce the impact of underground leakage loss.
7. The factor as given in the TOR i.e.. *"Measurement Errors"* has not been understood in its true perspective and the Report has misconstrued metering at TBSs/DRSs. Measurement at TBSs/DRSs is contrary to the international practices. Measurement is carried out whenever there is custody transfer and all the custody transfer points on SNGPL network i.e.. Gas Sources, SMSs and CMSs are accurately metered. So it needs to be reviewed.
8. The conclusion arrived at by the Report on Page No. 60 thereof that **"Sui companies do not have implemented sufficient measures/control that can help companies deal with the UFG issue in a sustainable manner..."** is incorrect as the successful execution of UFG Reduction Plan of SNGPL, duly approved by OGRA and the results achieved thereon by SNGPL with regard to reduction in UFG, are sufficient to speak itself.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

9. The Report has not recommended any allowance in overall UFG benchmark with regard to losses in Transmission network, which needs to be reviewed in line with international practices.
10. While recommending the UFG Benchmark, the Report states on Page No. 68 thereof that **“UFG allowances are commonly set in correlation with gas consumption and network lengths”**. Considering this recommendation, the countries referred by the Report for the purpose of UFG benchmark, i.e.. Turkey and Bangladesh, **are incomparable as they have only 15,641 km and 20,804 Km network (15% and 20% respectively), as compared to an over 100,000 km network in case of SNGPL**. In case of Bangladesh, a model of appliance based billing for domestic consumers i.e.. 87 M³ is used (it is consumption of 2 domestic burners per customer and for single burner, it works out 43 M³ which is consistent with the minimum billing volume of 40 M³ in case of SNGPL), irrespective of their consumption that results in lower UFG rate. **Moreover, approximately 65% of gas is allocated to bulk sector, based on available information pertaining to their Gas Sales Mix. Similarly, in case of Turkey, 48% of gas is allocated to bulk sector.**
11. ***If countries like USA (Texas), Russia and Australia (Multinet) have benchmark in range of 5%, the typical circumstances being faced by the SNGPL warrant for reasonable UFG benchmark commensurate with the very UFG factors beyond its control, ground realities, operational constraints and unfavourable operating conditions. The Company strongly feels that the Report needs a review in light of the UFG Benchmark data of different countries, particularly with reference to all the UFG contributing factors mentioned in the TOR's finalized by OGRA and the UFG benchmark of each country needs be evaluated for all these UFG contributing factors. Only in that case comparison of UFG benchmark can be relevant and rational.***
12. The Report was required to study the relevant UFG contributing factors. The Company reiterates the need for revisiting the relevant UFG contributing factors annually by OGRA to make the UFG benchmark reasonable and realistic
13. That, in light of the above submissions, the Company provides its detailed comments on the Report, section by section, herein below:

2 **SECTION NO. 1**

1. **BACKGROUND**

Some of the figures quoted in this section of the report are incorrect and need attention.

- On page No. 17 it has been stated that UFG of the company has reached up to 15% in Year 2015 which it totally incorrect. In line with OGRA determination of FRR of FY 2014-15, UFG of SNGPL is 10.97%.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

- On page No. 18 the data table showing UFG figures of SNGPL are not in line with OGRA's Determinations of respective years.
- On Page No. 19, the data table containing network length and consumer base pertaining to SNGPL is incorrect.

2. **UFG DEFINITION, CALCULATION AND METHODOLOGY**

Stance of SNGPL has been reproduced regarding UFG calculation formula.

3. **UFG CONTRIBUTING FACTORS**

2.3.1 **GAS THEFT**

2.3.1.1 **Theft-Causes and Concern of Sui Companies:**

On Page No. 27 of the Report, the stance of the people living in Baluchistan has been mentioned but similar stance of people in oil and gas producing, law affected areas of KPK province have been missed out, which needs to be made part of report.

2. **OGRA Procedure for Dealing with Theft of Gas Cases**

On Page No. 28 of the Report, it is stated that the Company requested for revision in OGRA 'Procedure for Dealing with Theft of Gas Cases' on the premise that "...recovery claims stay pending in court of law for longer of time and no special courts...", which is incorrect. In fact, the Company requested OGRA for revision in this Procedure because the Company had presented certain cases to OGRA in which admissible evidences were available which were sufficient to prove that consumers were involved in gas theft for a period exceeding 12 months. Keeping in view the presented cases, OGRA has partially amended the said procedure and has allowed charging of "direct by pass" cases up to a recoverable period of 36 months.

3. **Table TT-4 (Consumer wise analysis of theft volume and recoveries :**

The comparison of detected gas theft cases with the total consumer base is irrational. Detailed response in this regard, is given in para No. 2.5.1.1 of this document

2.3.2 **LAW AND ORDER AFFECTED AREAS:**

On Page No. 33 of the report, it has been stated that OGRA allows claims pertaining to law affected areas on basis of gas supplied to these areas through 13 SMS's. This perception reflected in the Report is incorrect. The claim of SNGPL is not based on gas supplied to these areas, but, in fact, it is based on measured loss. Detailed response in this regard is given in Para No. 3.11 of this document.

2.3.3 **LEAKAGES**

On Page No. 37 of the report, it has been stated that company needs to consider the thickness of its pipeline to protect its network from being corroded. The Company uses steel pipe conforming to the specification defined in Standard 'API-5L: Specification for Line Pipe' and for design of distribution piping, follows Code 'ASME B 31.8: Gas Transmission and Distribution Piping System' so the thickness of pipe cannot be altered beyond provisions of Standard/Code.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

2.3.3.1 Overhead Leakages:

On Page No. 40 of the report, a figure of 1.8 leak/connection in the case of aboveground leakages from domestic connections has been worked out, which is incorrect and as such cannot be presented in this way. It was informed that there are around 9 No. threaded joints in each domestic connection above the surface and on the basis of different studies, contribution of 15 to 20% in total losses has been worked out due to aboveground leakages.

4. MEASUREMENT ERRORS:

On Page No. 41 of the report it has been stated that since transmission network is fully metered, so there is negligible UFG in transmission system. The Report has been unable to differentiate those very factors which differ in case of transmission and distribution network which contribute to losses. Losses in Transmission network are comparatively on lower side due to following:

- a. No gas theft.
- b. Smaller length of Transmission Network (less than 8,000 Km) as against distribution network which is over 100,000 Km. The Transmission network has been laid in Company's owned 'Right of Way' so there are no significant instances of gas leakages, except ruptures due to sabotage activities.
- c. Precise measuring gadgets, with high accuracy and close monitoring of Transmission network through SCADA (Supervisory Control and Data Acquisition) system. There are ONLY 390 Sales Meter Stations as against consumer base on distribution network, which have crossed a figure of 5.2 Million.

1. Table ME-1 (Page No.42):

Only 73% of total consumers have been shown as metered, which is totally incorrect. In fact 100% of the consumers connected to SNGPL are measured. The consultant has considered all the minimum billed cases as sticky, which is not logical.

2. Table ME-6a (Page No. 46)

It has been stated that useful life of 14.5% of total industrial meters has lapsed, which is incorrect. Company is following the criteria for replacement of meters against 'Schedule Replacement Program' prescribed by OGRA. Details are given in Para No. 4.2.8 of this document.

4. EFFECT OF UFG DISALLOWANCE

Effect of UFG disallowance is attached as Annexure-A .

5. CONCLUSION TO THE SITUATIONAL ASSESSMENT

1. GAS THEFT

The Report lists the following as significant impediments with regard to gas theft:

- Continuous growth of the gas distribution network

Annexure T.1 - SNGPL response on 1st draft (Cont.)

- insufficient and delayed legislative support for recovery of detected cases
- inadequate monitoring and maintenance efforts of sui companies
- expectation of free gas supply in gas producing areas

However, the following important factors have been ignored/considered insignificant by the Report, which are reiterated by the Company since the same are beyond its control:

- Increase in gas price, tempting consumers to use unfair means
- Shortage of gas supplies, tempting consumers to use it illegally
- Moratorium on new gas connections of industrial and commercial category and provision of limited number of domestic gas connections as against huge number of applications pending for new gas connections.

2.5.1.1 Theft By Consumers:

The Report makes comparisons of a number of detected gas theft cases with the total number of consumers, which is irrational and has worked out an incorrect figure to show that Company has detected gas theft cases which are only 1% of total consumer base. The efforts of SNGPL against gas theft cannot be gauged by such a comparison, as the Company is executing its UFG Reduction Plan, duly approved by OGRA and vigilance of industrial, commercial and domestic consumers are its most important components. The following are targets defined in this plan:

Activity	Target
Industrial CMS inspection	Vigilance of each Industrial consumer on monthly basis
Commercial CMS inspection	Vigilance of each Commercial consumer on quarterly basis
Domestic CMS inspection	1.5 million domestic consumers

As a result of hectic efforts by the Company and support provided by law enforcement agencies and FIA, it has been able to detect a large number of gas theft cases involving substantial gas theft volume despite facing serious issues at site, only some of which are limited to brutal torture and manhandling of our field staff at site by gas pilferers. Summary pertaining to achievements against UFG Reduction Plan era i.e.. February, 2013 to June, 2016 is given in table below:

Category	Cases (No)	Volume (MMCF)	Amount (Rs. Million)
Industry	526	12,236	7,548
Commercial & Spl. Domestic	22,142	4,469	3,087
Domestic	107,141	4,936	1,948
Total	129,809	21,641	12,583

The above data shows that company is already making best possible efforts on its part which has created deterrence against gas theft, so the conclusion arrived at in the Report regarding "inadequate monitoring" with regard to gas theft is contrary to the facts.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

2.5.1.2 Theft by Non Consumers:

The Report concludes that calculations of gas theft volume pertaining to non consumers are based on '*judgments and hypotheses*', which is incorrect. The Company had apprised the Consultants that theft charges against Non Consumers are established in line with OGRA's 'Procedure for Dealing with Theft of Gas Cases' and such a conclusion without thorough study of calculation mechanism is merely a statement. Volumes pilfered by non- consumers are not out of the blue and are calculated using a scientific basis in accordance with OGRA procedures. Company detects, works out gas theft volumes and forwards the cases to the Authority for arranging recoveries in line with sections 26 & 27 of OGRA Ordinance, 2002 and Rule 30 of Natural Gas Regulatory Authority (Licensing) Rules, 2002 since the Authority is the only body which has jurisdiction under the OGRA Ordinance.

The recently promulgated Gas (Theft Control & Recovery) Act, 2016 only applies to the extent of criminal liability. It does not take care of recovery issues, which is a civil matter. Therefore the new law may not adequately address this issue either.

The Report on page No. 57 thereof notes that ***"...owing to factors listed above and other complexities in retail supply of gas, argument for non controllability of theft by company carries weight and needs to be addressed"***. **Despite the above understanding, the conclusions reached in the Report on the issue of theft by non-consumers are contrary to established facts and against the provisions of OGRA Ordinance and applicable laws and need to be reviewed. Allowances have to be made by the Authority in gas losses in this regard.**

2.5.2 LAW AND ORDER AFFECTED AREAS:

The Report fails to appreciate the crux of the issue regarding law & order affected areas, despite the fact detailed documents were provided in this regard. The Company reiterates its contentions on this issue below:

- The KPK Provincial Government was requested to advise law enforcement agencies for providing necessary support to take action against illegal usage of gas, due to prevailing law & order situation in these areas
- The Provincial Government has shown its inability to take action against the gas pilferers. The Chief Minister of KPK himself has written to the Authority stating ***"Provincial Government is in agreement that the gas losses in oil & gas producing areas of KPK are not due to inefficiency of SNGPL but due to prevailing worst law and order situation of the area it could not be controlled even through administrative measures of Provincial Government"***
- Local people are interfering with operations of the company and this interference has increased to such an extent that now, with political support, they increase the delivery pressures of SMSs at their own. These events have been reported in print media and its evidences were provided.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

- Similar issues are being faced by Oil and Gas, Exploration and Production (E&P) Company M/s MOL, Pakistan working in these areas, whereby its production was suspended due to protests by locals. Instances have also been reported by M/s MOL Pakistan in which the locals attempted to sabotage/pilfer their 'gathering system' in TAL, block area. So this particular factor is beyond the company's control. Relevant supporting evidences were provided to the consultant. It is evident that the issue is beyond Company's control and on this basis the Company has claimed 100% allowance against losses in these areas from OGRA for UFG calculation.
- The Economic Coordination Committee of the Cabinet, while considering socio-economic conditions and complexity of the UFG issue, has given policy guidelines to Authority on this very factor also.
- The OGRA while giving Determination of Final Revenue Requirement of SNGPL pertaining to FY 2012-13, FY 2013-14 & FY 2014-15 has only partially implemented the above stated decision of ECC of Cabinet and has:
 - ❖ allowed only 75% of actual losses in these areas and
 - ❖ for the remaining volume it has decided that the Federal Government should arrange funding from its own resources or from Royalty of concerned province and all such amounts in future to meet the shortfall
- The Ministry of Petroleum and Natural Resources has informed the Authority that no such mechanism nor subsidy head is available with the Federal Government to claims made by SNGPL in respect of Law and Order affected areas. The Authority has therefore been requested by the Ministry of Petroleum and Natural Resources to consider the request of SNGPL regarding claim of remaining gas volume with respect to Law and Order affected areas in pursuance of ECC decision.
- The company also submitted proposal for laying and rehabilitation of network in these areas at an estimated cost of Rs. 6,666 Million on cost sharing basis.
- On desire of KPK Government matter was taken up with the Bank of Khyber but the said bank has shown inability to provide soft term loan for this purpose.
- The Federal and Provincial Government of KPK have difference in opinion on the issue so the issue is still unresolved.

The above stated events clearly indicate the commitment of Company to address the issue while highlighting factors beyond its control hindering the process.

Moreover, recently the Federal Cabinet during its meeting held on 06-09-2016 has ratified the decisions taken by Economic Coordination Committee of Cabinet during the period Year 2013 to 2016 which also includes the decision taken in Year 2014 regarding UFG contributing factors beyond the Company's control. In this regard, Press Release No. 66 is available on website of Press Information Department (PID).

The issue of measured loss in law and order affected areas of KPK Province needs review as maintenance of law and order is a provincial subject, in line with the 18th amendment to the Constitution whereas recommendations/conclusions of the Report

Annexure T.1 - SNGPL response on 1st draft (Cont.)

on this particular issue are contrary to the provisions of the constitution. Therefore, the Provinces would be the appropriate authority to declare an area as law and order affected and in this particular case, the Chief Minister of KPK himself has written to the Authority which has been ratified by the ECC as well as the Federal Cabinet.

The Report assumes that other utilities are not facing similar losses in law affected areas. Such an assumption should perhaps have been made after a thorough comparative study and analysis between the losses faced by the company and other utilities operating in these areas. As for instance, if we consider losses, being faced PESCO in these areas, they are also on higher side, as given in table below:

Description	Losses of PESCO Feeder*
Siraj Baba	84%
Warana	90%
New Ghoriwala	93.5%
Kakki	97.2%
Zargiri	82%

*http://www.express.com.pk/epaper/index.aspx?Issue=NP_PEW&Page=Back_Page008&Date=20150625&PageNo=8&View=1

Therefore, in view of the above explained complexity of situation and uncontrollability associated with it, maximum protection needs to be given to the Company by the Authority since it is mandated under the law to protect the interests of the licensee as well.

2.5.3 MINIMUM BILLING:

The conclusion arrived at by the Report in this regard is incorrect. The 40 M³ per month gas usage by single domestic user is not based on any assumption, but in fact is based upon research carried out UET, Lahore, through which it is concluded that the most households, which are billed the minimum are using at least 40M³ regardless of the actual volume registered by domestic meters. It is pertinent to mention here that the issue of minimum billing arises due to un-favourable operating parameters, i.e., operation of network below its design pressure due to supply and demand gap, resultantly the carbon dust/condensate and debris present in pipeline travel into the meter body. This increases rate of wear and tear of meter internal parts, affecting its measurement accuracy. Even if the Company replaces all domestic meters in one year (without prejudice to the prohibitive cost associated there with), the newly installed meters with have similar issues due to prevailing huge gap between supply and demand. The working pertaining to minimum billed cases of FY 2014-15 is given in table below:

A Monthly Consumption Bracket (Hm ³)	B TotalCases during the FY 2014-15 (Nos.)	C Total Actual Annual Consumption (Hm ³)	D	E	F=E/(12*30) Average Daily usage, Based on Average Consumption (Hours)	G=(0.4-D)*B Unbilled Estimation (Hm ³)
			(Hm ³)	ft ³		
Zero	1,589,929	-	-	-	-	-
0.01 - 0.20	5,860,802	656,537	0.11202	395.30	1.1	1,687,784
0.21 - 0.30	4,771,921	1,210,783	0.25373	895.35	2.49	697,986

Annexure T.1 - SNGPL response on 1st draft (Cont.)

0.31 - 0.40	5,202,377	1,838,917	0.35348	1,247.33	3.46	242,034
Total <small>(excluding zero consumption cases)</small>	15,835,100	3,706,236	0.23405	825.91	2.29	2,627,804
						9,327 MMCF

As for instance, if we consider monthly consumption bracket of 0.01 Hm³ to 0.20 Hm³, it translates into ONLY 1.1 hours daily usage by domestic consumers, which is practically not possible. In Bangladesh, a model of appliance based billing for domestic consumers, i.e., 87 M³ is used which is consumption of 2 domestic burners and for single burner, it works out 43 M³ which commensurate with the minimum billing volume of 40 M³ in case of SNGPL).

Moreover, the bona fides of the Company in this matter can be gauged from the fact that the Company is not claiming any allowance against minimum billed volume on account of those consumers which have a 'zero consumption' reading. Therefore, the Company requests that this issue needs to be revisited in its true perspective.

2.5.4 LEAKAGES:

The Report concludes that non-replacement of underground network and low Cathodic protection level reflect weakness of the Company, which is true only to the extent that low Cathodic protection level is causing deterioration of underground network, BUT owing to repeated power outages, which is certainly not in control of the company.

As regards the replacement of underground network, the Report has not referred to any international practice or Code applicable to distribution piping network, which recommends replacement of network ONLY on the basis of its aging and without its assessment/evaluation. The Company has adopted a highly scientific approach in this respect as explained in detail in Para No. 3.12 of this document. This shows that there is a need to thoroughly explore this particular issue in view of international practices.

2.5 MEASUREMENT

The Report's approach towards this very factor i.e., 'Measurement Errors' is misdirected and has been confused/perceived as metering on TBSs/DRSs. The conclusions that following will address the 'Measurement Errors' in the system is far from the reality:

- Metering at TBSs
- Segmentation of network

Whereas the company's as well as the Authority's intentions with regard to 'Measurement Errors' was with reference to various issues related to measurement faults associated with already INSTALLED meters. These defects/faults arise due to mechanical moving parts of meters which are further aggravated due to following issues:

a. Network Operating Parameters:

Due to considerable decrease in gas supplies from indigenous sources, the Company's distribution network is experiencing a huge gap between demand and supply of natural gas, which is resulting in continuous low pressure in the distribution network. This factor is beyond Company's control.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

Reduction in operating pressures of network caused due to huge Demand Supply gap, increases the velocity of gas, resultantly the carbon dust/condensate and debris present in pipeline travel in to the meter body. This increases rate of wear and tear of meter internal parts, affecting its measurement. **Study conducted by the company was also furnished to the consultant and it was found that 37.11% of total checked meters were found recording on minus side beyond permissible limit (i.e.. -2%) and the average extent of minus recording is 7.4%.**

b. Quality of Locally Manufactured Domestic Meters:

The quality of locally manufactured domestic meters is another factor affecting the measurement accuracy in domestic sector. The Company as per instructions of the Ministry of Petroleum and Natural Resources vide letter No. DGO(NG)-12(29)/81 dated 04-04-1982 (copy already provided to the consultant) was bound to procure locally manufactured meters from its sister concern M/s SSGC. The company raised concerns on quality and performance of meters supplied by M/s SSGC due to which the bar was withdrawn by the Ministry of Petroleum and Natural Resources vide letter No. NG(II)-15(27)/12.GC dated 12-03-2013 (copy already provided to the consultant) and the Company was allowed to procure domestic meters from international market through International Competitive Bidding process. However, even if and when the Company replaces all meters, the newly installed meters are also prone to similar defects due to continuous low pressure problems mentioned above.

The Report has not given any conclusion regarding the above highlighted issues and has tried to divert it to a new dimension i.e.. measurement at TBSs and segmentation, therefore, there is a need to review the effect of "Measurement Error" on UFG.

2.5.6 BULK-RETAIL:

Although the Report acknowledges the particular reasons due to which the Company is claiming allowance against this very factor, however, the stance that the Company has not made efforts for corrective measures is simply not true. It is reiterated that shift of gas from Bulk to Retail is beyond Company's control. The Company has put in best possible efforts to curb the menace of gas theft, keeping in view the specific operating conditions, budgetary provisions and HR benchmark allowed by OGRA on an annual basis.

The results achieved by the Company as a result of executing its UFG Reduction Plan duly approved by OGRA against core UFG contributing factors i.e.. leakages, gas theft and measurement errors are on record and need due recognition in the Report as well as by the Authority. Moreover, the KMIs proposed need to be reviewed. Detailed comments on the KMIs are given in section No. 4.2 of this document.

2.5.7 OVERALL CONCLUSION:

We agree that there is always room for further improvement, but the overall conclusion of the Report that the Company does not take ownership of the UFG issue and plan to curb, is without any detailed analysis and thorough study. The successful execution of the Company's UFG Reduction Plan speaks about the efforts put in by the Company in this regard. The Report also fails to reflect the genuineness of the Company's claims against

Annexure T.1 - SNGPL response on 1st draft (Cont.)

cognizant of the situation and has issued policy guidelines to Authority, considering complexity of the issue, to allow the volumes claimed by the company against following factors beyond its control:

1. Gas Volume pilfered by Non-consumers
2. Gas Losses in Law & Order affected areas
3. Impact of change in Bulk Retail Ratio on UFG, using the base year 2003-04

The execution of different UFG control activities is a continuous ongoing process irrespective of any specific time period. The constitution of proposed objectives and recommendations of the Report for short term and long term measures lacks thorough understanding of technical issues and financial constraints associated with these. The detailed comments/response of the Company against KMIs recommended by the Report are given in para No. 4.2 of this document.

3 SECTION NO. 2: "OUR RECOMMENDATIONS"

3.1 100% METERING:

Installation of measurement facility at TBSs is not a standard practice. Although from an administrative point of view, it is a better option to split the area of operation into smaller units, but the Report has recommended it as a tool of measurement. The peculiar circumstances of the Company do not support this concept. In line with international practices, the gas on the Company's network is measured whenever there is a custody transfer and the custody transfer points on company's network are:

Description	Remarks
Gas Sources	Custody is transferred from gas producer to Transmission Department
Sales Meter Stations (SMS)	Custody is transferred from Transmission Department to Distribution Department
Consumer Meter Stations (CMS)	Custody is transferred from Distribution Department to Individual Consumers

All the above mentioned Custody Transfer points are precisely metered and reconciliation of following is made in monthly accounts of SNGPL:

- UFG in Transmission Network (which is difference of gas received in Transmission System from the Gas Sources and passed to Distribution Network through SMSs)
- UFG in Distribution of Network (which is difference of gas received in Distribution System through SMSs and passed to Individual Consumers through CMSs)

Further, the UFG of distribution network is a composite of UFG in different distribution regions which is also prepared on a monthly basis. In addition to the above, the Company also prepares "SMS Wise Gas Reconciliation" through which UFG of regions is further subdivided at SMS level and such reports are available on a monthly basis as well. UFG

Annexure T.1 - SNGPL response on 1st draft (Cont.)

control activities are carried out accordingly at SMS level. All above highlighted instances indicate that Company's system is precisely measured and reconciled at all necessary points.

The concept of metering at TBSs/DRSs envisaged by the Report points to a parallel setup to the existing arrangements, which is not feasible. There are certain technical issues which stem from the fact that the primary purpose of TBSs/DRSs installed by SNGPL is pressure regulation to reduce gas pressures to desired level, as per operational requirements of a particular locality/area. The EVCs have been installed on selected TBSs/DRSs to get data of pressure and flow and to supervise the performance of field staff remotely with regard to effective load management and monitoring of system parameters etc.

Presently more than 4,200 TBSs/DRSs exist on the distribution network of SNGPL with different sizes depending upon load requirements. Most importantly, 45% of the total consumer base is under the looped TBSs/DRSs. As a consequence, the following technical constraints exist in installation of measurement meters at ALL the TBSs/DRSs:

a. **International Practices:**

As explained above, in international practices, gas is measured wherever there is custody transfer. In case of SNGPL, no custody transfer of gas occurs at TBSs. However, all the following custody transfer points are precisely measured:

- Gas Sources
- Sales Meter Stations (SMS)
- Consumer Meter Stations (CMS)

b. **Looping of Distribution Network:**

- Under-sizing of Network:** Distribution network was designed on single feed basis and over the years, the consumer density on the network has increased due to induced developmental works on directives of Government of Pakistan which has resulted in undersizing of SNGPL's network. To overcome the issue, network at downstream of TBSs has been looped to meet pressure and flow for different segments/areas.
- Supply and Demand Gap:** The increasing gap between demand and supply of gas has further aggravated the situation and despite looping, the Company is unable to provide gas to all its consumers at desired pressures. De-looping of these TBSs will further aggravate the low pressure problems in areas and lead to a situation where consumers and the general public will, in all likelihood, be further deprived of natural gas during winter months. All major cities such as Multan, Faisalabad, Lahore, Islamabad, Rawalpindi, and Peshawar have looped network which covers more than 40% of the consumer base.
- Possible Solution - Network Augmentation:** The isolation of network downstream of TBS's is only possible through an extensive augmentation of SNGPL's network by laying larger diameter lines, which involves a huge finance/capital budget and will require detailed surveys and can only be undertaken once the demand and supply gap of natural gas in the country improves.

c. **Space Constraint:**

Annexure T.1 – SNGPL response on 1st draft (Cont.)

- i. **Existing Design of TBSs:** Since a measurement facility was not part of the design of TBS/DRSs in line with international practice. However, if we consider installation of measurement facility for the time being, additional significant space will be required to execute the recommendations of consultant. The network in major cities is located in densely populated and congested areas, this would require support from Provincial Governments, TMAs, City Government, private land owners etc.
- ii. **TBS Facility Located at Corners of Streets:** At a considerable number of locations, TBSs/DRSs have been installed at corners of congested road/streets and modification is practically not possible. Therefore, addition of a measurement facility at existing TBSs/DRSs will require acquisition of additional space from concerned outside agencies.
- iii. **Land Acquisition:** The land acquisition is an extremely cumbersome task in settled areas and might take years. It should also be noted that modifications at such locations may lead to third party damages and may result in leakage loss at high gas pressure, causing threat to human life and property. Even, otherwise, at certain locations, space is available only to the extent that the Company has no other option but to adopt “Poll Mounted Design”. The design was opted at certain locations only due to the reason of non availability of appropriate space.

At present, approximately more than 2,200 Nos TBSs/DRSs have critical issues related to additional space acquisition and non availability of additional space at site.

d. **Experience So Far:**

- i. **Damaging of Installed Meters:** It also appears that the experience of the Company so far in this regard has not been considered by the Report. Although the Company has equipped some of its TBSs/DRSs with measurement meters where such equipment was practicable, yet desired results could not be achieved. This is so because ‘Turbine Type’ meters will be suitable for measurement at TBSs but such meters are unable to accurately measure at the low operating pressures faced by SNGPL due to the demand and supply gap. Therefore, the company opted to install ‘Rotary Type’ meters. Experiences have revealed that frequency of meter damage in these types of meters is very high due to network operation at low pressures and issue of debris/condensate which increase rate of wear and tear.
- ii. **Bypass Operation:** During peak hours, the TBSs are operated in ‘bypass’ mode due to supply & demand gap, during which gas remains unmetered.

e. **Audit Observations:**

The installation of measurement facility at TBSs will invite the Audit observations by Commercial Auditors, as it involves huge financial impact and the Company will not be able to achieve intended benefits due to impediments explained above.

f. **Alternative:**

- i. **SMS wise Reconciliation Reports:** The Report has assumed measurement at TBSs/DRSs the only possible solution to the menace of UFG, whereas alternatives already exist. The basic objective of measurement at TBSs/DRSs is identification of losses. A mechanism is already in place for measurement of losses through ‘SMS wise Gas Reconciliation Reports’. For the purpose of identification of losses, the

Annexure T.1 - SNGPL response on 1st draft (Cont.)

company after carrying out hectic exercise over past 2-3 years has mapped all consumers with respective Sales Meter Stations (SMSs). All 390 SMSs of SNGPL are accurately metered and the UFG losses are calculated at each SMS on a monthly basis by comparing the gas passed through respective SMS with gas consumption of individual consumers.

- ii. **Benefits Achieved from Available Alternatives:** Through this exercise, abnormal behaviours are detected both in consumption trend of consumers, gas theft as well as leakages. Moreover, analysis of consumption of industrial and commercial & zone wise consumption analysis of domestic consumers at different SMSs helps identify abnormal behaviours

The Company is therefore of the firm opinion that 'SMS Wise Gas Reconciliation Reports' are an effective tool already being used by the Company successfully. The effectiveness of these reports is evident from the fact that UFG losses of the Company have shown visible reduction during past 1-2 years. In the presence of an already available tool, it will not be advisable to experiment and shift the focus altogether to a new dimension, just on the basis of this Report, which will halt the ongoing efforts of the Company.

2. **NETWORK SEGMENTATION:**

The concept of network segmentation is good suggestion, but it is not workable in the case of SNGPL due to following practical constraints:

a. **Existing Network Design:**

Detailed comments with regard to existing network design and looping have already been given in para No. 3.1.b.

b. **Supply and Demand Gap:**

Network segmentation is not practicable till such time supply and demand situation is balanced as explained in para No. 3.1.b

c. **Financial Issues:**

As already explained, the isolation of network downstream of TBS's is only possible through an extensive augmentation of network by laying larger diameter lines, which involves a huge finance/capital budget and will require detailed surveys and can only be undertaken once the demand and supply gas of natural gas in the country improves.

So network segmentation in the present circumstance is not practicable.

3. **CYLINDER MODEL:**

The Company in principle agrees with the recommended 'cylinder model' for provision of gas to new domestic users, however, only the Government of Pakistan and OGRA can take policy decisions in this respect.

4. **KEY MONITORING INDICATORS:**

Annexure T.1 - SNGPL response on 1st draft (Cont.)

The Report has specified KMI's for a period of 5 years only and that too with the intent to treat impact of Bulk-Retail ratio. This is contrary to the facts. As the Company understands, execution of UFG control activities is a continuously ongoing activity. The Company is already successfully executing 'UFG Reduction Plan', duly approved by the Regulatory Authority. This plan includes crucial UFG control activities, envisaged in view of key UFG contributing factors. The KMI's must be brought in line with the key UFG contributing factors and the Company, having vast experience in this particular field, should be authorized to select the UFG control activities to be incorporated in the KMI's along with appropriate weightage. Detailed response on KMI's is given in Para No. 4.2 of this document

5. **REGIONAL UFG MANAGEMENT:**

The recommendations of the Report for assigning targets to Regional Managers are in line with the system already in place, whereby Regional Heads are assigned annual targets for UFG Reduction by carrying out different UFG control activities.

6. **TWO YEARLY METER INSPECTION:**

The Report has recommended inspection of all meters installed on SNGPL's network for detection of gas theft and tampering etc. Contrary to the recommendations of the Report, SNGPL has already adopted a highly technical approach in this regard, which includes the following steps:

- Physical checking of Consumer Meter Stations
- Identification of suspected tampered meters/ measurement error cases.
- Identification of violation cases
- Flow proving of removed meters in Metering Workshop to confirm working of meters in line with OGRA 'Procedure for Dealing with Theft of Gas Cases'
- Detection of 'Meter Tampering' and 'Measurement Error' cases
- Charging to the consumers on account of gas pilferage or under measurement etc.

For the purpose of checking, the following criteria is being followed against UFG Reduction Plan:

- Industrial meters = once every month
- Commercial meters = once on quarterly basis
- Domestic meters = 15% of the total consumers annually

The above details show that industrial and commercial consumers are being inspected multiple times already on a yearly basis, whereas all removed domestic meters are inspected in Metering Workshops. The Report has presumed that inspection activity will not be required beyond two years, whereas it is in fact an ongoing CONTINUOUS activity.

7. **TECHNOLOGICAL ADVANCEMENT:**

The Company is cognizant of the fact of using latest available technologies to keep itself at par with new developments in the natural gas industry. The following measures have already been adopted in this regard:

Annexure T.1 – SNGPL response on 1st draft (Cont.)

- Use of G-6 meters for high consumption domestic connections to ensure measurement accuracy.
- Use of G-4 domestic meters, having anti reverse features
- Installation of Class-900 meters with EVC for detection of gas theft by commercial consumers
- Use of Electronic Volume Correctors (EVC), with improved anti theft features particularly with regard to detection of influence of external magnetic force
- GPRS based remote monitoring system for industrial connections for detection of ‘Gas Theft’, ‘Measurement Error’ and ‘Load Management Violation’ cases.
- All Material Locator (AML) to detect underground illegal tapping of distribution network.
- Laser based ‘Leak Detectors’ to identify underground leakages points
- ‘Hi Flow Sampler’ for detection of leakage flow rates
- ‘Vehicle Mounted’ gas leak detectors
- Pilot Project for ‘Cyber Locks’ has been initiated

8. **COST OF SERVICE STUDY**

OGRA being the statutory body can comment on the pricing mechanism for different categories of consumers.

9. **DETECT, MONITOR AND CONTROL:**

The finding of the Report that the Company has a reactive approach, instead of a proactive approach, for gas theft control is not based on detailed study of existing practices of SNGPL. The Company already has vigilance programs in place, as explained in para No.

3.6 for monitoring, detection and control of gas theft and, as a result of vigilance activities, the Company has been able to detect and establish gas theft volumes in line with OGRA ‘Procedure for Dealing with Theft of Gas Cases’ during Feb, 13 to June, 16.

Category	Cases (No)	Volume (MMCF)	Amount (Rs. Million)
Industry	526	12,236	7,548
Commercial & Special Domestic	22,142	4,469	3,087
Domestic	107,141	4,936	1,948
Total	129,809	21,641	12,583

As regards the recommendation of independent verification of gas theft volumes claimed against consumers, it seems that the Report has failed to appreciate the procedures and practices in place. Contrary to the understanding reflected in the Report, fact of matter is that a number of consumers to whom gas pilferage charges are booked, approach OGRA to get relief against established gas theft charges, which shows that validation mechanism is already in place in line with provisions of OGRA Ordinance and complaint resolution procedure of OGRA.

3.10 **RING FENCING:**

Annexure T.1 - SNGPL response on 1st draft (Cont.)

The Report has recommended installing bulk meters in areas which are prone to gas pilferage. It is a misconception that theft is localized in any specific area/locality. It is categorically stated that except for the law & order affected areas, gas theft is not localized, and rather it is spread across the Company's distribution network.

3.11 **USE OF BULK METERS**

The Report has recommended installing bulk meters to detect the losses in law and order affected areas. It is clarified that SNGPL's claim pertaining to law and order affected areas is based on accurate measurement of losses on the basis of following:

- Metered gas passed through SMSs feeding these areas.
- Metered gas billed to individual consumers at downstream of these SMSs

Loss at individual SMSs is calculated as follows:

$$\text{Volumetric Loss} = \left\{ \text{Metered gas passed through SMS} \right\} - \left\{ \text{Metered gas billed to individual consumers at downstream of SMSs} \right\}$$

The above precise quantification of losses is available on SMS wise, month wise and year wise basis. Moreover, it is not feasible to install additional 'bulk' meters in these areas due to similar law and order situation.

3.12 **LEAKAGE MANAGEMENT PLAN:**

The company has already put in place a comprehensive leakage management plan, which covers the following key activities:

- Aboveground leakage rectification
- Underground leakage rectification
- Underground network replacement

All these activities are carried out after thorough assessment and analysis whereas the Reports seems to focus ONLY on replacement of underground network. This has been done without a thorough study, referencing of international practices and working of its financial impact. The Company on its part has adopted a highly technical approach. SOPs have been devised through which segments of distribution network are assessed/evaluated and are recommended for replacement based on the following:

- Pipe to Soil Potential (PSP) survey
- Direct Current Voltage Gradient (DCVG) survey
- Close Interval Potential (CIP) survey
- Cathodic Protection level of network
- Underground Leak detection survey to identify leak points
- Assessment of Pipeline coating conditions
- Physical inspection of pipeline through bell holes

Annexure T.1 – SNGPL response on 1st draft (Cont.)

The Company also understands that replacement of the network involves huge finances and in order to avoid unnecessary expenditures, the Company has adopted this scientific approach. The underground network is surveyed using 'Leak Detectors' to identify leak points. Through use of these equipments, localized leakage detection and its repair is possible against old conventional strategy of replacing network without assessment of its integrity. **The replacement of network ONLY on the basis of its aging without its through assessment and referencing of international practices, as recommended in the Report will lead to a wastage of funds for which requisite budget will have to be allowed by OGRA, to be borne by consumers through price increase.**

3.13 **RECOMMENDATIONS ON UFG CALCULATION AND TREATMENT:**

The company appreciates that the consultant has acknowledged the long outstanding issue of UFG calculation methodology and stance of SNGPL has been acceded.

3.14 **RECOMMENDATIONS RELATING TO UFG ALLOWANCE:**

The Report has stated that since TBSs/DRSs are unmeasured, therefore the Company is

- Unable to measure actual difference between volume received and dispatched
- Present UFG volume in terms of contributing factors

This perception is incorrect as has already been explained in detail in Para No. 3.1 above.

If for the time being, it is assumed, that all TBSs/DRSs are equipped with measurement facility, even then quantification/splitting of total volumetric losses in different contributing factors will not be possible. The Company on the basis of vast experience and various studies has estimated the share of different contributing factors in total volumetric losses. **The Report, though concludes that estimation of the Company with regard to share of different UFG contributing factors in overall losses is incorrect, it fails to suggest any methodology for splitting the total UFG in different contributing factors, nor has it referred to any international practice in this respect.**

3.15 **STREAM 1 MID TERM PLAN:**

3.15.1 **UFG Calculation Formula:**

We appreciate that the Report has recognized that, in addition to the UFG rate, appropriate allowance has to be given to the Company which firms our stance that there are certain extraordinary circumstances in which the Company is operating which are not prevalent in any other country. The following formula has been proposed in the Report:

$$\text{UFG}_{\text{Allowed}} = \text{Gas}_{\text{AFS}} \times \text{Rate}_{\text{Fixed}} + \Delta \text{Volume}_{\text{UFG}} \times \beta$$

where;

$\Delta \text{Volume}_{\text{UFG}}$ is volumetric 'Impact of change in Bulk Retail Ratio on UFG'

Annexure T.1 - SNGPL response on 1st draft (Cont.)

Although the Report has recommended allowance against bulk-retail ratio in line with guidelines of ECC of Cabinet, it is surprising that allowance of Bulk-Retail has been recommended through above formula, subject to completion of certain tasks defined as Key Monitoring Indicators (KMIs). Contribution of these KMIs will be incorporated in the UFG calculation formula through the factor β calculated on the basis of weightage of individual KMIs. Detailed comments against proposed KMIs is given in Para No. 4.2 of this document. However, as it stands, the linkage between factor β and the KMIs as proposed is not acceptable to the Company. **Moreover, the formula negates the guidelines of the Federal Cabinet which allowed due recognition against the following :**

1. **Gas Volume pilfered by Non-consumers**
2. **Gas Losses in Law & Order affected areas**

2. UFG Rate:

The Company strongly contests the fixation of 5% UFG benchmark in the Report owing to following:

- a. According to the figures quoted in Table R-1 of the Report, even in countries like the USA (Texas), Russia and Australia (Multinet), UFG benchmarks go up to 4-5% despite the fact that there is minimum impact of gas theft and other operational constraints as highlighted in this document. If developed countries like USA, Russia and Australia have UFG rate around 5%, it is surprising that the same figure has been proposed for a company such as SNGPL which operates on wholly different considerations. **Most importantly, the Report has not stated specific reasons which resulted in UFG benchmark of around 5% in those countries, which needs to be elaborated to check consistency with SNGPL.**
- b. **While recommending the UFG Benchmark, the Report states that “..UFG allowances are commonly set in correlation with gas consumption and network length..”. Considering this recommendation, Bangladesh and Turkey have been made reference for the purpose of fixed UFG Rate to be applied for SNGPL. While looking at the reported figures in Table R-1, it is important to highlight that these countries have network length of 15,641 Km and 20,804 Km ONLY respectively as against SNGPL, which is above 100,000 Km (15% and 20% respectively in comparison to SNGPL).**
- c. In case of Bangladesh*, a model of appliance based billing for domestic consumers i.e.. 87 M³ is used (which is consumption of 2 domestic burners and for single burner, it works out 43 M³ which commensurate with the minimum billing volume of 40 M³ in case of SNGPL), irrespective of their consumption that results in lower UFG rate. Moreover, approximately 65% of gas is allocated to bulk sector based on available information pertaining to Gas Sales Mix.

* “Clean Fuel Sector Development Program” prepared by “Technoconsult International Limited” under Technical Assistance Study program of Asian Development Bank”

- d. Similarly in case of Turkey**, 48% of gas is allocated to bulk sector based on available information pertaining to Gas Sales Mix.

Annexure T.1 – SNGPL response on 1st draft (Cont.)

[**https://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/NG-82.pdf](https://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/NG-82.pdf)

e. The Report fails to refer to the following important factors, while referring the UFG Benchmark of the different countries, which have a direct link with UFG and thus UFG benchmark:

- Consumer base
- Gas sales mix
- Law & order situation
- Supply and demand situation/operating parameters

Fields such as “population”, “urban population” “area”, “density” etc pertaining to different countries have been reported in the Tables R-1 and Table R-2 of the Report which has no relevance with the UFG benchmark.

The typical circumstances being faced by the Company warrant for a reasonable UFG benchmark commensurate with facts, ground realities, operational constraints and operating conditions of SNGPL. The Company strongly feels that the Report needs to be reviewed in light of the UFG Benchmark data of different countries, particularly with reference to all the UFG contributing factors mentioned in TORs finalized by OGRA and the UFG benchmark of each country needs to be evaluated for all these UFG contributing factors. Only in that case comparison of UFG benchmark can be relevant.

4 SECTION No. 3: “WAY FORWARD”

4.1 LONG TERM PLAN:

The Report has recommended Key Monitoring Indicators spread over a period of 5 Years, after which UFG rate of 5% is to be achieved by FY 2021. The corrective actions proposed by the Report, and the comments thereon by SNGPL are as under::

4.1.1 Reduce Data & Metering Errors

Description	Target	Comments of SNGPL
Ensure installation of measurement facility at all TBSs/DRSs	FY 2018	Installation of measurement facility at all TBSs is not practicable due to issues discussed in detail in Para No. 3.1 of this document in detail
Install EVC/Modem meters at facilities on all TBSs/DRSs	FY 2020	
Inspect all meters domestic, commercial, special domestic and industrial within a 5 year cycle for identification of malfunctioning meters at least 20% meters inspection annually.	FY 2021	Inspection criteria defined in UFG Reduction Plan, already duly approved by OGRA for industrial, commercial and domestic consumers will be followed in future as well.
Identify and replace defected (slow/pug/sticky) meters and bring it to an acceptable level of <5% of total consumers	FY 2020	Comparison of replaced sticky meters with total consumer base is incorrect as consumer base will continuously increase.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

Segment/isolate all TBSs to identify, measure and control supply of gas to areas susceptible to pilferage and losses	FY 2018	Isolation of network is not possible due to constraints stated in Para No. 3.1 of this document
Identify consumers being minimum billed and ensure it is brought to an acceptable limit of <5% of the total domestic connections.	FY 2020	Minimum billing result from following: 1. Actual low consumption of the consumer 2. Measurement issues in meters Both the above issues will remain persistent hence does not appear possible.
Incorporate in the existing system relevant features or acquire a system with built in feature of analyzing the system data and identifying malfunctioning meters on the basis of anomalies identified. During the transition period establish separate data cell for manual analysis of the billing data. This can be done at the regional level or the head office level.	FY 2019	Company already has Customer Care and Billing (CC&B) system in place, through which customized reports can be extracted.
Replace student meter readers with permanent meter readers	FY 2019	Company is ready to hire permanent meter readers on career term basis, subject to additional provisions in HR benchmark to be allowed by OGRA
Identify areas with gas pilferage and install bulk meters for such areas to enable monitoring of UFG in that particular area.	n/a	Not practicable in view of already explained situation in Para No. 3.11 of this document

4.1.2 Reduce Leakage and Gas Loss:

Description	Target	Comments of SNGPL
Replace at least 5,000 Km of average underground distribution network	FY 2021	Replacement will be carried out through assessment of relevant parameters so length of network to be replaced cannot be specified. Detailed discussion given in 3.12
Acquire tools with improved features for underground leakage detection and reduce underground leak per Km to less than 1 leak/km	FY 2021	Detection of leakage is only one component. In fact rectification of detected leakages is actual solution to the problem. Low Cathodic protection level due to repeated power outages, continuous deterioration of network takes place hence new leakage will develop over period of time.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

Carry out survey for leak identification and extensive leak rectification of the overhead leakage and reduce it to less than 1 leak/connection	FY 2020	It is a continuous ongoing activity. however, the term 1 leak/connection in case of aboveground leakages is not understandable and require clarification at explained in Para No. 2.3.3.1 of this document
Establish additional Cathodic protection stations to ensure 100% cathodic protection over the network to control corrosion. Ensure availability of alternative source power supply at CP stations	FY 2021	100% protection level and availability of alternative power cannot be achieved due to issues explained in Para No. 4.2.12 of this document
Establish separate data cell for analysis of the EVC data.	FY 2019	System is already in place of EVC data analysis.

4.1.3 Detect, Monitor and Control:

Description	Target	Comments of SNGPL
Enhance develop system capabilities to enable automated analysis of billing data and identification of gas pilferage on the basis of anomalies. During transaction period establish special cell units to manually analyze CC&B data to detect abnormal consumer behavior for identification of gas theft.	FY 2019	System is already in place to analyze the billing data through CC&B.
Acquire and install cyber locks at all industrial connections/CNG stations	FY 2018	Pilot Project is already being considered for installation of cyber locks at selected industrial connections.
Improve /increase the channels for theft complaints registration system etc. Advertisement campaign should be conducted to increase awareness during the public in this regard.	FY 2019	System is already in place to register gas theft complaints. Media campaigns against gas pilferage are also launched
Increase the turnaround time of the resolution of gas theft complaint applications received during the year	n/a	Gas theft complaints are already promptly addressed for corrective measures.

4.1.4 Increase and Ensure Capacity:

Description	Target	Comments of SNGPL
Conduct mandatory technical training program for employees of all levels Ensure the attendance of employees in seminars/workshops pertaining the gas industry, both national and internal	n/a	Company already has its dedicated training institute in which various technical trainings are conducted. In addition foreign training of employees is also arranged in relevant fields.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

Establish dedicated research and development cell with aim to identify /develop tools for increased efficiency cost reduction	FY 2019	Services departments such as Metering and Corrosion Control carry out necessary R&D from time to time.
Conduct periodic environmental audits to identify and rectify issues in a timely manner. Hire environmental experts	FY 2019	Company has fully established HSE department to look after such issues.
Improve data quality and timelines for system, operation, planning and regulatory acceptance. Develop acquire system capable of managing company data and generating timely reports as and when needed.	FY 2019	Best possible efforts are being made to meet timelines related to Regulatory Authority. All departments are custodian of relevant data
Attend periodic meetings/joint sessions with other gas companies in and outside Pakistan for exchange of ideas/knowledge sharing	n/a	Already being done.

2. **KEY MONITORING INDICATORS (KMIs):**

As already stated above, although the Report has proposed KMIs for the Company, certain aspects have been missed out in the Report. This is so because the said KMI's appear to have failed to consider the technical, financial and logistical hurdles faced by the Company. It is further highlighted that **execution of activities defined in the KMIs will require specific budgetary provisions on annual basis along with additional provisions in HR benchmark, leading to a consequential rise in tariff which will have to be borne by the gas consumers. The Report presumes that execution of certain KMIs in next five years will permanently bring down UFG to 5%, whereas, in reality, the execution of different UFG control activities is a continuous ongoing activity which has to be carried out regularly irrespective of any specified time period since:**

- A resurvey of underground distribution network for leakage detection and rectification is required every 5 years in line with international practices.
- Meters have a limited service life at site and required to be replaced periodically for maintenance
- Theft control is continuous activity as the gas users may again indulge in pilferage, regardless of vigilance activities of the Company.

Therefore, it appears that KMIs have been suggested without consideration of the specific operational constraints being faced by the Company. These constraints are contrary to the international practices, some of which include: a significant supply and demand gap, forcing the Company to operate its network beyond its design parameters; network operations at low pressures, causing measurement inaccuracies; looping of distribution network due to unprecedented growth and to facilitate the gas users in view of shortage of gas supplies and non availability of dedicated corridors for distribution network, to name a few.

Annexure T.1 – SNGPL response on 1st draft (Cont.)

If KMIs are to be identified and targets for meeting the same have to be set, it would be more appropriate that the Company in consultation with OGRA finalize such task and targets based on practical, reasonable, technical and financial viabilities. Without prejudice, specific issues that SNGPL has with regards to different KMIs defined by the Report are as follows:

4.2.1 Number of TBSs Metered with EVCs/Modems Installed as % Age of Total TBS

We disagree with the conceptual basis for this particular KMI, regarding measurement at TBSs/DRSs because the Report fails to appreciate the international practices and technical details of the issue which prevent the company from meeting the KMI target. The following related to installation of measurement facility at TBSs/DRSs has already been explained in a detail in Para No. 3.1 of this document:

- Internal Practices
- Looping of distribution network
- Space constraint
- Experience of company so far
- Alternative available

Concluding to this, the fact of the matter is that measurement of losses at TBSs is only a small portion of solution to the actual problem, whereas the Report appears to assume the same as a whole solution to the menace of UFG so this KMI needs to be deleted.

4.2.2 Number of Meters Inspected (Consumer wise) Annually as % of Total Metered Connections

Vigilance of all categories of consumers is part and parcel of the UFG Reduction Plan envisaged by the Company, duly approved by OGRA as already been explained in detail in par No. 2.5.1.1 of this document. Through the aforesaid vigilance activities, the Company has achieved very fruitful results. SNGPL acknowledges the effectiveness of vigilance activities and it is suggested that the above mentioned activities should be separately reflected in the KMIs with following targets to continue the ongoing efforts against gas theft:

Description	KMI Proposed by SNGPL	Weightage
Industrial CMS inspection	Vigilance of each industrial consumer once every month	10%
Commercial CMS inspection	Vigilance of each commercial consumer on quarterly basis	10%
Domestic CMS inspection	Vigilance of 15% of total domestic consumers	10%

These activities will require an approximate budget of Rs. 550-600 Million annually.

4.2.3 Number of Bulk Meters Installed Annually Area Wise

Detailed comments has already been given in Para No. 3.11

Annexure T.1 – SNGPL response on 1st draft (Cont.)

Thus, in view of above explained situation, installation of separate bulk meters for law & order affected areas of KPK province is impracticable and unfeasible. This activity should be deleted from the KMIs of SNGPL.

4.2.4 Number of Total Defected Meters Replaced as % Age of Total Meters

In line with the prevailing practices and procedure, duly approved by OGRA, the defected meters cases are detected by SNGPL through following:

- Visit to Consumer Meter Stations against Consumer’s complaints
- Reports of meter readers.
- Periodic vigilance activities.

SNGPL understands the importance of replacing defective meters and therefore such meters are replaced on a priority basis in line with the ‘Performance and Service Standards’ given by OGRA against which periodic reports are also furnished to OGRA. However, the Report has linked the performance against meter replacement activity as a %age of total meters which is logically incorrect due to the fact that the consumer base of SNGPL is continuously increasing.

Replacement of meters is a continuous ongoing activity and it cannot be ensured that after 5 years no further meter will become defective or require replacement since meters contain mechanical moving parts, which are always prone to wear and tear. Moreover, the Company’s peculiar operating conditions such as low pressure causes increased gas velocity and thus the carbon dust travel inside meter internal parts, increasing its rate of defect. Despite the above, the Company carries out replacement of approximately 8-9 % of total meters annually based on defects detected through above criteria, in line with OGRA guidelines. Therefore, so far as the question of KMI targets in this regard is concerned, such a target can only realistically be linked with the total defective meters required to be replaced. The KMI should be as follows:

KMI Proposed by SNGPL	Weightage
Industrial defective meters replaced as a % age of total defective industrial meters reported/notified	5%
Commercial defective meters replaced as a % age of total defective commercial meters reported/notified	5%
Domestic defective meters replaced as a % age of total defective domestic meters reported/notified	5%

This KMI will lead to an approximate budget of Rs. 2,500 Million annually which will have to borne by consumers in the shape of an appropriate price increase.

4.2.5 Number of TBSs Segmented as %Age of Total No of TBSs

Segmentation of network at present in not practicable as already been explained in detail in Para No. 3.1 and 3.2. It will be similar to re-designing the existing distribution network, and to put matters into perspective, it is stated that existing length of distribution network is over 100,000 Km and in order to further highlight the issue for understanding, applicable unit construction rates for different diameter line pipes is given in table below:

Annexure T.1 – SNGPL response on 1st draft (Cont.)

Dia of pipe	Unit Cost (Rs/meter)
2" dia	2,030
4" dia	3,824
6" dia	5,199
8" dia	7,555
10" dia	10,742
12" dia	11,252
16" dia	16,991

In view of above stated reasons, this activity should be altogether deleted from the KMIs, being impracticable.

4.2.6 Number Minimum Billed Consumers as a %Age of Total Number of Domestic Consumers

As stated in the detailed submissions on UFG factors, it appears that the Report has failed to comprehend the actual issue with regard to minimum billed consumers. SNGPL has been asked to bring down the % age of total minimum billed consumers to less than 5%. Moreover, performance of Company has been linked with total number of meters, which is not correct. As submitted by the Company before the Consultants, the minimum billed consumers fall in two categories:

- Minimum billing due to actual low consumption of the consumer
- Minimum billing due to measurement issues in meters.

It is clear from these two reasons, both equally relevant, that the number of consumers to whom minimum amounts are billed is not a discretionary number which can be controlled by the Company. Those actually consuming less than the minimum billed amount cannot be forced by the Company to increase their consumption, and, the reasons contributing to metering errors are beyond the control of the Company. Therefore, as a matter of principle, this KMI should be deleted.

The consumption of domestic consumers is dependent upon seasonal variations and climate. For instance, annual consumption of regions falling in Northern parts of the country (Peshawar etc.) have higher consumption as compared to the regions falling in Southern parts (Bahawalpur, Multan, Sahiwal etc) of the country. The same can be assessed through per consumer consumption shown below:

Region	Per Consumer monthly Average Consumption* (Hm ³)
Peshawar	0.92
Multan	0.50
Bahawalpur	0.49
Sahiwal	0.54

**based on billing of July, 2016*

Annexure T.1 – SNGPL response on 1st draft (Cont.)

Furthermore, consumption in summer months is on lower side, therefore leading to a higher number of minimum billed cases in summers, whereas in winter months it is vice versa. The consumers cannot be forced to increase their consumption. Presently, approximately 30- 35% consumers are billed as “minimum” in summers while 10-12% are billed as “minimum” in winter months. Thus, it is not practicable to bring down the minimum billed consumers to below 5% of the total consumer base.

This activity should accordingly be deleted from the KMI’s.

4.2.7 Number of Total Defected Meters Identified as % Age of Total Meters

In light of the submissions made herein above with respect to KMI given at 4.2.4 of this document, since the Company is already following ‘Performance and Service Standards’ given by OGRA, **this KMI becomes irrelevant and should be deleted.**

4.2.8 Number of Meters Replaced as % Age of Total Number of Meters Eligible for Replacement

We appreciate the activity of replacement of meters against schedule programs as suggested by the Report. It is admitted that this is a continuous ongoing activity to be carried out annually. The Company already acknowledges the importance of this activity and is following a replacement criteria given by OGRA, which states:

Description	Period
Schedule replacement of industrial meters	1 Years
Schedule replacement of Commercial meters	7 Years
Schedule replacement of Domestic meters	16 Years

In view of above separate criteria, it is suggested that the above activities needs to be reflected separately in KMIs as follows:

KMI Proposed by SNGPL	Weightage
Industrial meters replaced as a % age of total industrial meters qualifying schedule replacement criteria	5%
Commercial meters replaced as a % age of total commercial meters qualifying schedule replacement criteria	5%
Domestic meters replaced as a % age of total domestic meters qualifying schedule replacement criteria	2%

These activities will require an approximate budget of Rs. 1,500 Million annually and additional amount required for replacement of meters will have to be borne by consumers in shape of price increase.

4.2.9 Length of Distribution Network Rehabilitated (Km) as % of Total Length of Distribution Network

While recommending this particular KMI, the Report has not referred any international practice which recommends replacement of network ONLY on the basis of its aging. The replacement of underground network is an uphill task due to following constraints:

Annexure T.1 - SNGPL response on 1st draft (Cont.)

- Major part of underground network is big cities under busy roads and requires road cut permissions from concerned departments (Provisional, District/Tehsil Administrations) to expose the network as it has not been laid in separate corridors unlike international practices, where separate corridors are available for different utilities.
- Majority of the funds allocated to Public Representatives for developmental schemes are for Sewerage, Water Supply, etc. so while executing the work, these utilities lay their installations on our network, causing coating defects, third party damages, thus corrosion and leakages.
- In old localities, pipeline depth has reached at a level more than 10 feet below the earth surface.

The methodology being used currently by the Company for replacement of its network has already been explained in Para No. 3.12 of this document. Presently, approximately 250-300 Km of network is replaced annually. However, the comparison of rehabilitated network as a %age of total network as made in the Report is perhaps superficial given the fact that the distribution network is constantly increasing. So, instead of a game of numbers, it would be more prudent to replace those segments of network where integrity is doubtful and replacement activity will actually serve the desired objective i.e.. leakage control based on relevant assessment parameters as already mentioned.

We would like to highlight that the Company is receiving government directives for laying of new network in different areas whereas availability of skilled manpower is limited since only qualified personnel can work on gas distribution lines in line with applicable Standards/Codes. Despite these factors, the Company will carry out underground network replacement activity on the basis of recommendation received by our Corrosion Control department, keeping in view the above relevant parameters as stated in Para No. 3.12 of this document so fixing annual replacement target will not be prudent. Furthermore, it should be noted that OGRA has never allowed requisite budgetary provisions for the activity and has been slashing the budget as evident from the table:

Figures in Rs. Million

Period	Requested by SNGPL	Allowed by OGRA in ERRs
FY 2015-16	1,500	544
FY 2016-17	1,000	548

The budget allowed by OGRA is sufficient to execute replacement of ONLY up to 250-300 Km of different diameter distribution network annually. In view of above, replacement of 1,000 km is practically not possible due to operational constraints stated above and non provision of funds by OGRA in ERRs. Most importantly, the requisite budget, if allowed by OGRA, will have to be borne by consumers in shape of price increase.

The quantification of target for underground network replacement to be carried out annually cannot be fixed. It requires qualitative surveys and assessment as already explained in Para No. 3.12. Approximate budget of Rs. 1,000 Million annually will merely be sufficient to replace only 250 to 300 Km network, the cost of which will be

Annexure T.1 – SNGPL response on 1st draft (Cont.)

10. **Number of Underground Leaks Rectified per Km as % of Total Leakage Rate per Km**

Underground Leakage Rectification (Laser Leak) is an integral part of the UFG Reduction Plan envisaged by the Company, duly approved by OGRA. SNGPL is accordingly carrying out survey of its underground distribution network using ‘Leak Detectors’ to identify leak points. According to available data, the leakages pertaining to ‘UFG Reduction Plan’ era stand at 2.2 leakages/Km. These leakages are contributed by:

- Non availability of dedicated corridors
- Third party damages
- Coating defects
- Inherent issues with coating materials
- Drop in network Cathodic protection levels
- Corrosive nature of soil
- Moisture content in soil, etc.

Due to above stated persistent factors, new leakages develop in the network and in the presence of above stated impediments, it will be very difficult to reduce the per km leakages drastically. The Company through execution of underground leakage rectification program will make efforts to gradually reduce the per Km leakages.

The KMI should be reviewed as follows:

Description	KMI Proposed by SNGPL	Weightage
Underground leakage rectification (laser leak)	Present level of 2.2 leaks/Km to be gradually reduced	10%

This activity will require an approximate budget of Rs. 450-500 Million annually

4.2.11 **Number of Overhead Leaks Rectified as % of Total Number of Domestic Consumers**

Aboveground leakage rectification is an integral part of UFG Reduction Plan envisaged by company, duly approved by OGRA. It is a continuous ongoing activity and SNGPL is carrying out survey of aboveground domestic connections and on the basis of surveys, leaks are identified and rectified. This KMI should realistically be reviewed as follows:

Description	KMI Proposed by SNGPL	Weightage
Aboveground leakage rectification	Survey of 15% of total domestic connections annually and rectification of detected leak connections	5%

This activity will require an approximate budget of Rs. 300 Million annually

4.2.12 **Number of Km with Cathodic Protection Coverage as % Age of Total No of Km of Distribution Network**

The underground Mild Steel network is protected against corrosion by providing electric current to pipe through external power source (LESCO, FESCO, IESCO etc.). However, repeated power outages in the past years have caused threat to the distribution network since

Annexure T.1 - SNGPL response on 1st draft (Cont.)

during the period of power outages, cathodic protection level of MS pipeline network drops, making it prone to corrosion and leakages. It is practically impossible to ensure 100% Cathodic protection of distribution network due to various constraints such as:

- Non availability of dedicated corridors
- Repeated periodic Power outage
- Inherent issues with coating material
- Corrosive environment surrounding the pipe (soil)
- Moisture content in soil
- Third party damage

At present, 1424 CP Stations are installed at Distribution Network. Company is arranging for installation of Thermoelectric Generator (TEGs), Solar Power System and Battery Backup Units as alternative power sources at limited number of locations for Cathodic Protection but they involve huge financial impact as given in table below:

Description	Single Unit Installation Cost
Thermoelectric Generator (TEGs)	10* Million
Solar Panel System and Battery Backup Units	5** Million

*4 TEG units are to be installed at each existing CP station.

**excluding land acquisition cost

These alternative power supply systems have limitations w.r.t. space for installation, current output, security and operational constraints. These options can be installed on only selected locations and cannot be installed at every location. Even if we go for additional CP stations on the existing network, it will involve acquisition of additional land for which OGRA will have to facilitate SNGPL.

13. **Number of Theft Cases Detected Against Registered Consumers**

Already been covered against para No. 4.2.2 of this document so **it should be deleted from KMIs**

14. **Number of Theft Cases Detected Against Non Consumers**

Vigilance activities are a part of SNGPL's UFG Reduction Plan and efforts of the company have already been reflected against Para No. 2.5.1.2 of this document. The detection of non consumer cases may be included in KMIs, subject to the condition that OGRA gives allowance against this particular factor but the weightage as recommended by the consultant cannot be applied in this particular case. Moreover, OGRA is requested to facilitate and expedite recoveries from non consumers.

15. **Number of Disconnections in Respect of Theft as % Age of Total Consumer Base of the Period**

Given the prevailing facts and circumstances, it would perhaps be counter-productive to link number of disconnections in respect of gas theft with consumer base.

Annexure T.1 - SNGPL response on 1st draft (Cont.)

The number of disconnection can only be linked with cases due for disconnection on the basis of the established disconnection criteria already in vogue and weightage should be assigned accordingly to a ceiling of 4%.

16. **Number of Gas Theft /Leakage Complaints Received per 100,000 Consumers**

Company on its part is making effective media campaign in this regard but SNGPL has no control over general public forcing them to lodge complaints regarding gas leakage/theft. However, all the received complaints are attended/ rectified as per OGRA guidelines.

In light of these facts, this KMI should be deleted.

17. **Number of Gas Theft/Leakage Complaints Resolved per 100,000 Consumers**

The resolution of gas theft/leakage complaints is one of the top priorities of SNGPL and such cases are regularly being monitored by OGRA through its 'Performance and Service Standards'. The Company already makes best possible efforts to promptly rectify complaints. However, it should be linked with actual number of such complaints received by the Company and its weightage may not be more than 6% in the KMIs as per the opinion of the Company.

18. **Miscellaneous (Training, Knowledge Sharing, Meetings etc)**

The Company already has a training system in place through dedicated training institute where the work force and the executives are trained in relevant fields. Moreover, all concerned are familiarized with the new technologies being used the Company. Periodic meetings are also part of assessment program which help in knowledge sharing. Its weightage in no case by more than 5%

19. **SUMMARY of KMIs Proposed By SNGPL:**

Sr.No.	Description of KMIs proposed by SNGPL*	Weightage proposed by SNGPL
1	Vigilance of each industrial consumer once every month	10%
2	Vigilance of each commercial consumer on quarterly basis	10%
3	Vigilance of 15% of total domestic consumers	10%
4	Industrial defective meters replaced as a % age of total defective industrial meters reported/notified	5%
5	Commercial defective meters replaced as a % age of total defective commercial meters reported/notified	5%
6	Domestic defective meters replaced as a % age of total defective domestic meters reported/notified	5%
7	Industrial meters replaced as a % age of total industrial meters qualifying schedule replacement criteria	5%
8	Commercial meters replaced as a % age of total commercial meters qualifying schedule replacement criteria	5%

Annexure T.1 - SNGPL response on 1st draft (Cont.)

9	Domestic meters replaced as a % age of total domestic meters qualifying schedule replacement criteria	2%
10	Underground network replaced as a %age of total annual target, as recommended by Corrosion Control Dept.	7%
11	Present level of 2.2 Underground leaks/Km to be reduced gradually	10%
12	Survey of 15% of total domestic connections annually and rectification of detected leak connections	5%
13	Installation/Renovation of 150 No. CP station annually	6%
14	Number of theft cases detected against non consumers (Subject to condition that non consumer volume is allowed by OGRA)	Not applicable
15	Number of disconnection as a % age of consumers due for disconnection	4%
16	Number of gas leakage complaints resolved as a % age of actual number of such complaints received by company	6%
17	Misc (Trainings , Knowledge Sharing, Meetings, HSE)	5%
Total		100

***Note:**

All the above mentioned activities are of continuous nature, to be carried out regularly irrespective of any time period.

The above comments are accordingly given.

Annexure U - SSGC response on 1st draft

Sui Southern Gas Company Limited

SSGC'S COMMENTS/ RESPONSE REGARDING CONSULTANT FIRST DRAFT UFG BENCHMARK STUDY REPORT

1. The Company has gone through the first draft of the 'UFG Benchmark Study Report' (the "Report"), prepared by the consultant M/s. KPMG. While we sincerely appreciate the efforts of the Consultants in preparation of the Report, it is the opinion of the Company that the Report has made unrealistic comparisons of the Company with some international best practices in certain cases, without taking into account the dissimilar operating conditions. Furthermore, it appears that the Report has misunderstood certain issues, such as the issue of measurement of volume lost in the law and order affected areas.
1. Furthermore, the Report presumes that execution of certain KMIs in next five years will permanently bring down UFG to 5%, whereas, in reality, the execution of different UFG control activities is a continuous ongoing activity which has to be carried out regularly irrespective of any specified time period. The execution of activities defined in the KMIs will require specific budgetary provisions on an annual basis, along with additional provisions in HR benchmark which would translate into a significant increase in the Tariff applicable to consumers. It appears that this impact of the responsibilities spelt out in the proposed KMIs has not been perused in the Report and therefore the same needs revisiting.
1. It should be noted that the ECC of the Federal Cabinet was cognizant of the situation and has issued policy guidelines to Authority, considering the complexity of the issue, to allow volumes claimed by the Company against following factors beyond its control as deemed gas sales:
 - a. Gas Volume pilfered by Non-consumers
 - a. Gas Losses in Law & Order affected areas
 - a. Impact of change in Bulk Retail Ratio on UFG, using the base year 2003-04
1. Some of the key observations in the Report which, in the opinion of the Company need to be revisited are as follows:
 - a. The Report recommends replacing the underground network, without giving reference of international practices in this respect, which needs to be elaborated
 - b. Measurement Errors has been correlated with metering at TBS. Measurement is carried out whenever there is custody transfer i.e.. Gas Sources, SMSs and CMSs that have already been metered, it needs to be reviewed.
 - c. It has been observed that fixed rate of UFG allowance is proposed based on Countries that are more developed and advanced in technology and whose socio economic conditions are different from Pakistan. In most of countries there are no domestic customers (with gas supply priority) or having fixed billing mechanism for Domestic Customers.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

Turkey and Bangladesh, are incomparable as they have only 15,641 Km and 20,804 Km Network as compared to an around 45,000 km network in case of SSGC. Appliance based billing for domestic consumers i.e.. 87 CM used irrespective of their consumption that results in lower UFG rate in Bangladesh, with approximately 65% of gas is allocated to bulk sector. Similarly, 48% of gas is allocated to bulk sector in Turkey.

If countries like USA (Texas), Russia and Australia (Multinet) have benchmark in range of 5%, the typical circumstances being faced by the SSGC warrant for reasonable UFG benchmark commensurate with the very UFG factors beyond its control, ground realities, operational constraints and unfavorable operating conditions.

5. That, in light of the above submissions, the Company provides its detailed comments on the Report, herein below:

Section 1: Background

6. Under Table ME-1 (Page 42), only 67% of total consumers have been shown as metered assuming all Nil and Minimum category Meters as faulty. While it is a fact that most of faulty meters are found under this category, however, a blanket assumption cannot be made regarding all these meters as sticky/ PUG, and may need to be reviewed. It is ensured that 100% registered Customers connected to SSGC Network are metered.
6. Under Table ME-3 (Page 43), it is fact that in Karachi, 45% of TBSs are interconnected with each other covering more than 70% of customers. There is similar situation with all major cities of Sindh and Balochistan where major cities of Region have interconnected network showing only smaller %age as compared to surrounded areas, while TBSs supplying gas to small towns and villages are isolated which are shown under relevant Regions in referred Table.

Section 2: Situational Assessment

8. The Report lists the following as significant impediments with regard to gas theft:
- a. Continuous growth of the gas distribution network
 - a. Insufficient and delayed legislative support for recovery of detected cases
 - a. Inadequate monitoring and maintenance efforts of Sui Companies
 - a. Expectation of free gas supply in gas producing areas

Following important factors should also be included which are reiterated by the Company since the same are beyond its control:

- a. Increase in gas price, tempting consumers to use unfair means
- a. Shortage of gas supplies, tempting consumers to use it illegally
- a. Moratorium on new gas connections of industrial and commercial category
- a. Frequent electricity outages, tempting domestic customers to use generators through tempering in pressure regulator that is difficult to identify.
- a. Pressure Theft by commercial Customers due to unlawful load enhancement.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

12. The Report highlighted Leakages as a major UFG contributing factor and suggested to replace network based on its ageing without referring to any international practice for replacement of underground distribution piping network, which recommends replacement of network ONLY on the basis of its aging without its assessment/ evaluation. This issue needs to be thoroughly explored in view of international practices.
12. The Report's approach towards Measurement Errors is associated with non availability of meters on TBS. UFG Contributing factor of Measurement Errors actually applies to measurement faults associated with point of delivery i.e.; SMS and CMS wherein meters are already installed. It is endorsed that the installation of meter at TBS will facilitate for monitoring and analysis of UFG at micro level.
12. The Report acknowledges that UFG volumes rise as a consequence of Sales Mix shifting from Bulk to Retail. However, the stance that the Company has not made efforts for corrective measures is simply not true. It is reiterated that shift of gas from Bulk to Retail and vice versa is beyond the Company's control.

SSGC's network has increased from 851 towns/ villages in 2004 to 3,727 towns/ villages in 2015. This induced development is responsible for shift of gas from low or zero UFG bulk sector to highly UFG prone retail sector. Retail gas supplies increased from 48% in FY 2003-04 to 75% in FY 2014-15.

The company has been obligated to gasify remotely located towns and villages to support socio political agenda of Government for which financial assistance covering the capital cost only is provided. However, operating these networks in an efficient manner is a real challenge.

The Company has put in best possible efforts to curb the menace of gas theft, keeping in view the specific operating conditions, budgetary provisions and HR benchmark allowed by OGRA on an annual basis. Therefore, the observation that the Company has not taken corrective measures in this regard is misplaced and this factor needs a review.

12. We agree that there is always room for further improvement, but the overall conclusion of the Report that the Company does not take ownership of the UFG issue and plan to curb, is without any detailed analysis. The Report also fails to reflect the genuineness of the Company's claims against compensation/ allowance against the factors beyond its control. The ECC of Cabinet was cognizant of the facts and has issued policy guidelines to Authority, considering complexity of the issue, to allow the volumes claimed by the Company against following factors beyond its control:
 - a. Gas Volume pilfered by Non-consumers
 - a. Gas Losses in Law & Order affected areas
 - a. Impact of change in Bulk Retail Ratio on UFG, using the base year 2003-04

As stated above, the execution of different UFG control activities are a continuous ongoing process irrespective of any specific time period. The constitution of proposed objectives and recommendations of the Report for short term and long term measures lacks thorough understanding of technical issues and financial constraints associated with these.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

Section 2: Recommendations

100% metering at TBSs is not a standard practice. Although from an administrative point of view, it is a better option to split the area of operation into smaller units, but the Report has recommended it as a tool of measurement. The purpose of installing TBS is to reduce the pipeline pressure required in system and most of TBS located in remote areas where there is no provision of a measurement facility.

16. Network Segmentation is an admirable suggestion of the Report and SSGC is already working on possible segments within major cities for better network visibility. Segment wise Gas Volume Reconciliation is preferred where one segment covers 100% customers and gas should ideally be supplied through one source with following exceptions:
- a. Large Segments will be developed with multiple TBS where network is interconnected in big Cities i.e.; Karachi, Hyderabad, Nawabshah, Sukkur and Quetta. However, every TBS in big cities will be metered.
 - a. Cluster of small towns TBS and villages PRS should be treated as one segment under one SMS to avoid unnecessary cost on modification, metering, and Maintenance and security arrangements of small TBS/ PRS. Gas Purchase and Sales Figures will be reconciled on SMS Basis.

It is expected that whole franchise area may be divided into around 500 segments, subject to the above, and can be reconciled after meter installation/ customers tagging.

17. Cylinder Model is also an interesting suggestion which may be considered for upcoming new gasification schemes for domestic and commercial consumers, however, the Government of Pakistan and OGRA can take policy decisions in this regard.
17. Key Monitoring Indicators are proposed for a period of 5 years and that too with the intent to discount the impact of Bulk-Retail ratio. This is contrary to the fact that execution of UFG control activities are an ongoing process and besides Bulk to Retail Ratio, other factors i.e.; theft by Non-Consumers, Law & Order, etc., need to be addressed.

The Company is already executing 'UFG Reduction Plan' that includes crucial UFG control activities, envisaged in view of key UFG contributing factors. The KMIs must be brought in line with the key UFG contributing factors and the Company, having vast experience in this particular field, should be authorized to select the UFG control activities to be incorporated in the KMIs along with appropriate weightage.

19. The Business Model to manage UFG at Regional Level is already in place duly supported by Management Information Tools and controls.
19. Two yearly Meter Inspection is proposed for all Customer's premises for detection of theft and tempering. At present the total customer base of SSGC is around 2.8 million customers. Instead of surveying 400,000 customers, we plan on surveying 1.2 Million domestic customers in two years by effective realignment of resources available.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

21. Technological Advancement is already in place. EVCs and Modems have been installed at all major industrial locations and are being monitored remotely at Head Office. Furthermore, meters, EVC and Modems are being installed in phased manner at all SMSs and TBSs/PRSs.

However, as suggested the company is evaluating the feasibility of installing of Smart Meters for high Domestic and commercial Customers.

21. Cost of Service Study is suggested if Companies have option to run business on commercial basis without any priority and subsidy, however, OGRA being the statutory body can comment on the pricing mechanism for different categories of consumers at this juncture.
21. Detect, Monitor and Control proposes a reactive rather than proactive approach on gas theft and proposes independent verification of gas theft volumes claimed against consumers.

It seems that the Report has failed to appreciate the procedures and practices already in place. Contrary to the understandings reflected in the Report, fact of the matter is that a number of consumers to whom gas pilferage charges are booked, approach OGRA to get relief against established gas theft charges, which shows that validation mechanism is already in place in line with provisions of OGRA Ordinance and complaint resolution procedure of OGRA.

The Report has recommended installing bulk meters in areas which are prone to gas pilferage. It is a misconception that theft is localized in any specific area/ locality. It is categorically stated that except for the law & order affected areas, gas theft is not localized, and rather it is spread across the Company's distribution network. However, Bulk Meters are already being installed at Flat Sites to determine the extent of gas losses.

Section 2: Recommendations on UFG Calculation

24. We appreciate that the Report has recognized that, in addition to the UFG rate, appropriate allowance has to be given to the Company which firms our stance that there are certain extraordinary circumstances in which the Company is operating which are not prevalent in any other country.

UFG Allowed = 5% + (Δ Bulk to Retail Ratio x β)

where Beta (β) is based on KMIs

According to the figures quoted in Table R-1 of the Report, even in countries like the USA (Texas), Russia and Australia (Multinet), UFG benchmarks go up to 4-5% despite the fact that there is minimum impact of gas theft and other operational constraints as highlighted in this report. If developed countries like USA, Russia and Australia have UFG rate around 5%, it is surprising that the same figure has been proposed for a company such as SSGC which operates on wholly different environment and socio economic/ political conditions. Most importantly, the Report has not stated specific reasons which resulted in UFG benchmark of around 5% in those countries, which needs to be elaborated to check consistency with SSGC.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

The Report should correlate following important factors, while referring the UFG Benchmark of the different countries, which have a direct link with UFG and thus UFG benchmark:

- a. Consumer base
- a. Gas sales mix
- a. Law & order situation
- a. Supply and demand situation/operating parameters

It is proposed that fixed UFG allowance may be revised upward or Beta (β) should be considered from 0.5 to 1.5 instead of 0 to 1. i.e.; if performance against KMI is 50% then Beta (β) should be $0.5+0.5=1$.

UFG Allowed = 5% + (Δ B2R x β) **where Beta (β) is based on KMIs Range 0.5 – 1.5**

25. Based on sample calculation (Template) recommended by Consultant, it is proposed to utilize relevant year Retail UFG% (20.23%) instead of Base Year Retail UFG% (13.62%) applied to work out Bulk to Retail Impact as worked out on actual figures as follow:

	FY 2003-04 (MMCF)			FY 2014-15 (MMCF)		
	Bulk	Retail	Total	Bulk	Retail	Total
Gas Available for Sales	178,431 ¹	162,602 ³	341,033	105,146	323,304	428,450
Gas Sales	177,539	140,459	317,998	104,620	257,890	362,510
UFG	892 ²	22,143 ⁴	23,035	526	65,414	65,940
UFG %	0.50%	13.62%	6.75%	0.50%	20.23%	15.39%
Bulk Retail Ratio	52.32%	47.68%	100.00%	24.54%	75.46%	100.00%

Numbers (1) to (5) are marked in order to complete above template.

	Recommended by Consultant		
Base Volumes (% B2R)	224,165	204,282	428,447
Transferred to Retail	(119,019)	119,019	-
UFG Impact	(595)	16,208	15,613
			13.62%

Comparison of Impact - Change in UFG Benchmark of last five years is enclosed as Annexure-A.

It is appreciated that Gas supplies shifted from Bulk to Retail have been considered for allowable adjustment but the factors behind rising trend of UFG in %age from 13.62% in 2003-04 (Base Year) to 20.23% in FY 2014-15 has been ignored.

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

	SSGC's Observation		
Base Volumes (% B2R)	224,165	204,282	428,447
Transferred to Retail	(119,019)	119,019	-
UFG Impact	(595)	24,081	23,486
			20.23%

The approach adopted by the consultants ignored that the rising trend of UFG% is beyond Company's control i.e., illegal connections, gas distribution in economically unfeasible areas (villages) owing to the state's socio-economic commitments, shift of sale from Bulk to Retail as per Government policy, frequent third party damages to gas pipeline and installations because of inexistence of utility corridors, theft and hampering of operational activities due to deteriorating law and order situation, and theft due to moratorium on new gas connections.

If volume of Δ B2R is considered at fixed Rate 13.62% (Base Year) and β factor (assuming 1), the differential UFG rate 6.62% will also be treated and disallowed directly from fixed UFG allowance and effective rate of remaining Retail UFG increased further from 20.23% to 24.09% as worked out below:

MMCF in FY 2014-15

Category	Available for Sales	UFG %	UFG	Effective UFG		
Bulk	224,165	105,146	0.50%	526	526	0.50%
		119,019	13.62%	16,205	16,205	13.62%
Retail	204,285	(Δ B2R)	6.62%	7,876	49,209	24.09%
		204,285	20.23%	41,333		
	428,450	428,450		65,939	65,939	

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

SSGC Recommendations:

•It is suggested that adjustments i.e.. Pilfered Volume by Non Consumers, Unbilled Volume in Law & Order Areas Volume may be individually allowed as Deemed Sales or Retail UFG %age of said year i.e.. 20.23% in FY 2014-15 may be considered in Bulk to Retail Volume Shift, impact of both scenarios have been worked in Annexure-B. Further, volume pursuant to company's claim on account of Minimum Billing under UFG allowance may also be considered. The revised Performance Based UFG Benchmark should be improved as follow:

UFG Allowed = Fixed Rate 5% + B2R x Retail UFG% in Said Year x (0.5 + β) where Beta (β) is based on KMIs

Actual Retail UFG% of Said Year to be considered instead of Base Year UFG% because of multiple factors contributed in rising UFG% beyond Company's control during period.

Proposed Beta (β) = Fixed 0.5 + Actual Performance (0.5 - 1.5) to be considered in view of ground difficulties in carrying operation activities, network complexity, delay in Road cutting Permissions within budgeted amount, shortage of resources and skilled labour, lengthy Procurement timeline/ procedures/ approvals and role of agencies.

UFG Penalty should not be exceeded from ROA of said year for survival gas industry and overall economy, the punishment should not be more than one's bearing capacity.

Section 3: Way Forward

•The Report has recommended Key Monitoring Indicators spread over a period of 5 Years, after which UFG rate of 5% is to be achieved by FY 2021.

Network Visibility:

Segmentation, Metering on TBS/ Area wise, Meter Inspection, Replacement of Defective Meters, Reduction in Minimum Billing	54%
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Network Improvement:

Rehabilitation, Underground/ Overhead Leak Repairs, CP Coverage	23%
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Theft Control:

Detection, Disconnection & Complains	18%
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Research & Development:

Training, Capability Enhancement, HSE, Data Quality, Knowledge Sharing	5%
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Total	100%
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•We welcome this proposal on Performance Based UFG Benchmark, however, it is suggested that the weightages allotted to these KMIs be revised as follows:

Annexure U – SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

SSGC's Observations on Key Monitoring Indicator (β Working)

Network Visibility		Beta (β)	Act	Rev
	<p>Number of TBSs Metered with EVCs/Modems Installed as a % of total TBSs.</p> <p>The purpose of installing TBS is to reduce the pipeline pressure required in system and most of TBS are located in remote areas where there is no provision of a measurement facility. For network visibility, Segment wise Gas Volume Reconciliation is suggested where one segment covers 100% customers and gas should ideally be supplied through one source with following exceptions:</p> <p>a) Large Segments will be developed with multiple TBS where network is interconnected in big Cities i.e.; Karachi, Hyderabad, Nawabshah, Sukkur and Quetta. However, every TBS will be metered.</p> <p>b) Cluster of small towns TBS and villages PRS should be treated as one segment under SMSs to avoid unnecessary cost on modification, metering, and Maintenance and security arrangements of small TBS and PRS. Gas Purchase and Sales Figures will be reconciled on SMS Basis.</p> <p>It is expected that whole franchise area may be divided into around 500 segments with above exceptions and can be reconciled after meter installation/ customers tagging. It is proposed to update this KMI as follow: Number of Segments reconciled per 100 Segments annually (Target FY 2020-21)</p>		20%	20%
1				
	<p>Number of Meters Inspected (Consumer Wise) annually as a % of total metered connections.</p> <p>Vigilance of all categories of consumers is integral part of UFG Reduction Plan. The performance should be measured separately for each customer class based on following schedule:</p> <p>a) 100% Industrial Consumers on Quarterly Basis 2%</p> <p>b) 100% Commercial Consumes on Semi-Annually Basis 3%</p> <p>c) 20% of Domestic Consumers (around 600,000) annually 5%</p>		5%	10%
2				
	<p>Number of Bulk Meters Installed annually area wise.</p> <p>The precise quantification of losses at SMSs feeding these areas prone to gas pilferage is available on month wise as well as year wise basis and in no case involves any estimation. Moreover, it may not be possible for the company to install bulk meters feeding different pockets in these areas.</p> <p>This KMI should be merged under KMI 1.</p>		3%	0%
3				

Annexure U - SSGC response on 1st draft (Cont.)

		Beta (β)	
4	<p>Number of total defected (Slow & PUG/Sticky) meters replaced as a % of total meters. Replacement of meters is a continuous ongoing activity and it cannot be ensured that after 5 years and no further meters will become defective or require replacement. The performance should be measured against identified defective meters (instead of Total Meters).</p>	3%	15%
5	<p>Number of TBSs segmented as a % of total no. of TBSs. TBS wise Segmentation may be difficult to achieve in big Cities as discussed under KMI 1, this KMI should be merged under KMI 1.</p>	10%	0%
6	<p>Number of Minimum billed consumer as a % of total number of domestic consumers. The minimum billed consumers fall due to actual low consumption or measurement issues in meters. The consumers cannot be forced to increase their consumption. The minimum billed customer %age varies between 22% to 35% depending on the seasonal consumption that are surveyed on selected criteria and it is observed that only 13 % meters are identified as slow/ PUG. This KMI should be measured against survey as % of Minimum billing customers and merged with KMI 2.</p>	3%	0%
7	<p>Number of total defected meters identified as a % of total meters. The performance should be measured against identified defective meters.</p>	5%	0%
8	<p>Number of meters replaced as a % of total number of meter eligible for replacement. This is a continuous ongoing activity to be carried out annually. The performance should be measured separately for each customer class based on following schedule:</p> <p>Industrial Meters Commercial Meters Domestic Meters</p> <p>* Instead of Industrial Meter replacement, SSGC carries out meter proving/ testing at field (Field Proving at meter installation site) and at workshop. Any meter found outside accuracy limits is replaced immediately.</p>	3 Years* (Meter change/ Meter Proving) 7 Years 16 Years	5% 10%

Annexure U – SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

Network Improvement

Beta (β)

9	<p>Length of the distribution network rehabilitated (KMs) as a % of total length of distribution network. This is a continuous ongoing activity to be carried out annually based on extreme requirement to avoid unnecessary wastage of funds. Overall Steel Pipelines is surveyed on quarterly basis and magnesium anodes are installed on small Dia Pipelines where CP Stations are not feasible, Battery Backup Systems are installed at CP Stations to ensure pipeline protection level in absence of electricity. The Target of Rehabilitation is around 300 KMs per annum (based on previous actual results). The performance may be compared against Targets in revised UFG Reduction Plan (instead of total length of network).</p>	10%	10%
10	<p>Number of underground Leaks rectified per KM as % of the total leakage rate per KM. This is a continuous ongoing activity to be carried out annually and rate of average leaks per KM varies area to area, it is difficult to reduce the per km leakages drastically because new leakages develop in the network because of damages and soil conditions, it will be very difficult to reduce the per km leakages drastically. The performance may be compared against Targets in revised UFG Reduction Plan (instead of total leakage rate per KM).</p>	5%	5%
11	<p>Number of overhead leak rectified as a % total number of domestic consumers. This is a continuous ongoing activity to be carried out annually, the performance may be based on both surveyed and rectified of 15% of total domestic connection annually. The performance may be compared against Targets in revised UFG Reduction Plan (instead of total number of domestic consumers).</p>	4%	5%
12	<p>Number of KMs with Cathodic protection coverage as a % of total No. of KMs of distribution network. At present, Out of 85% Steel Pipelines Network consists of 28% Supply Mains (SMS to TBS) that are almost protected (around 90%) and remaining 72% Distribution Mains and Services that are not well protected (around 50%).</p>	4%	5%

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

Beta (β)

It is practically impossible to ensure 100% cathodic protection of distribution network due to various constraints such as Power outage, Third party damage, no right of ways, pipeline coating service life / pipeline aging, soil condition and difficulties to carryout operational work in large cities.

This is very important aspect and it is proposed that the performance may be measured as % of steel larger Dia Pipeline instead of total distribution network. The proposed KMI will as follow:

Additional 4% Cathodic protection coverage of total steel distribution network as compare to CP coverage of last year.

Theft Control

13	<p>Number of theft cases detected-against registered consumers. CR Department received around 50,000 theft cases p.a. from following sources:</p> <ul style="list-style-type: none"> •Billing Department •Surveillance &Monitoring •CRD Field Staff •SSGC complaint center (1199) <p>e) Media 4%</p> <p>The company will explore new sources to increase reporting of number of theft cases, however, this KMI should be measured against performance i.e.; disconnections of reported cases. It is proposed to merge under KMI 15.</p>	4%	0%
14	<p>Number of theft cases detected against non-registered consumers. The companies, through constant vigilance, identify and disconnect as many instances of theft by non-consumer that they can. The theft of gas by non-consumers (i.e.. persons not registered on the company's network) is difficult to identify, quantify and approach. New Gas Theft Act deals with instances of gas theft only, the companies are not provided with the security to recover the amounts lost.</p> <p>CR Department detected around 125,000 theft cases against non- registered customers in FY 2015-16.</p> <p>These efforts may further be increased if OGRA appreciate and reward allowance against this particular factor. This KMI may be included subject to its treatment.</p>	4%	0%

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

		Beta (β)
15	<p>Number of disconnections in respect of theft as a % of total consumer base of the period. These illegal connections are disconnected wherever detected despite resistance of people, however, these connections are immediately reconnected by rapturing pipeline from another point. As a result, pipeline is deteriorated with high rate of leakages and corrosion.</p> <p>CR Department will attempt/ disconnects around 100% theft cases against non-registered customers detected in Karachi Region whereas the theft cases in Interior Sindh and Baluchistan cannot be attempted/ disconnected due to resource constraints in managing large scattered areas as well as reluctance of lodging FIRs by the local police stations at all regions.</p> <p>The performance may be measure against detected cases (instead of total customers)</p>	4% 5%
16	<p>Number of gas theft/ leakages complaints received per 100,000 consumers annually. CR Department receives around 45,000 leakage complaints during FY 2015-16. Complaint resolved against received may be utilized as performance indicator. This KMI should be merged under KMI 17.</p>	3% 0%
17	<p>Number of gas theft/Leakages complaints resolved per 100,000 consumers annually. CR Department resolves 100% leak complaints received. This KMI should be based on Complaint resolved against received as performance indicator (instead of 100,000 customers)</p>	3% 5%
*	<p>It is proposed to add survey of disconnected customers as it is experienced that most of theft cases are reported at locations where gas supply was disconnected.</p> <p>The performance should be measured separately for each customer class based on following schedule:</p> <ul style="list-style-type: none"> a) 100% Industrial Disconnected Consumers annually b) 50% Commercial Disconnected Consumes annually c) 20% Domestic Disconnected Consumers annually 	0% 5%

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited

Research & Development		Beta (β)	
18	Number of training hours per employee per year.	1%	1%
19	Improved capability of cost effective construction. Maintenance and emergency repairs	1%	1%
20	Number of environmental issues rectified during the year / Amount of penalties paid as a result of violation of environment laws.	1%	1%
21	Volume of data quality issues identified during the year.	1%	1%
22	Number of knowledge sharing meetings / joint sessions attended / organized during the period.	1%	1%
Total		100%	100%

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited Comparison of Impact - Change in UFG Benchmark

Annexure-A

			MMCF				
			2011-12	2012-13	2013-14	2014-15	2015-16E
Purchases	a		403,470	415,472	419,113	428,450	456,168
Shrinkage/ RLNG (BTUs)	b		2,267	2,924	3,622	5,348	12,071
Total Purchases	c		405,737	418,396	422,735	433,798	468,239
Bulk	d		105,295	102,032	98,531	104,620	136,453
Retail	e		254,353	271,613	255,345	257,890	248,960
Sales to Customers	f = d+e		359,648	373,645	353,876	362,510	385,412
Deemed Sales	g=b		2,267	2,924	3,622	5,348	12,071
Adjustments	h		2,031	6,573	6,819	6,876	6,876
Total Sales	i=f+g+h		363,946	383,142	364,318	374,735	404,359
UFG	j=c-i		41,791	35,254	58,417	59,063	63,879
UFG %age	k=j/c		10.30%	8.43%	13.82%	13.62%	13.64%
Allowed UFG	l=c x 7%		28,402	29,288	29,591	30,366	32,777
Disallowed UFG	m = j-l		13,389	5,967	28,826	28,697	31,103

Revised Scenario

Available for Sales							
Bulk	n=d/(1-0.5%)	105,824	102,545	99,027	105,146	137,139	
Retail	o=a-n	297,646	312,927	320,086	323,304	319,029	
Total	p=n+o	403,470	415,472	419,113	428,450	456,168	
Bulk %age	q=n/p	26.23%	24.68%	23.63%	24.54%	30.06%	
Short B2R% (Base 52.32%)	r=52%-q	26.09%	27.64%	28.69%	27.78%	22.26%	
Bulk to Retail Shift	s= p x r	105,271	114,830	120,253	119,019	101,529	
Bulk UFG	t=s x 0.5%	(526)	(574)	(601)	(595)	(508)	
Retail UFG	u=s x 13.62%	14,336	15,638	16,376	16,208	13,826	
Proposed B2R Adj (Base 13.62%)	v = t + u	13,810	15,063	15,775	15,613	13,319	
Purchases	a	405,737	418,396	422,735	433,798	468,239	
Sales to Customers	f	359,648	373,645	353,876	362,510	385,412	
Deemed Sales	g=b	2,267	2,924	3,622	5,348	12,071	
Adjustments (β is 100%)	v	13,810	15,063	15,775	15,613	13,319	
Total Sales	w = f+g+v	375,725	391,632	373,273	383,472	410,802	
UFG	x = a - w	30,012	26,764	49,462	50,326	57,437	
UFG %		7.40%	6.40%	11.70%	11.60%	12.27%	
Allowed UFG	y = c x 5%	20,287	20,920	21,137	21,690	23,412	
Disallowed UFG	z = x - y	9,725	5,844	28,325	28,636	34,025	
Net Benefit/ (Deficit)	aa = m-z	3,664	123	501	61	(2,922)	

SSGC's Point of view

Actual Retail UFG %	bb = e / o	14.55%	13.20%	20.23%	20.23%	21.96%
Proposed B2R Adjustment	v = (s x bb)+t	14,785	14,586	23,721	23,486	21,792
UFG	x = a - (f+g+v)	29,036	27,241	41,515	42,453	48,964
UFG %		7.16%	6.51%	9.82%	9.79%	10.46%
Allowed UFG	y = a x 5%	20,287	20,920	21,137	21,690	23,412
Disallowed UFG	z = x - y	8,750	6,321	20,378	20,763	25,552
Net Benefit/ (Deficit)	aa = m-z	4,640	(355)	8,448	7,934	5,551

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited Comparison of Impact - Change in UFG Benchmark

Annexure-B

			2011-12	2012-13	2013-14	2014-15	2015-16E
Existing Scenario							
Adjustments	MMCF		2,031	6,573	6,819	6,876	6,876
UFG	MMCF		41,791	35,254	58,417	59,063	63,879
UFG % (after Adj)	%age		10.30%	8.43%	13.82%	13.62%	13.64%
Disallowed UFG	MMCF		13,389	5,967	28,826	28,697	31,103
AGCV	BTU/CF		943	937	999	979	995
WACOG	Rs. / MMBTU		307	343	345	366	327
UFG Penalty	Rs. Million		3,881	1,920	9,944	10,282	10,130
Effective UFG Benchmark	%age		7.50%	8.57%	8.61%	8.59%	8.47%
Consultant Scenario : B2R Δ @ 13.62% (Base Year)							
Adjustments (ΔB2R x β 100%)	MMCF		13,810	15,063	15,775	15,613	13,319
UFG	MMCF		30,012	26,764	49,462	50,326	57,437
UFG % (after Adj)	%age		7.40%	6.40%	11.70%	11.60%	12.27%
Disallowed UFG	MMCF		9,725	5,844	28,325	28,636	34,025
UFG Penalty	Rs. Million		2,819	1,881	9,771	10,260	11,082
Net Benefit/ (Deficit)	Rs. Million		1,062	39	173	22	(952)
Effective UFG Benchmark	%age		8.40%	8.60%	8.73%	8.60%	7.84%
Scenario 1 : ΔB2R @ 13.62% (Base Year) + Previous Allowed Adjustments							
Adjustments	MMCF		15,841	21,636	22,594	22,489	20,195
UFG	MMCF		27,981	20,191	42,643	43,450	50,561
UFG % (after Adj)	%age		6.90%	4.83%	10.09%	10.02%	10.80%
Disallowed UFG	MMCF		7,694	-	21,506	21,760	27,149
UFG Penalty	Rs. Million		2,230	-	7,419	7,797	8,842
Net Benefit/ (Deficit)	Rs. Million		1,651	1,920	2,525	2,485	1,288
Effective UFG Benchmark	%age		8.90%	10.17%	10.34%	10.18%	9.31%
Scenario 2 : ΔB2R @ Retail UFG (Said Year) only							
Adjustments	MMCF		14,785	14,586	23,721	23,486	21,792
UFG	MMCF		29,036	27,241	41,515	42,453	48,964
UFG % (after Adj)	%age		7.16%	6.51%	9.82%	9.79%	10.46%
Disallowed UFG	MMCF		8,750	6,321	20,378	20,763	25,552
UFG Penalty	Rs. Million		2,536	2,034	7,030	7,439	8,322
Net Benefit/ (Deficit)	Rs. Million		1,345	(114)	2,914	2,843	1,808
Effective UFG Benchmark	%age		8.64%	8.49%	10.61%	10.41%	9.65%

Annexure U - SSGC response on 1st draft (Cont.)

Sui Southern Gas Company Limited Comparison of Impact - Change in UFG Benchmark

Annexure-C

Existing (As per Actual: SHC Fixed 7% + Allowances) Actual Figures of FY 2014-15 in MMCF

Customer Category	Available for Sales		Proposed UFG Breakup		Fixed UFG 7% Benchmark			Variable UFG Benchmark			Total		
	Proposed	Actual	UFG %	UFG	UFG	Disallowed	Allowed	Claims*	Disallowed	Allowed	Disallowed	Allowed	
Bulk	105,146	105,146	0.50%	526	526								
Retail	323,304	323,304	20.23%	65,414	28,859	(1,507)	30,366	37,080	30,204	6,876	28,697	37,243	
	428,450	428,450	15.39%	65,939	28,859	(1,507)	30,366	37,080	30,204	6,876	28,697	37,243	
											UFG Penalty (Rs. M)	10,182	8.50%

* Dates include from Customer's 20.4 BCF (Allowed 5.1 BCF), 200 Years 2.4 BCF (Allowed 1.8 BCF) and 800 Years 16.3 BCF (Allowed 16)

Consultant Proposal: Fixed Rate 5% + Δ B2R x Retail UFG% in Base Year x (β upto 1)

Customer Category	Available for Sales		Proposed UFG Breakup		Fixed UFG 5% Benchmark			Variable UFG Benchmark			Total		
	Proposed	Actual	UFG %	UFG	UFG	Disallowed	Allowed	Δ B2R UFG	Rate (β)	Allowed	Disallowed	Allowed	
Bulk	324,165	105,146	0.50%	526	526			526				526	
		Δ B2R	19.62%	16,205				16,205	0.50	8,102	8,102	8,102	
		119,019	Retail UFG% (Base Year)										
Retail	204,285		6.62%	7,876	49,209	28,044	21,164				28,044	21,164	
		204,285	Differential UFG%										
			20.23%	41,333									
	428,450	428,450	15.39%	65,939	49,734	28,044	21,690	16,205	8,102	8,102	36,147	29,792	
											UFG Penalty (Rs. M)	12,951	6.87%

SSGC Proposal: Fixed Rate 5% + Δ B2R x Retail UFG% in Said Year x (0.5+ β)

Customer Category	Available for Sales		Proposed UFG Breakup		Fixed UFG 5% Benchmark			Variable UFG Benchmark			Total		
	Proposed	Actual	UFG %	UFG	UFG	Disallowed	Allowed	Δ B2R UFG	Rate (β)	Allowed	Disallowed	Allowed	
Bulk	324,165	105,146	0.50%	526	526			526				526	
		Δ B2R	20.23%	24,081				24,081	1.00	24,081		24,081	
		119,019	Retail UFG% (Said Year)										
Retail	204,285		6.62%	7,876	41,333	20,168	21,164				20,168	21,164	
		204,285	Differential UFG%										
			20.23%	41,333									
	428,450	428,450	15.39%	65,939	41,858	20,168	21,690	24,081	0	24,081	20,168	45,771	
											UFG Penalty (Rs. M)	7,226	10.55%

Other Related Figures Shrinkage/ Swapping (MMCF) 5,348	WACOG (Rs. / MMBTU) 365.90	GCV (BTU/ CFT) 979.20	ROA (Rs. B) 7.67
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- Remarks: 1. Actual Retail UFG% of Said Year to be considered instead of Base Year % because of multiple factors contributed in rising UFG% beyond Company's control during period.
2. Proposed Beta (β) = Fixed 0.5 + Actual Performance to be considered in view of ground difficulties in carrying operation activities, network complexity, delay in Road cutting Permissions within budgeted amount, shortage of resources and skilled labour, lengthy Procurement timeline/ procedures/ approvals and role of agencies.
3. UFG Penalty should not be exceeded from ROA of said year for natural gas industry and overall economy, the punishment should not be more than one's bearing capacity.



2nd Draft

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