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Oil & Gas Regulatory Authority

UFG Study

Risk Consulting | Karachi office
March 2017



Agenda

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- Background and Scope
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-

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- Incremental Improvement Plan
- UFG Benchmark and Control Formula
- Performance Factor
- Way Forward



Project Background and Scope

Project Background and Scope

Objective of the Project

OGRA appointed KPMG to carry out a UFG study for determining and fixing the UFG benchmark(s) for the Sui Companies over the next five years and thereafter development of a formula to calculate UFG on yearly basis.

Scope of the Project

Task 1: Rationalized Overall UFG benchmark

Task 2: International best practices

Task 3: Factors Contributing UFG

Task 4: Capping Volumes of allowable

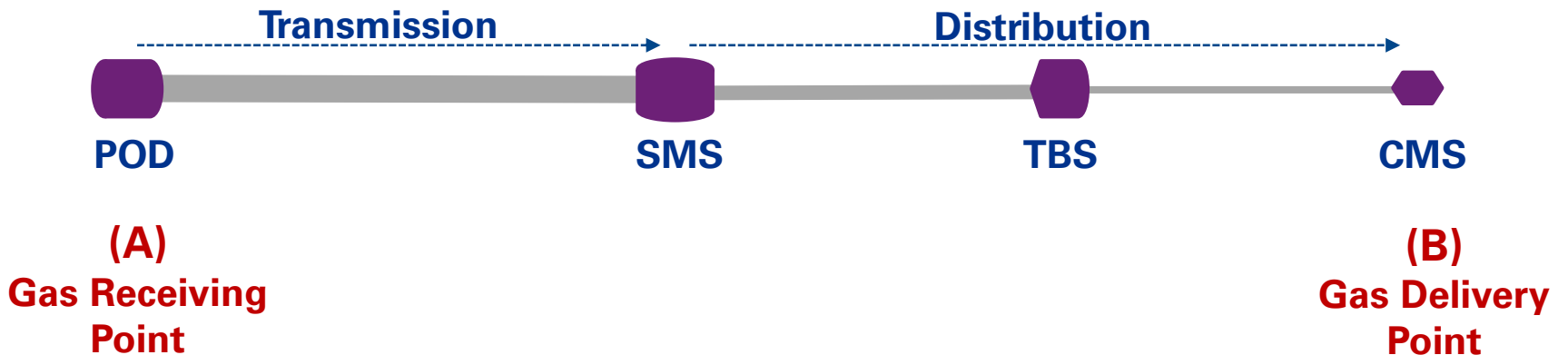
Task 5: Anticipated development in natural gas sector

Task 6: Incremental Improvement



About UFG Problem

In a Financial Year, the difference of Metered Gas volume from A to B.



Snapshot of SSGC and SNGPL

| SSGC | 2004 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Gas Connections | | | | | | | | |
| Domestic | 1,713,153 | 2,127,593 | 2,219,138 | 2,338,853 | 2,460,494 | 2,546,619 | 2,618,806 | 2,683,024 |
| Commercial | 18,152 | 23,606 | 24,156 | 24,998 | 24,494 | 24,119 | 23,740 | 23,408 |
| Industrial | 2,638 | 3,801 | 3,863 | 4,042 | 4,129 | 4,119 | 4,156 | 4,153 |
| Total Connections | 1,733,943 | 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 | 3,320 | 3,320 | 3,337 | 3,401 | 3,490 | 3,551 | 3,551 |
| Distribution Network | 24,339 | 34,282 | 36,785 | 39,253 | 40,905 | 42,360 | 43,090 | 43,890 |
| Total Network Size | 27,319 | 37,602 | 40,105 | 42,590 | 44,306 | 45,850 | 46,641 | 47,441 |
| Gas Available for Sale (MMCF) | 341,033 | 422,387 | 439,341 | 395,779 | 405,737 | 418,396 | 422,735 | 433,798 |
| Gas Sales (MMCF) | 318,068 | 384,522 | 388,828 | 360,012 | 364,409 | 373,645 | 353,904 | 362,510 |

Snapshot of SSGC and SNGPL

| SNGPL | 2004 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Gas Connections | | | | | | | | |
| Domestic | 2,263,875 | 3,358,439 | 3,611,187 | 3,836,091 | 4,151,518 | 4,394,281 | 4,670,962 | 4,908,461 |
| Commercial | 38,842 | 52,242 | 54,631 | 55,877 | 55,906 | 56,212 | 53,957 | 47,913 |
| Industrial | 2,881 | 5,953 | 6,375 | 6,606 | 6,628 | 6,561 | 6,455 | 4,649 |
| Total Connections | 2,305,598 | 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 | 7,347 | 7,585 | 7,613 | 7,654 | 7,654 | 7,733 | 7,796 |
| Distribution Network | 38,258 | 67,449 | 75,653 | 81,828 | 87,796 | 93,646 | 95,855 | 97,300 |
| Total Network Size | 44,021 | 74,796 | 83,238 | 89,441 | 95,450 | 101,300 | 103,588 | 105,096 |
| Gas Available for Sale (MMCF) | 484,678 | 652,987 | 650,291 | 665,235 | 674,868 | 638,076 | 581,961 | 521,533 |
| Gas Sales (MMCF) | 451,959 | 585,316 | 587,163 | 581,901 | 597,283 | 552,621 | 506,423 | 450,843 |

UFG has been a long standing challenge

Consumers

- Need sufficient, continuous and affordable supply of gas for domestic, commercial and industrial use.

Sui Companies

- Technical/ operating challenges resulting in increasing gas losses. Claim that most of UFG is beyond control

OGRA

- As a regulator, has to protect public interest and ensure enabling environment for licensees.

Government

- Socio-economic development of its people at large.

UFG Profile

BCF

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------------------|-------|-------|-------|-------|-------|-------|
| SSGC | | | | | | |
| Gas Available For Sale | 396 | 406 | 418 | 423 | 434 | 496 |
| Total UFG Volume Actual | 37 | 44 | 42 | 65 | 66 | 68 |
| Total UFG %age | 9.4% | 10.8% | 10.0% | 15.4% | 15.2% | 13.7% |
| Effective Allowance %age | 7.0% | 7.5% | 8.6% | 8.6% | 8.6% | 6.0% |
| SNGPL | | | | | | |
| Gas Available For Sale | 665 | 675 | 638 | 582 | 522 | 506 |
| Total UFG Volume Actual | 83 | 78 | 85 | 76 | 71 | 57 |
| Total UFG %age | 12.5% | 11.5% | 13.4% | 13.0% | 13.5% | 11.3% |
| Effective Allowance %age | 8.3% | 8.1% | 6.7% | 6.9% | 7.1% | 7.1% |

Source: SSGC, SNGPL FRR/DERR [FY 2011 – FY 2016]

UFG Contributing Factors

Leakages

- Natural gas leaked to the outside atmosphere from within a transmission/distribution system and staying un-accounted for.

Measurement errors

- Mechanical faults resulting in slow meters and billing errors

Theft – by consumers or non-consumers

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

Losses from law and order affected areas

- Claim of UFG volumes for areas in which prevailing law and order situation hinders gas company operations resulting in UFG.

UFG Contributing Factors (Cont.)

Minimum billing

- Difference of minimum billed and actual consumption volumes included in UFG claimed by the companies.

Impact of bulk to retail shift

- Claim of increase in UFG due to shift of gas supply from bulk to retail ratio over the period.

Increase in gas prices / moratorium on new connections

- Increase in the cost of gas purchased from exploration companies and moratorium on new connection is also considered as another factor contributing towards UFG level.

BTU equivalence and 3rd party access

- 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.

Situational Assessment

- 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”

- Sui companies are unable to determine the actual difference between the volume received and dispatched for a particular network segment.

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Contributing Factor 5 - Measurement Errors (Cont.)

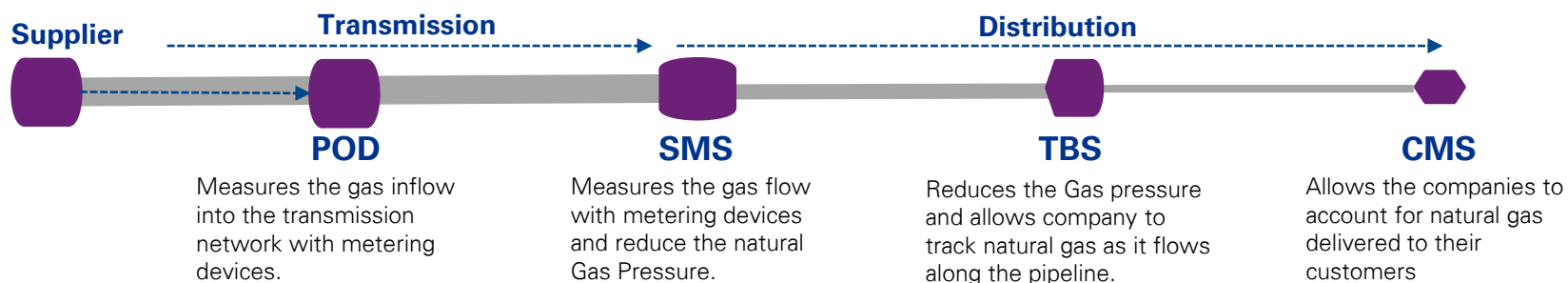


Table ME - 1

| | 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% |

Source: SNGPL & SSGC Reported Information

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



Our Recommendation

Incremental improvement Plan

Key Considerations:

- Enhanced Network Measurement and Visibility;
- Regular Network Rehabilitation;
- Strong Theft Control; and
- Appropriate Research & Development.

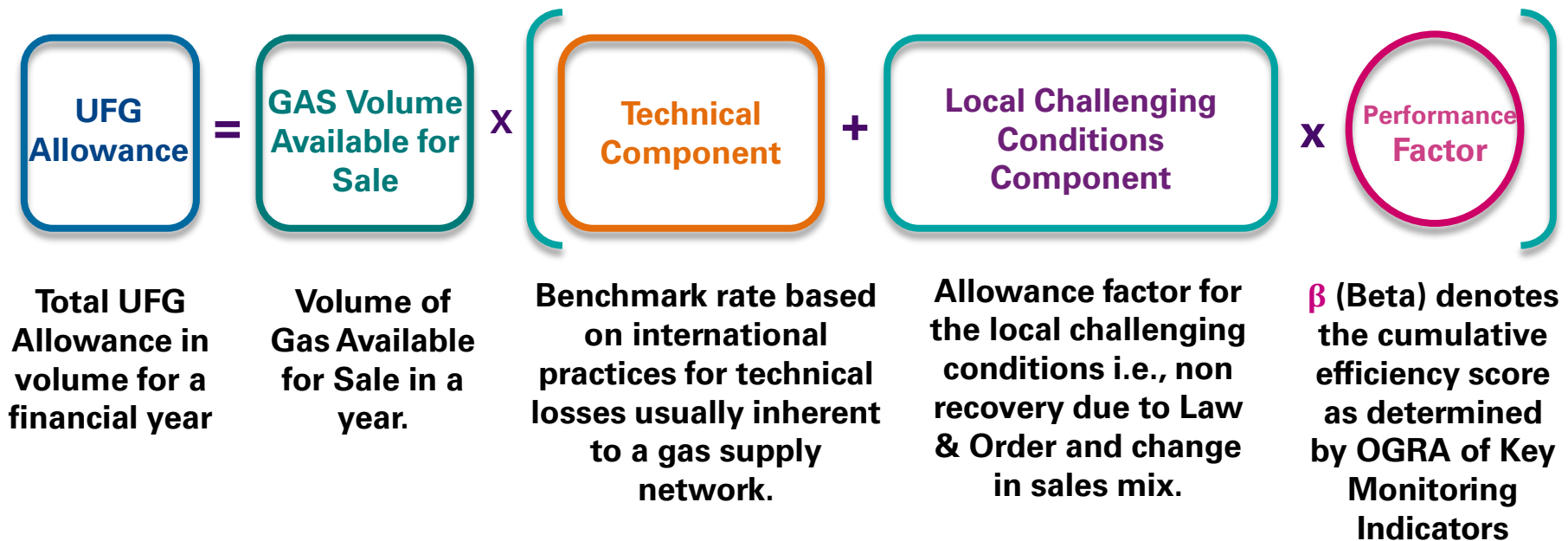
Incremental improvement Plan

Key Recommendations:

- 100% Metering
- Network Segmentation and Ring Fencing
- Cylinder Model
- Regional UFG Management
- Frequent Meter Inspections
- Technological Advancement
- Cost of Service Study
- Detect, Monitor and Control
- Use of bulk meters
- Leakage Management Plan
- Key Monitoring Indicators

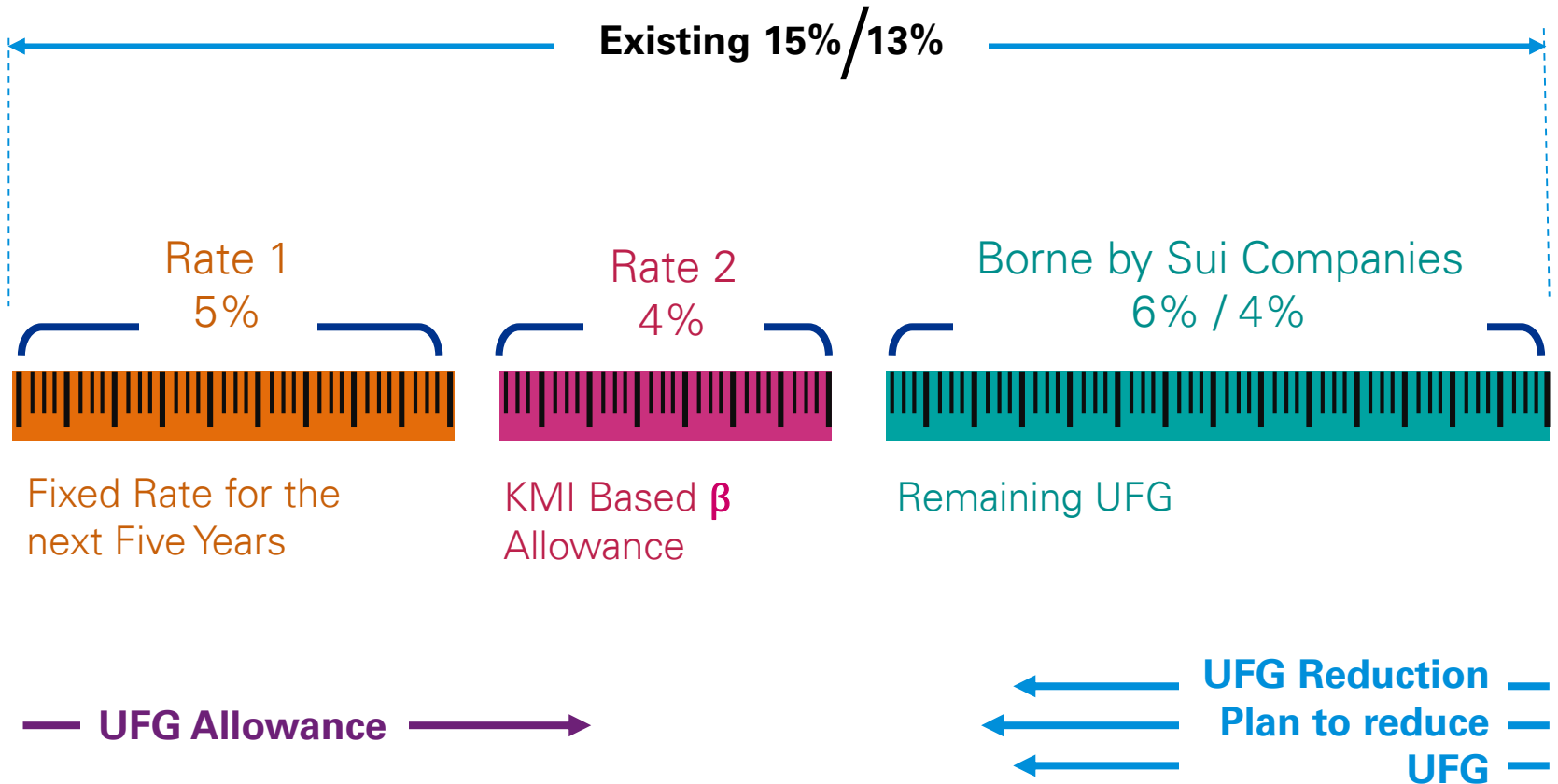
UFG Benchmark and Control Formula

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



UFG Formula

UFG FY 2015



Performance Factor

Key Monitoring Indicators

Strategy

Key Monitoring Indicators (KMIs)

Increased Network Visibility

- Metering at TBS along with EVCs/ Modems.
- Improved TBS level segmentation enabling reconciliation.
- 100 % meter inspection over a period of five (5) years
- Meters replaced as per scheduled replacement criteria

Network Rehabilitation

- Annual pipeline network replacement targets
- Reduce present level of 2.2 underground leaks/km gradually to less than 1 leak/km
- Improved Cathodic Protection

Performance Factor

Key Monitoring Indicators

Strategy

Key Monitoring Indicators (KMIs)

- **A robust targeted theft detection and control plan**

Theft Control • **Re-inspection of disconnected consumers annually**

- **No. of gas theft/Leakages complaints resolved**
-

Research & Development • **Enable improvement in existing UFG control measures.**

Way Forward

For the next five years – 2017 - 2021

OGRA may review UFG Allowances in the FRR, in line with the proposed UFG Control Framework.

For the FY 2013, 2014, 2015 & 2016

OGRA may re-visit its earlier (provisional) UFG Allowances in the FRR, in line with the proposed UFG Control Framework.



Thank you



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