



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF ENERGY

ENERGY AND WATER UTILITIES
REGULATORY AUTHORITY
(EWURA)



NATURAL GAS MID AND DOWNSTREAM SUB-SECTOR REPORT FOR THE YEAR ENDED 30TH JUNE 2022



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CHAIRMAN'S STATEMENT

EWURA Board of Directors is pleased to present the Natural Gas Sub-Sector Regulatory Performance Report for Financial Year (FY) 2021/22. The report provides pertinent details on new developments, performance and compliance with regulatory requirements in the mid and downstream natural gas sub-sector in Mainland Tanzania. It explains the business trends of the natural gas industry for FY 2021/22 in comparison with FY 2020/21.

During the period under review, there was an increase in natural gas production and consumption. The natural gas sub-sector recorded significant achievements in various areas, including increased natural gas connections to industries, households, and numbers of vehicles filled with Compressed Natural Gas (CNG). In addition, the natural gas sub-sector contributed more than 60% of the power generation in the National Grid.

EWURA continued to facilitate and improve investments by promoting and supporting existing and prospective investors in the mid and downstream natural gas sub-sector by developing investor-friendly regulatory tools, timely issuance of construction approvals of natural gas infrastructures, and operational licenses to regulated entities for the provision of natural gas services.

Apart from being a tool for assessing the natural gas sub-sector performance, the report provides important reference to the Government in planning, policy formulation, and strategizing the future growth of the natural gas sub-sector. Also, the report is useful to stakeholders in assessing the industry performance and identifying investment opportunities.

EWURA acknowledges Her Excellency Dr. Samia Suluhu Hassan, the President of the United Republic of Tanzania for efforts of promoting private investment in the natural gas sub-sector. Further appreciation is extended to the Ministry of Energy for its guidance and support, which enabled EWURA to effectively undertake its regulatory functions.

Finally, I take this opportunity to congratulate Members of the Board of Directors, Management and Staff for their commitment and diligence in performing their obligations to ensure that EWURA meets its objectives.

Prof. Mark J. Mwandosya
BOARD CHAIRMAN
March 2023

FOREWORD

The Natural Gas Sub-Sector Regulatory Performance Report for FY 2021/22 has been prepared pursuant to Section 7(1)(f) of the EWURA Act, Cap. 414 and Section 31(2) of the Petroleum Act, Cap. 392 with regards to dissemination of information on matters relevant to its functions and submission to the Minister responsible for energy the annual report related to mid and downstream natural gas activities.

This report provides the performance of the mid and downstream natural gas sub-sector during FY 2021/22. It covers key performance indicators with respect to legal requirements, plant availability, facility utilisation, natural gas production, gas quality, facility integrity, wayleave management, quality of services, emergency response plan, environmental requirements, local content, and financial performance.

During the year under review, the performance of the sub-sector had improved when compared to FY 2020/21, whereby; natural gas production increased by 20%, the number of vehicles filled with CNG increased by 33%, local companies registered into LSSP database increased by 84%, new connections increased by 121% and 10% to households and industries respectively. The Authority continued to monitor regulated entities' compliance with regulatory requirements to ensure the quality of services and integrity of natural gas facilities.

EWURA extends appreciation to the Board of Directors for its continued guidance and to stakeholders for their invaluable contribution to this report. Further appreciation is extended to EWURA Management and staff for their efforts in preparing this report.



.....
Dr. James A. Mwainyekule
Director General
March 2023

ABBREVIATIONS AND ACRONYMS

ANRIC Gas	ANRIC Gas Technology Tanzania Company Limited
BCF or Bcf	Billion Standard Cubic Feet
CNG	Compressed Natural Gas
CRB	Contractors Registration Board
CNG-V	Compressed Natural Gas Vehicles
EWURA	Energy and Water Utilities Regulatory Authority
FY	Financial Year
GASCO	Gas Company (Tanzania) Limited
GJ	Gigajoule
GTL	Gas-to-Liquids
HSE	Health, Safety, and Environment
LSSP	Local Suppliers and Service Providers
LNG	Liquefied Natural Gas
LTi	Lost Time Injuries
Mcf	Thousand Standard Cubic Feet
MMBtu	Million British Thermal Unit
MMSCF	Million Standard Cubic Feet
MMSCFD	Million Standard Cubic Feet per Day
M&P	Maurel and Prom Exploration Production (T) LTD
MW	Megawatt
PAET	Pan African Energy Tanzania Limited
PNG	Piped Natural Gas
PPE	Person Protective Equipment
PSV	Pressure Safety Valve
PRS	Pressure Reduction Station
PSV	Pressure Safety Valve
SSI	Songosongo Island
TANESCO	Tanzania Electric Supply Company Limited
TBS	Tanzania Bureau of Standards
TCF	Trillion Standard Cubic Feet
TPDC	Tanzania Petroleum Development Corporation
USA	United States of America

EXECUTIVE SUMMARY

Pursuant to Section 30(2)(n) and Section 31(2) of the Petroleum Act, 2015, the natural gas sub-sector regulatory performance report for mid and downstream is to be prepared and submitted to the Ministry of Energy annually. The report informs on the annual performance of the mid and downstream natural gas sub-sector and provides important information on existing and future investment opportunities.

The Authority continued to monitor the compliance of natural gas facilities to technical, safety and economic requirements. Monitored facilities include natural gas processing plants, high-pressure pipelines, and distribution networks located in Songosongo Island (Lindi), Mtwara, Coast and Dar es Salaam regions.

Performance analysis showed that total processed natural gas increased from 60,619.2 MMscf recorded in FY 2020/21 to 72,533.56 MMscf in FY 2021/22 which is equivalent to a 20% increase. This was due to an increase in demand for power generation, households use, industries and the use of CNG vehicles for both existing and new customers. During the financial year, five (5) new industries and 970 households were connected to natural gas. Also, the average rate of fuelling of CNG-V increased from 150 to 199 vehicles per day, which is equivalent to a 33% increase.

In the year ended 30th June 2022, the Authority issued three (3) operational licences, two (2) for CNG filling stations and one (1) for natural gas processing plant; and issued four (4) construction approvals for natural gas supply lines to industries in Dar es Salaam Region. The Authority continued to monitor regulated entities compliance with local content requirements as per Regulation 7 of the Petroleum (Local Content) Regulations, 2017, and respective local content and procurement plans. During the period under review, the Authority registered 620 local business entities in the LSSP database equivalent to an increase of 84%, which makes a total of 1,357 registered local entities by June 2022.

Financial analysis performed by the Authority considered revenue generation and cost incurred in processing, transmission, and distribution of natural gas incurred by regulated entities (PAET, TPDC, M&P and Songas). During the period under review, revenue generation increased by 8% due to increased consumption of natural gas-fired power plants to offset hydropower plants during dry seasons.

Further, during the period under review, the overall costs increased by 6% whereby natural gas processing costs increased by 11%, transmission costs increased by 2% and distribution costs increased by 2.4%. This was attributed to an increase in natural gas production and consumption, high maintenance costs caused by inflation of price and capital-intensive activities such as pipeline pigging and overhaul of gas engines for power generation in processing plants.

During the period under review, the major observations in the mid and downstream natural gas sub-sector were inadequate coordination in controlling Compressed Natural Gas (CNG) operations among mandated regulatory entities and inadequate investments in distribution projects to meet the natural gas demand and future markets.

The Authority will continue to improve its regulatory tools to attract private investments in natural gas distribution projects. The Authority continued to oversee its regulatory functions in the mid and downstream natural gas sub-sector operations by monitoring compliance of the operations, products and services of the regulated entities with respect to technical and safety regulatory requirements. During the review period, it was observed that compliance of natural gas facilities to safety and technical requirements was 95% compared to 94% in the previous financial year.

EWURA continued to engage key stakeholders to ensure effective participation in developing natural gas projects as well as formulate investor-friendly regulatory tools.

1. INTRODUCTION

This Natural Gas Sub-Sector Regulatory Performance Report for Financial Year (FY) 2021/22 has been prepared in accordance with Section 7(1)(f) of the EWURA Act, Cap. 414 and Section 31(2) of the Petroleum Act, Cap. 392. The Authority has an obligation to disseminate information on matters relevant to its functions. Furthermore, the Authority is obliged to submit to the Minister responsible for Energy the annual report related to mid and downstream natural gas activities.

According to Section 29 of the Petroleum Act, Cap. 392, EWURA is responsible for regulating mid and downstream natural gas activities, which include processing, transmission, storage and distribution of natural gas in Mainland Tanzania. Consistent with Regulation 4 of the Petroleum (Natural Gas Mid and Downstream) General Regulations 2020, EWURA has the following functions: -

- (a) to protect the interests of consumers regarding price, availability, quality and reliability of supply;
- (b) to protect the public from dangers arising from processing, transportation, storage, conveyance, shipping, supply or use of natural gas;
- (c) to promote the efficient use of natural gas by consumers; and
- (d) to advise the Government on all matters related to importation, exportation, processing, storage, transportation, conveyance, shipping, supply or use of natural gas.

The report provides an overall performance of natural gas-regulated entities in adherence to key performance indicators in undertaking mid and downstream natural gas activities in the FY 2021/22. Performance monitoring and evaluation of the regulated entities intend to improve the quality, availability and affordability of the natural gas supply. Furthermore, the report analysed and compared the technical and economic performance of the Mid and Downstream natural gas activities.

Evaluation of the financial performance in this report is based on the following regulated entities: -

- (a) TPDC, which is mandated to carry out mid and downstream natural gas activities such as processing, transportation, distribution and aggregation of natural gas;
- (b) Songas, which is responsible for processing, transportation of natural gas and generation of electricity in Tanzania using natural gas from Songosongo Island;
- (c) PAET, which is dealing with the production and marketing of natural gas produced from Songosongo Island; and
- (d) M&P, which is responsible for producing, processing and transporting natural gas.

In the FY 2021/22, the performed activities by regulated entities were natural gas processing, transmission and distribution. Distribution activities were categorised as low-pressure distribution and virtual pipelines, which include CNG mother stations, CNG daughter stations and CNG filling stations.

In addition, the report presents the overall performance of regulatory activities accomplished, achievements attained, challenges observed and the way forward.

2. REGULATORY TOOLS AND STANDARDS

The Authority developed two (2) regulatory tools to enhance the efficient monitoring of regulated entities in mid and downstream natural gas operations. The developed tools include the Petroleum (Natural Gas) Midstream and Downstream Investment Guidelines, 2022 and the Protection of Underground Infrastructure in Shared Wayleave Guidelines, 2022. A list of developed regulatory tools in the natural gas sub-sector is shown in **Annex 1**. In addition to that, ISO standards for Compressed Natural Gas Vehicles (CNG-V) components were initiated and proposed by the Authority to the Tanzania Bureau of Standards (TBS) and these standards were reviewed, adopted and gazetted as National Standards during the FY 2021/22. A List of adopted and gazetted natural gas standards is shown in **Annex 2**.

3. CONSTRUCTION APPROVAL AND LICENCE

3.1. Construction Approvals Issued

In FY 2021/22, the Authority issued four (4) construction approvals for the construction of distribution infrastructures in Dar es Salaam and Coast (Pwani) regions as compared to five (5) construction approvals that were issued in the previous year. Details of construction approvals issued in the FY 2021/22 are shown in **Table 1** and the total construction approvals issued as of 30th June 2022 are shown in **Annex 3**.

Table 1: Total Construction Approvals Issued in the FY 2021/22

SN.	Applicant Name	Approval No.	Date Of Issue	Type of Construction Approval
1	PanAfrican Energy (T) Limited – P.O. Box 80139 Dar es Salaam: Oyster Plaza Building, Haile Selassie/Ali Bin said Roads, Dar es Salaam	NGCA 2021-06	16/08/2021	Construction of distribution facilities for supplying natural gas to Tanga Pharmaceuticals and Plastics Limited at Vingunguti area in Ilala city
2	Tanzania Petroleum Development Corporation - P. O. Box 2774 Dar es Salaam	NGCA-2021-07	30/11/2021	Construction of natural gas distribution facilities for supplying natural gas to Raddy Fiber Manufacturing (T) Limited located along Njia Panda ya Kibamba area at Mkuranga in the Pwani region
3	PanAfrican Energy (T) Limited – P.O. Box 80139 Dar es Salaam: Oyster Plaza Building, Haile Selassie/Ali Bin said Roads, Dar es Salaam	NGCA-2021-08	21/12/2021	Construction of distribution facilities for supplying natural gas to Quaim Steel Mills Limited located at Chang'ombe area in Temeke district
4	PanAfrican Energy (T) Limited – P.O. Box 80139 Dar es Salaam: Oyster Plaza Building, Haile Selassie/Ali Bin said Roads, Dar es Salaam	NGCA-2021-09	21/12/2021	Construction of distribution facilities for supplying natural gas to Urafiki Textile Mills located in Ubungo municipality

Source: EWURA

3.2. Licences Issued

By section 131 of the Petroleum Act 2015, the Authority issued three (3) licenses, one (1) for processing plant operations and two (2) for Compressed Natural Gas (CNG) filling station operations as shown in **Table 2**. In the previous FY, two (2) licenses were issued, one (1) for processing plant operations and one (1) for transmission pipeline operations.

Table 2: Licences Issued in the FY 2021/22

SN.	Licensee	Licence Number	Date Of Issue	Type of License	Facility Location
1	Dangote Cement Limited	CNGOL – 2021 – 001	6/07/2021	CNG Filling Station Operation (Own Use)	Mtwara
2	Gas Company Tanzania Limited (GASCO)	NGPL – 2021 – 002	26/07/2021	Processing Operation	Songo Songo Island
3	Anric Gas Technology (T) Co. Ltd	CNGFSL – 2021 – 001	30/08/2021	CNG Filling Station Operation	Dar es Salaam

Source: EWURA

3.3. Complaints and Dispute Resolution

The Authority is mandated to resolve disputes and complaints of suppliers of goods and services of regulated entities customers as per Section 7(1)(e) of the EWURA Act, Cap 414. During the period under review, one (1) complaint was received regarding refusal to re-fill natural gas into CNG-Vehicle, however, the complaint was resolved by the parties. The Authority will continue to raise awareness of customers' satisfaction with the services rendered by natural gas service providers.

4. NATURAL GAS INFRASTRUCTURE PERFORMANCE MONITORING

The level of compliance and integrity of natural gas infrastructure continued to be monitored as per regulatory requirements. The monitored infrastructures include natural gas processing plants, high-pressure transportation pipelines, low-pressure distribution network facilities, virtual pipeline networks and compressed natural gas filling stations. This section gives a summary of the natural gas processing, transmission and distribution networks' compliance performance during the FY 2021/22. The current list of regulated entities operating in the mid and downstream natural gas sub-sector is shown in **Annex 4**.

4.1. Natural Gas Processing Infrastructures

During the period under review, the number of natural gas processing infrastructures remained the same as in the previous year. The total installed capacity of natural gas processing plants is 470MMscfd from four (4) gas processing plants: TPDC (Madimba 210MMscfd and SSI 140MMscfd) Songas 110MMscfd and M&P 10MMscfd as detailed in **Figure 1**.

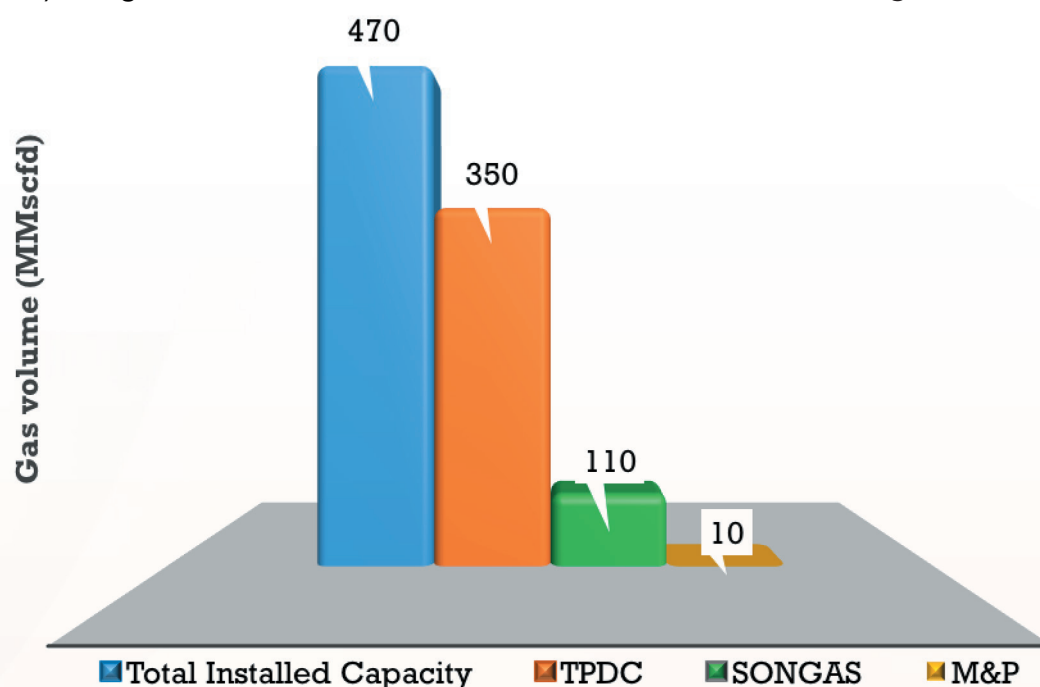


Figure 1: Installed Capacities of Natural Gas Processing Plants

4.1.1. Processing Plants Technical Performance

The Authority performed technical compliance monitoring of natural gas processing plants and assessed their capability based on installed capacity, natural gas processing plant nomination compliance, plant availability, plant utilisation and integrity management. The key performance indicators were assessed based on information shared by regulated entities.

4.1.2. Installed Capacity of Processing Plants

The total installed processing capacity of the four (4) natural gas processing plants is 470 MMscfd. TPDC contributes 74.5% from its two (2) processing plants while Songas and M&P contribute 23.4% and 2.1%, respectively as presented in **Figure 2**. These plants receive raw gas from Songosongo and Mnazi Bay gas fields located in Lindi and Mtwara regions, respectively.

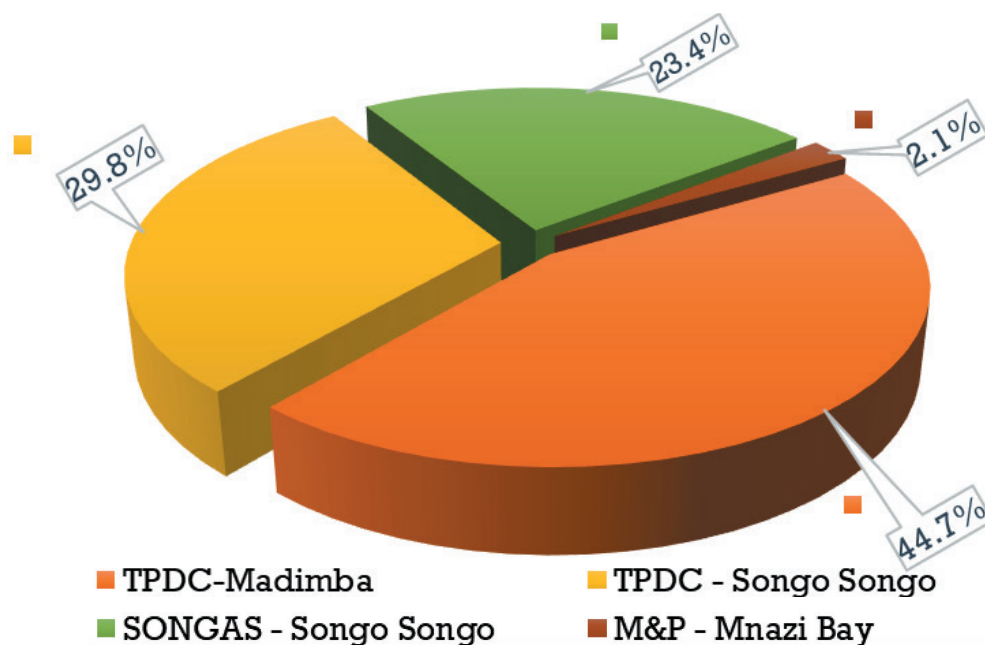


Figure 2: Processing Plants Capacity contribution

4.1.3. Processing Plants Nomination Compliance

Nomination compliance is measured by the gas processor's capacity to meet the demand of downstream users. The Authority continued to monitor the supply of natural gas by regulated entities to ensure a continuous supply of natural gas to end-user customers. During the period under review, average daily nomination compliance of the four (4) natural gas processing plants was analysed to ensure the availability of gas supply to end users and adherence of the gas producers to commercial terms. **Table 3** illustrates the average variance in daily nomination compliance of the processing plants for the financial year under review.

Table 3: Average Variance Nomination Compliance Recorded

S/N	Processing Plant	Nominated Natural Gas (MMscfd)	Utilised Capacity (MMscfd)
1.	TPDC Madimba	87.86	84.96
2.	TPDC Songosongo	34.92	34.04
3.	Songas Ltd	90.79	78.31
4.	Maurel et Prom	3.047	3.047

Source: TPDC, Songas/PAET and M&P

Based on the data in the last column of **Table 3** above, all the gas processors met the nomination compliance. However, some had lower nomination compliance due to the following reasons: -

- (a) Declining reservoir pressure
- (b) Inevitable/mandatory interactive maintenance of natural gas infrastructures
- (c) Seasonal variation of gas demand

4.1.4. Natural Gas Processing Plants Availability

Plant availability was measured based on the amount of time the plant was able to produce natural gas. The Authority continued to monitor the natural gas processing plants' operations and maintenance activities to ensure plant availability. TPDC Madimba and M&P gas processing plants were available at 100%, TPDC Songo Songo gas processing plant at 99% while Songas' plant was at 98%. In February 2022, the Songas gas processing plant was shut down for 181.5 hours to allow the installation of compression systems to improve the plant inlet pressure. **Table 4** shows the average plant availability for the period under review.

Table 4: Annual Average Plant Availability of Existing Processing Plants

S/N	Processing Plant	Total Operation hours	Downtime hours	Average Plant Availability (%)
1.	TPDC Madimba	8760	0	100
2.	TPDC Songosongo	8760	86	99
3.	Songas Ltd	8760	181.5	98
4.	M&P	8760	0	100

Source: TPDC, Songas and M&P

4.1.5. Processing Plants Capacity Utilisation

The annual average capacity utilisation for TPDC Madimba, TPDC SSI, Songas and M&P gas processing plants for the FY 2021/22 are illustrated in **Table 5** and **Figure 3**.

Table 5: Gas Processing Plants Capacity Utilisation

S/N	Plant Name	Available Capacity (MMscfd)	Plant Capacity Utilisation for FY 2020/21		Plant Capacity Utilisation for FY 2021/22	
			MMscfd	(%)	MMscfd	(%)
1.	TPDC Madimba	210	74.28	35.2	84.96	40.5
2.	TPDC Songosongo	140	24.67	17.6	34.04	24.3
3.	Songas Ltd	110	66.50	60.5	78.31	71.2
4.	Maurel & Prom (M&P)	10	2.40	24.0	3.05	30.5

Source: TPDC, Songas and M&P

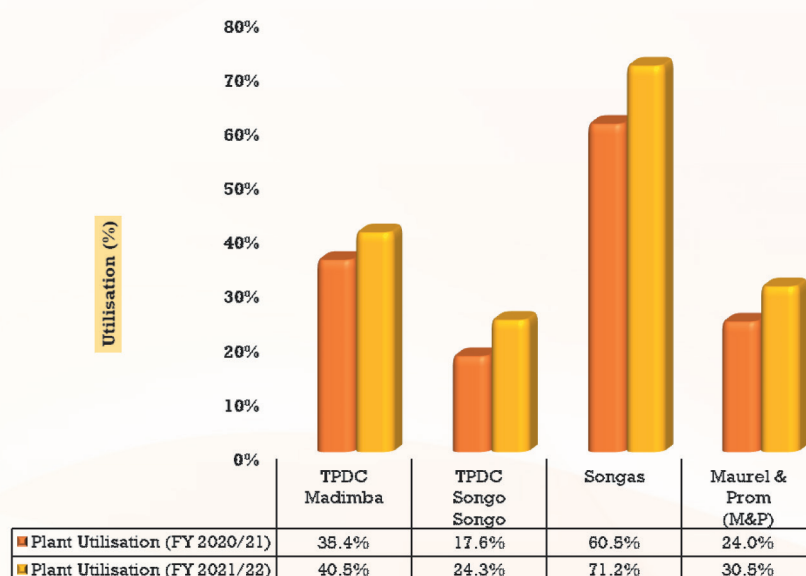


Figure 3: Gas Processing Plants Capacity Utilisation

4.1.5.1 TPDC Madimba Gas Processing Plant Capacity Utilisation

Madimba gas processing plant was available at 100% with an average daily utilisation of 84.96 MMscfd, equivalent to 40.5% utilisation capacity. Utilisation for the gas processing plant increased by 5.3% from 35.2% in the last financial year. Moreover, the maximum production attained was 102 MMscfd in March 2022. **Figure 4** shows the Madimba gas processing plant capacity utilisation for the period under review.

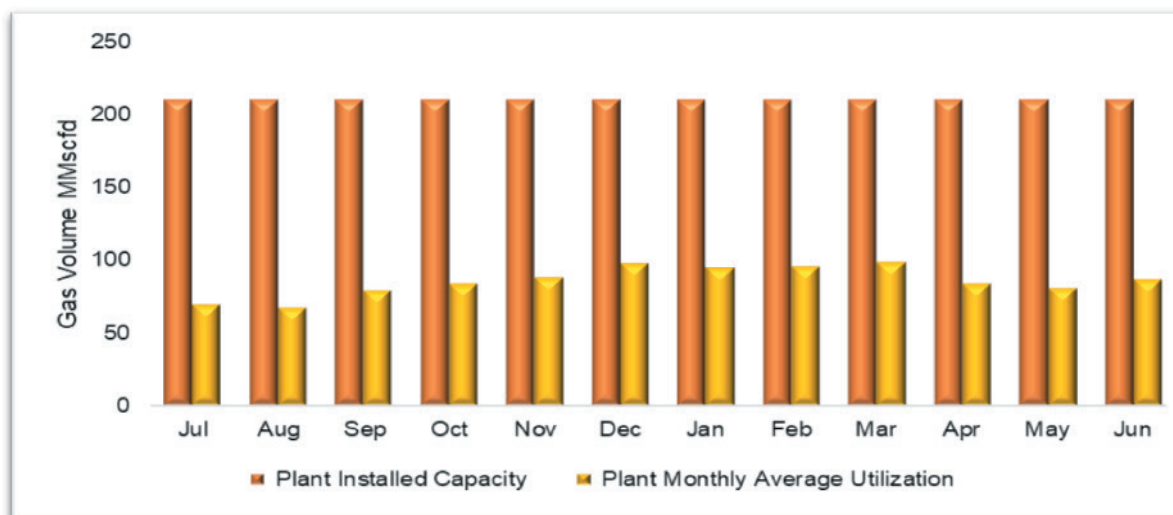


Figure 4: Average Monthly TPDC Madimba Gas Plant Utilisation Capacity

4.1.5.2 TPDC Songosongo Gas Processing Plant Capacity Utilisation

The Songosongo gas processing plant was available at 99% with average daily utilisation of 34.04 MMscfd, equivalent to 24.3% utilisation capacity. This translates to an increase of 6.7% as compared to 17.6% in the last financial year. Maximum production attained was 92.36 MMscfd in February 2022. **Figure 5** shows TPDC Songosongo processing plant capacity utilisation for the period under review.

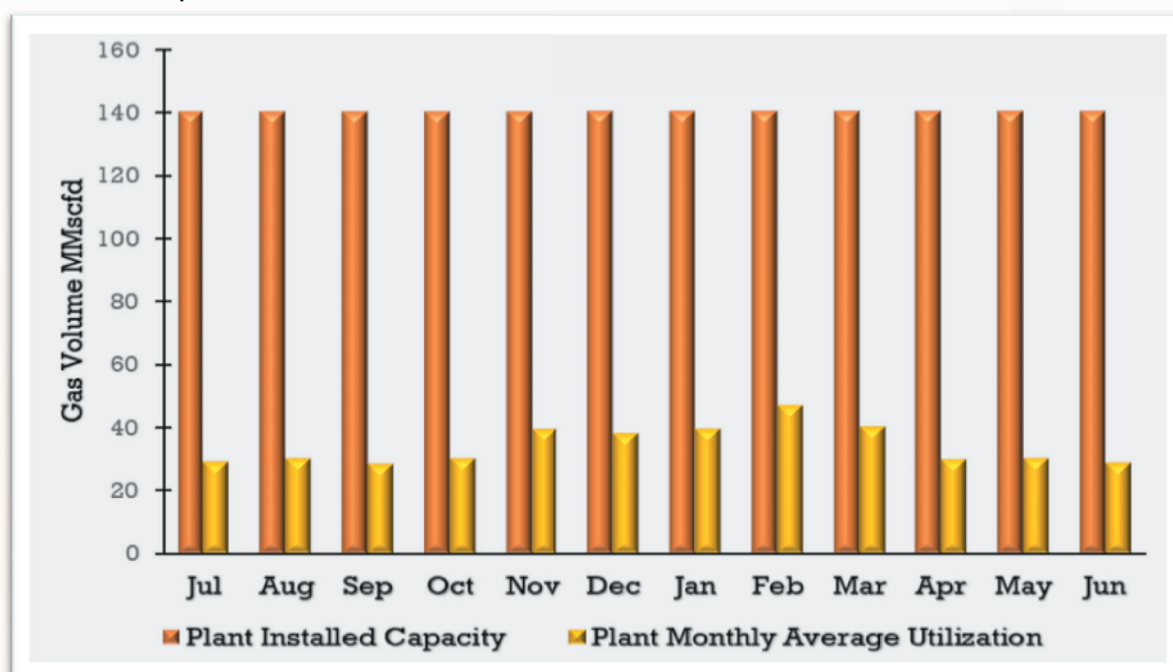


Figure 5: Average Monthly TPDC SSI Gas Plant Utilisation Capacity

4.1.5.3 Songas Gas Processing Plant Capacity Utilisation

The Songas gas processing plant was available at 98% with average daily utilisation of 78.31 MMscfd, equivalent to 71.2% utilisation capacity. The utilisation capacity of this plant increased by 10.3% from 60.9% in the last financial year. Moreover, the maximum production attained was 106.79 MMscfd in June 2022. **Figure 6** shows Songas Processing Plant Utilisation for the period under review

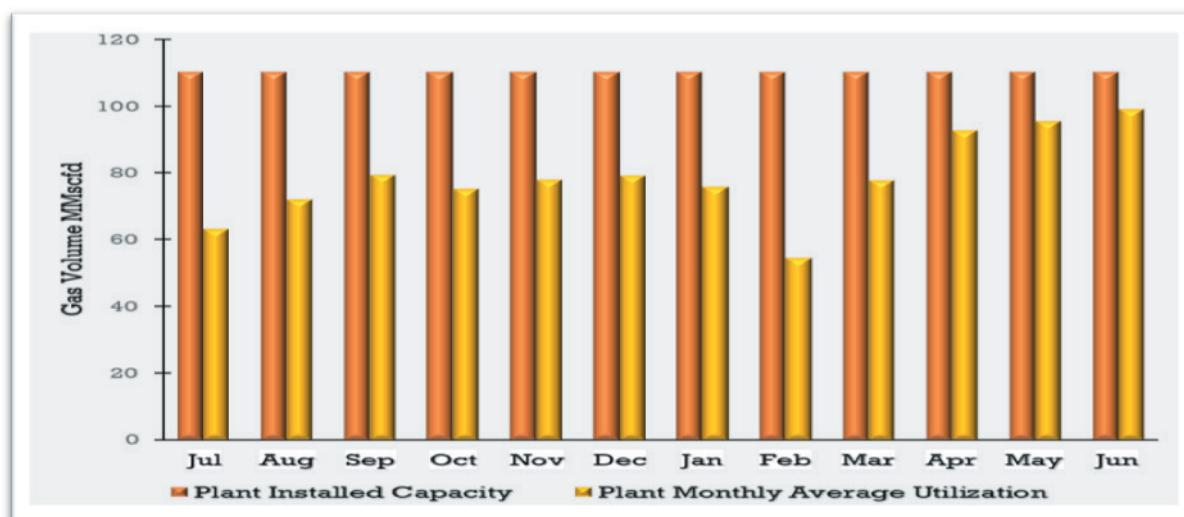


Figure 6: Monthly Songas Gas Plant Capacity Utilisation

4.1.5.4 M&P Gas Processing Capacity Utilisation

M&P gas processing plant was available at 100% with average daily utilisation of 3.05 MMscfd, equivalent to 30.5% utilisation capacity. Utilisation for the gas processing plant increased by 6.5% from 24% in the previous financial year. **Figure 7** shows M&P gas processing plant capacity utilisation for the period under review. Even though gas plant utilisation is largely driven by downstream gas consumers' demand, there has been a steady increase in the plant's utilisation capacity from 2.4 MMscfd to 3.05 MMscfd. This trajectory is expected to increase gradually over the years.

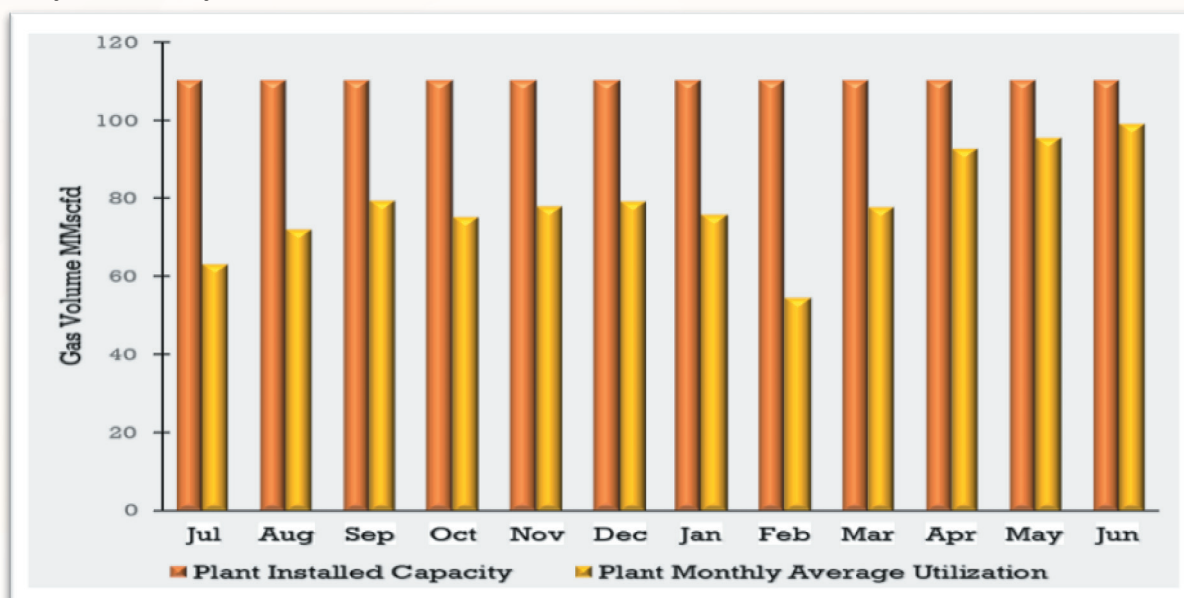


Figure 7: Average Monthly M&P Gas Plant Capacity Utilisation

As compared to the previous financial year there is an increase of 7% in utilisation capacities of the four (4) gas processing plants in the country. The average gas production in the FY 2020/21 was 67.86MMscfd equivalent to 36% utilisation capacity while the average gas production reported the FY 2021/22 was 200.4 MMscfd equivalent to 43.0% utilisation capacity as indicated in **Figure 8**.

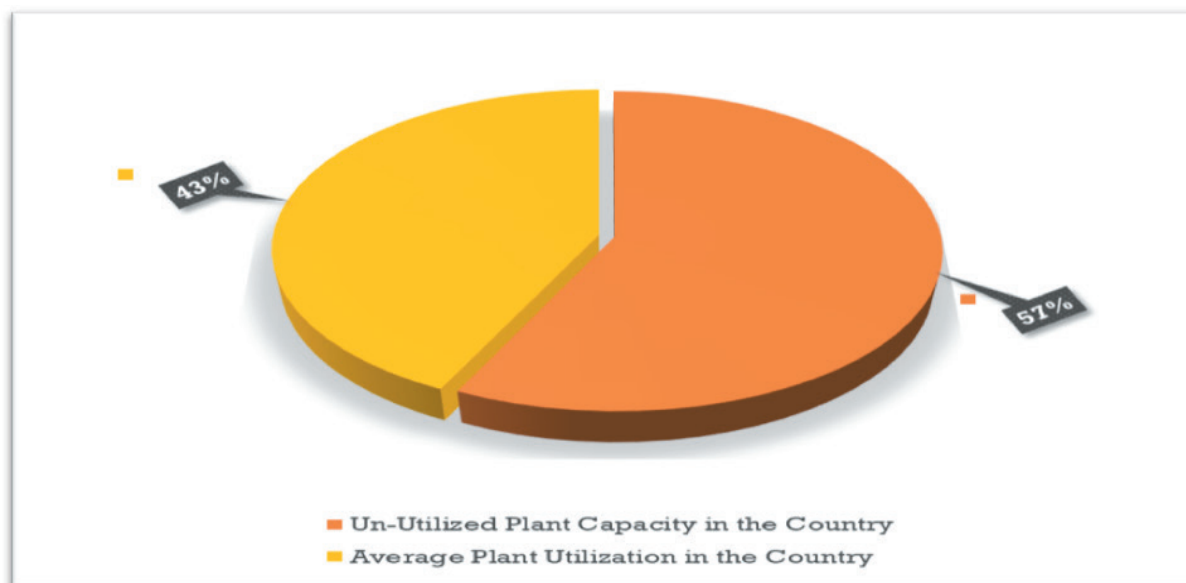


Figure 8: Total Processing Plant Capacity Utilisation in the Country

4.1.6. Natural Gas Production

Natural gas production during the FY 2021/22 increased by 19.7% from 60,619.12 MMscf recorded in the FY 2020/21 to 72,533.56 MMscf due to an increase in consumption of natural gas-fired power plants to offset hydropower plants caused by short periods of rainfall experienced in the country. The increase was also a result of new downstream customers including the Ubungo III gas-fired power plant. **Table 6** shows a two-year trend in natural gas production.

Table 6: Natural Gas Production

S/N	Processing Plant	Produced Gas (MMscf)		Percentage increase (%)
		2020/21	2021/22	2021/22
1	TPDC Madimba	26,919.20	30,798.15	6.4%
2	TPDC Songosongo	8,842.10	12,249.00	5.6%
3	Songas/PAET	23,978.40	28,440.94	7.4%
4	Maurel Prom (M&P)	879.5	1,045.48	0.3%
	Total	60,619.20	72,533.57	19.7%

Source: TPDC, Songas & M&P

4.1.7. Asset Integrity Management

The Authority continued to monitor the performance of gas processing plants to ensure regulated entities adhere to their asset integrity management plans throughout the operation period. The monitored devices include are but not limited to PSVs, export meters and gas chromatography units. During this period, all regulated entities complied with their facility integrity plans as in **Table 7**.

Table 7: Outline of PSV, Metering and Chromatography Device's Integrity

S/N	Processing Plant	Type of devices	No. of devices available	Planned No. of calibration	No. of device re-calibrated	Calibration in %	Target %
1	TPDC - Songosongo	PSV	96	96	82	85	100
		Export Meter	2	-	-	-	100
		Gas Chromatography	1	1	-	-	100
2	TPDC- Madimba	PSV	94	94	85	90.4	100
		Export Meter	2	-	-	-	100
		Gas Chromatography	1	-	-	-	100
3	M&P	PSV	15	15	15	100	100
		Meter	1	1	1	100	100
		Chromatography	2	2	2	100	100
4	SONGAS	PSV	93	93	93	100	100
		Meter	1	1	1	100	100
		Chromatography	2	1	1	50	100

Source: TPDC, Songas and M&P

4.1.8. Natural Gas Quality Monitoring

The Authority continued to monitor compliance of natural gas to quality standards, commercial terms and standards. During the period under review, all four (4) processing plants monitored complied with natural gas quality standards, commercial terms and standards. The natural gas quality was analysed and reported by the regulated entities from the processing plants as shown in **Table 8**.

Table 8: Quality of Natural Gas Composition (in % Mole) as of 30th June 2022

Natural Gas Component	Reference Gas Quality TBS Standard	Quality of Natural Gas			
		Songas	TPDC- SS	TPDC-Madimba	M&P
Methane (CH ₄)	87.0 - 99.0	97.2289	96.977	98.1167	98.1167
Ethane (C ₂ H ₆)	1.5 - 9.0	0.9773	1.0640	1.0332	1.0332
Propane (C ₃ H ₈)	0.1 - 1.5	0.2885	0.3230	0.2792	0.2792
iso-Butane (C ₄ H ₁₀)	0.01 - 0.3	0.0614	0.0900	0.0985	0.0985
n-Butane (C ₄ H ₁₀)	0.01 - 0.3	0.0786	0.0490	0.0992	0.0992
iso-Pentane (C ₅ H ₁₂)	trace - 0.04	0.0282	0.01361	0.0189	0.0189
normal-Pentane (C ₅ H ₁₂)	trace - 0.04	0.0242	0.2770	0.0193	0.0193
Hexanes (C ₆ H ₁₄)	trace - 0.06	0.0263	0.0300	0.0353	0.0353
Carbon Dioxide (CO ₂)	0.05 - 1.0	0.5030	0.3990	0.2480	0.2480
Nitrogen (N ₂)	0.2 - 5.5	0.6922	0.7640	0.1828	0.1828
Hydrogen Sulphide (H ₂ S)	trace to 0.02	0.0000	0.0000	0.0000	0.0000
Moisture (ppm)	trace to 5.00	0.9192	0.0000	0.0000	0.0000
Specific Gravity	0.57 to 0.62	0.5850	0.5738	0.56758	0.56758
Gross Heating Value (MJ/m ³)	36.0 to 40.2	38.10	38.07	38.2658	38.1487

Source: www.uniongas.com, Songas, TPDC and M&P

4.2. Natural Gas Transmission Infrastructures

The natural gas transmission network in Tanzania is comprised of three (3) pipelines operated by GASCO, Songas and M&P which supply gas to Mtwara, Lindi, Coast and Dar es Salaam Regions. Details of transmission pipelines are shown in **Table 9**.

Table 9: Length, Capacity and Operator of Pipeline

S/N	Pipeline Location	Length (km)	Diameter (inches)	Capacity (MMscfd)	Maximum Operating Pressure (Bar)	Network Operator
1.	Mtwara–Somanga- Kinyerezi in Dar es Salaam	477	36	784	80	GASCO
2.	Songosongo Island – Somanga Fungu	29	24			
3.	Kinyerezi – Tegeta in Dar es Salaam	27.5	16			
4.	Songosongo Island – Somanga Fungu	26	12	105	90	Songas
5.	Somanga Fungu – Dar es Salaam	206	16		90	Songas
6.	Mnazi Bay – TANESCO in Mtwara	27.5	8	80	90	M&P
	Total	793		969		

Source: TPDC, Songas and M&P

4.2.1. Natural Gas Transmission Technical Performance

During the year ended 30th June 2022, the technical performance of transmission pipelines considered pipeline length and capacity, service availability, percentage utilisation, number of outages, way-leave clearance and pipeline integrity management. Analysis of the key performance indicators was based on information received from regulated entities.

4.2.2. Natural Gas Transmission Pipeline Length and Capacity

The total length of natural gas transmission pipelines in the country is 793 km with a capacity of 969 MMscfd. The total number of Isolation Valves is 26, of which 16 are installed along the TPDC pipeline, 9 along Songas' pipeline and 1 along the M&P pipeline. The contribution of each pipeline to the total length of the transmission pipeline is shown in **Table 10**.

Table 10: Transmission Pipeline Length Contribution

S/N	Owner	Pipeline Length (km)	Number of Valve Stations	% Contribution
1.	TPDC	533.5	16	67.3
2.	Songas	232	9	29.3
3.	Maurel Prom (M&P)	27.5	1	3.4
	Total	793	26	100

Source: TPDC, Songas & M&P

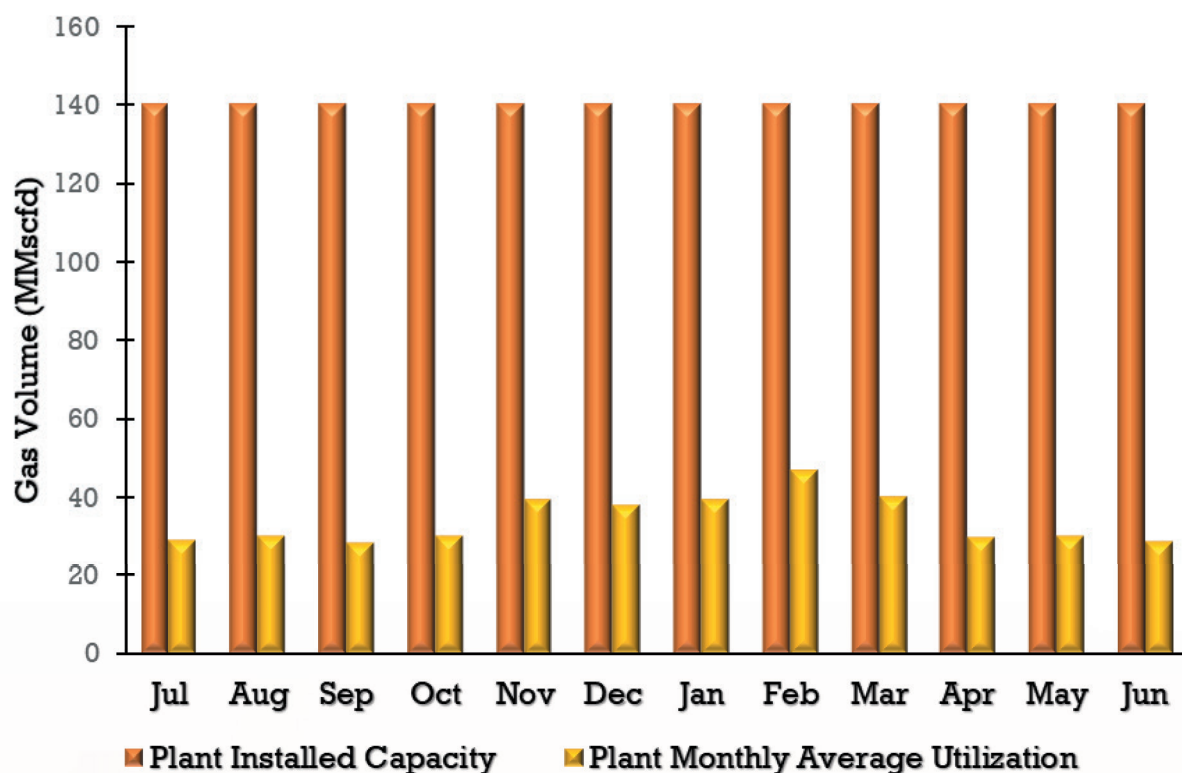
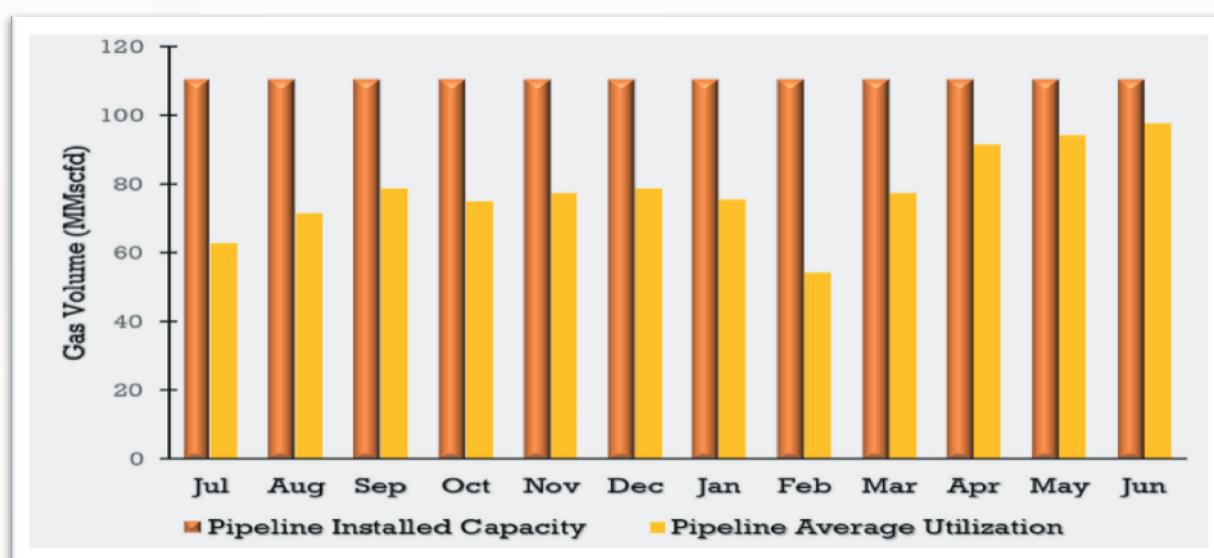
4.2.3. Transmission Pipeline Availability, Utilisation and Outages

Availability of natural gas transmission pipeline in the country for the FY 2021/22 was 100%. TPDC, Songas and M&P pipeline utilisation was 15%, 71%, and 4% respectively. Transmission pipeline utilisation for each regulated entity is shown in **Figures 9 - 11** for the year under review. A comparison of pipeline availability and utilisation is shown in **Table 11**.

Table 11: Transmission Pipeline Availability against Capacity Utilisation

S/N	Name	Installed capacity (MMscfd)	Average Availability (%)	Capacity Utilisation (%) for FY 2020/21	Capacity Utilisation (%) for FY 2021/22
1.	TPDC	784	100	12.5	15
2.	SONGAS	105	100	59.73	71
3.	M&P	80	100	3.44	4

Source: TPDC, Sogas and M&P

**Figure 9:** TPDC Pipeline Capacity Utilisation**Figure 10:** Songas Pipeline Capacity Utilisation

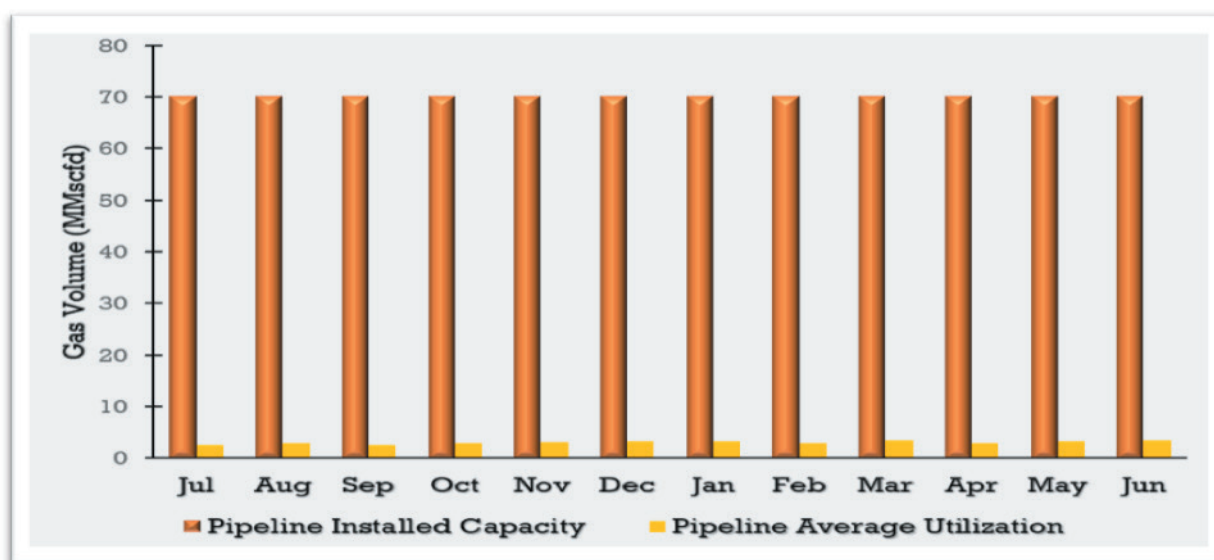


Figure 11: M&P Pipeline Capacity Utilisation

4.2.4. Transmission Pipeline Integrity Management

Transmission pipeline integrity management considered equipment (PSVs and Meters), cathodic protection system, pipeline pigging and way leave management's adherence to a maintenance management plan.

(a) PSV and Meter Device's Integrity

During the period under review, regulated entities performed calibration of PSVs and Meters to ensure their accuracy and proper functioning. Details of the calibration of equipment conducted by each regulated entity are shown in **Table 12**.

Table 12: PSV and Meter Device's Integrity

S/N	Operator	Type of devices	No. of devices available	Planned No. of calibration	No. of device re-calibrated	Calibration in %	Target %
1.	TPDC	PSV	31	31	31	100	100
		Meter	6	6	0	0	100
2	M&P	PSV	N/A	N/A	N/A	N/A	N/A
		Meter	1	1	1	100	100
3	SONGAS	PSV	10	10	10	100	100
		Meter	N/A	N/A	N/A	N/A	N/A

Source: TPDC, Songas and M&P

(b) Pipeline Cathodic Protection

The Authority continued to monitor the performance of regulated entities in ensuring pipeline compliance with corrosion control through cathodic protection. During the period under review, regulated entities ensured corrosion control whereby the electrical potential difference between the pipeline and anodes was within the required range. The distance covered and the number of cathodic protection test points conducted along the existing transmission pipeline are shown in **Table 13** and **Annex 5**.

Table 13: Corrosion Protection System (Cathodic Protection)

S/N	Name	Length of the pipeline (km)	Length of pipeline covered by CP units	Number of CP units (CP systems) on pipeline	Number of test points available	Number of test points conducted	Remarks
1.	TPDC	533.5	533.5	8	504	504	Ok
2.	Songas	232	200	200	200	200	Ok
3.	M&P	27.5	27.5	2	2	2	Ok
	Total	780.5	760.5				

Source: TPDC, Songas and M&P

(c) Pipeline Pigging

During the FY 2021/22, pipeline pigging was carried out for Songas' marine pipeline 25km long from Songosongo to Somanga Fungu to verify its integrity. TPDC and M&P pipelines were not due for pigging. The pipeline length pigged is shown in **Table 14**.

Table 14: Pipeline Pigging

S/N	Name	Length of the pipeline (km)	Date last pigging performed	Length pigged	Remarks
1.	Songas	26	October 2021	26	Ok
2.	TPDC	533	Not due	0.0	Planned in FY 2022/23
3.	M&P	27.5	September 2020	27.5	Form pigging

Source: TPDC and M&P

(d) Transmission Pipeline Wayleave Management

The Authority continued to monitor regulated entities plans for wayleave management including wayleave patrols for tracing encroachments and erosion as shown in **Table 15**. Furthermore, the Authority ensured regulated entities adequately attended erosion-prone areas along the pipelines including the erosion that occurred at Mto Kinyerezi, Mto Ng'ombe (UDSM), Mipeko and Mipele (Mkuranga). **Figure 12** shows a typical example of the restored pipeline after soil erosion at Mto Ng'ombe UDSM. Regulated entities were encouraged to ensure encroached areas are managed by providing awareness and installing marker posts to show demarcation of the wayleave.





Figure 12: Before and after Restoration of Transmission Pipelines at Mto Ng'ombe (UDSM) for TPDC/SONGAS

Table 15: Transmission Pipelines Way Leave Management

S/N	Operator	Length (km)	Number of wayleave patrols performed	Number of interruptions/ erosions affected pipeline	Number of encroachments within the way leave
1.	TPDC	533	6	10	3
2.	SONGAS	220	3	5	3
3.	M&P	27.5	7	3	0
	Total	780.5	16	18	6

Source: TPDC, Songas and M&P

4.3. Natural Gas Distribution Infrastructure

Natural gas distribution infrastructure includes both high and low-pressure distribution pipelines and virtual pipelines (CNG). Currently, there are two (2) operators for natural gas distribution networks namely; PAET and GASCO as well as three (3) operators for CNG operations which are PAET, DANGOTE and ANRIC.

4.3.1. Natural Gas Distribution Performance

In FY 2021/22, EWURA continued to monitor the performance of the natural gas distribution network. Natural gas distribution infrastructures performance was analysed based on pipeline length, number of connected customers, quality of services, natural gas consumptions, wayleaves clearance and pipeline integrity management. The key performance indicators above were evaluated by analysing and verifying information received from regulated entities.

4.3.1.1 Natural Gas Distribution Pipeline Networks

Natural gas distribution pipeline networks have a total length of 201.02km which is an increase of 87.11km from 113.91km reported in the previous year. The increase is due to new connections to power plants, industries, and households. The distribution pipeline networks are shown in **Table 16**.

Table 16: Natural Gas Distribution Pipeline Networks

Table 10: Natural Gas Distribution Pipeline Networks						
S/N	Distribution Network		Length (km)	PRS Capacity (MMscfd)	Location	Facility Operator
1.	Kinyerezi I connection		1.1	70	Dar es Salaam	TPDC
2.	Kinyerezi II connection		1.4	48	Dar es Salaam	
3.	Tegeta 45 connection		4.7	24	Dar es Salaam	
4.	BVS- 15 PRS		89.27	15	Dar es Salaam	
5.	BVS-1 PRS		1.4	55	Mtwara	
6.	GRF - PRS		25.3	10	Mtwara	
7.	Mkiu – Mkuranga PRS		1.7	15	Coast Region	
8.	Mwanambaya – PRS		5.95	10	Coast Region	
9.	Lindi-PRS		18.4	0	Lindi	
10.	Dar Es Salaam Ring main	Ubungo PRS – Buguruni–Kurasini	53	10.5	Dar es Salaam	PAET
		Gongo la mboto PRS – Buguruni		10.5		
		Wazo Hili PRS – Wazo Hill factory		16		
		Ubungo III		86		
	Total		200.52			

Source: PAET& TPDC

4.3.1.2 New Connections to Natural Gas Supply

In the year ended 30th June 2022, new 970 households in Dar es Salaam and four (4) industries were connected to gas supply, out of which three (3) were located in Dar es Salaam and one (1) in Mkuranga District. This makes a total of 1,407 households and 52 industries compared to last year when 437 households and 48 industries were connected to the gas supply. **Annex 6** – shows different categories of customers connected with natural gas supply.

4.3.1.3 Natural Gas Consumption

During the period under review, natural gas consumed was 72,533.56 MMscf compared to 60,619.12MMscf in the previous year, which is equivalent to a 20% increase in consumption.

4.3.1.4 Distribution Pipeline Wayleave Management

During the period under review, the Authority carried out compliance monitoring to ensure risks associated with natural gas pipelines in the wayleaves are minimized to protect public safety and properties. To ensure such risks are mitigated, the Authority coordinated and facilitated the development of a Memorandum of Understanding (MoU) and Guidelines for the Protection of Underground Infrastructures in the Shared Wayleave. Furthermore, regulated entities conducted wayleave patrols to control human activities on the pipeline wayleave. **Table 17** shows the Distribution of Pipeline wayleave Management conducted during the reviewed period.

Table 17: Distribution Pipeline Wayleave Management

S/N	Name of operator	Length (km)	Number of way leave patrols performed	Number of interruptions erosion-affected pipeline	Number of encroachments within the way leave
1	TPDC	254	4	0	0
2	PAET	53	360	0	4
	Total	307	364	0	4

Source: TPDC & PAET

4.3.1.5 Distribution Infrastructure Integrity Management

The integrity of the distribution network was monitored by ensuring regulated entities conducted calibration of PSVs, meters, pipeline and gas leakage surveys. In FY 2021/22, the integrity of the distribution infrastructure was maintained by regulatory requirements and standard operating procedures. Regulated entities complied with regulatory requirements as shown in **Table 18** and **Table 22**

Table 18: Calibration of PSV and Meter

S/N	Operator	Type of devices	No. of devices available	No. of devices planned due to calibration/ verification	No. of device re-calibrated / verification	Calibration /Verification in %	Target %	Remarks
1.	TPDC	PSV	35	0	Not due	N/A	N/A	Due for calibration in FY 2023/24
		Meter Industries -	8	8	8	100	100	Verified
		Meter household -	1407	1407	1407	100	100	Verified
2.	PAET	PSV	5	5	5	100	100	
		Meter	54	51	51	100	100%	Three new meters verified

Source: PAET& TPDC

4.3.1.6 Compressed Natural Gas Facilities

In the year ended 2021/22, the Authority continued to monitor the performance of Compressed Natural Gas facilities. CNG facilities operated during the period under review were as follows: -

- CNG mother station owned by PAET supplying CNG to Serena Hotel, Mikoani Edible Oil and Anric CNG filling station using CNG trailers;
- CNG filling station located at Ubungu for fuelling CNG-Vehicles owned by PAET;
- CNG filling station located at Tazara, Dar es Salaam owned by Anric Gas Company Limited;
- CNG mother and CNG filling station located in Mtwara for own use by DANGOTE.

The integrity of CNG facilities was maintained by regulatory requirements and standard operating procedures as shown in **Annex 12**.

4.3.1.7 Compressed Natural Gas Production

Compressed natural gas produced by mother stations during the FY 2021/22 increased by 60% to 3,754,493.3kg from 1,511,347.85kg recorded in the previous year. **Figure 13** shows the trend of compressed natural gas production in FY 2021/22. The graph shows a gradual increase in CNG production under reviewed period due to the coming into operation of the Dangote CNG Filling Station and the increase of CNG-Vehicles filled with natural gas as shown in **Table 19**.

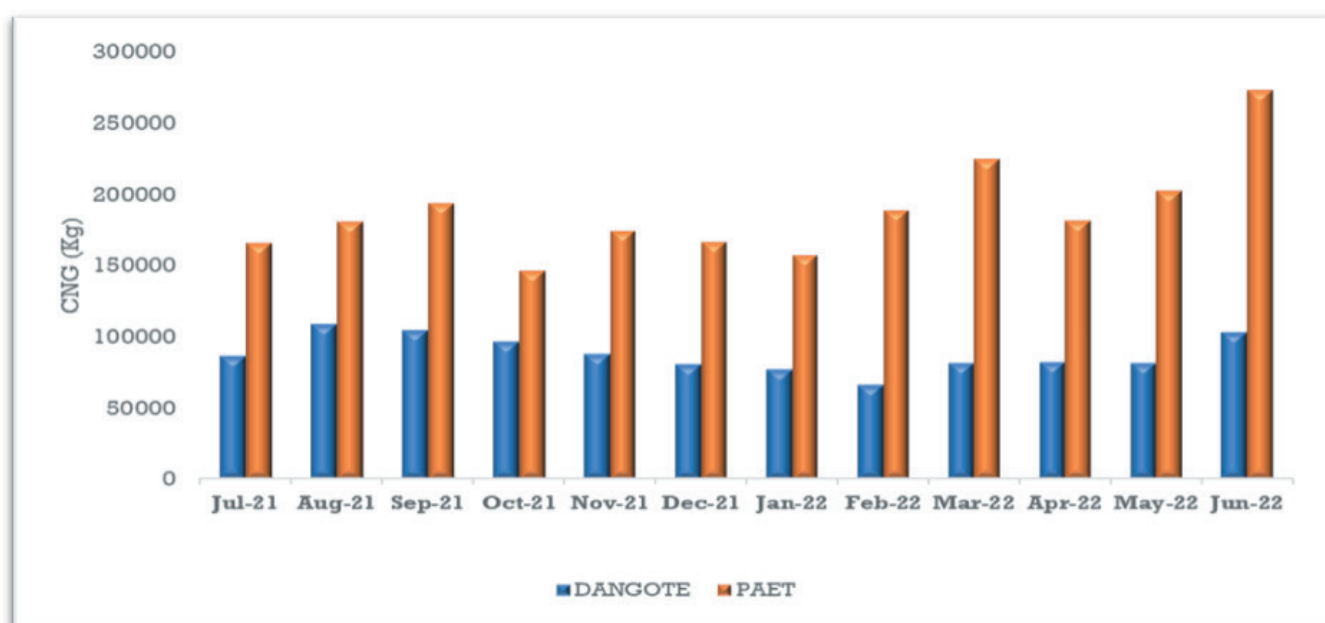


Figure 13: Monthly CNG production

4.3.1.8 Compressed Natural Gas Vehicles

During the period under review, the Authority analysed the trend of fuelling at CNG filling stations and noted an increase in the fuelling of CNG-V from 54,750 to 73,659 which is equivalent to an increase of 25% as shown in **Table 19**. This was due to increased awareness of the benefits of using natural gas over petrol and diesel fuels.

Table 19: Trend of Fuelling at CNG Filling Station

OPERATOR	Filled CNG-Vehicles FY 2020/21	Filled CNG-Vehicles FY 2021/22
PAET	54750	64458
DANGOTE	0	8271
ANRIC	0	930
TOTAL	54750	73659

Source: PAET, DANGOTE and ANRIC

4.3.1.9 Vehicles Conversion Workshops

During the year under review, 1,139 vehicles were converted by four (4) CNG-V conversion workshops as follows; Anric (120), BQ (132), Dangote (259) and DIT (628). The Government continued to raise awareness of the use of CNG as an alternative fuel. The Authority organized and coordinated CNG stakeholders meetings involving among others TBS and CRB who are responsible for regulating CNG-V activities particularly; the development of standards and registration of CNG-V conversion workshops.

4.3.1.9.1 CNG system fuel Inspector/Certifiers

The Authority continued to monitor compliance to approved TBS standards by CNG Fuel System Inspector/Certifier (CNG-FSI/C) in inspecting and certifying CNG V. Respective CNG – FSI/C have an obligation to submit to the Authority a list of all certified CNG V. In the FY 2021/22, there was an increase of CNG-FSI/C from three (3) to seven (7) as shown in **Table 20**.

Table 20: List of CNG-FSI

S/N	CNG-FSI/C	Certification No	Location	Contact
1	Dr. Rajab Hassan	U10343A	DSM	hmrajabu@gmail.com
2	Godwin Kulinga	U11771A	Arusha	godwinnkulinga@gmail.com
3	Paul Makoye	U11646A	Arusha	makoyepaul2000@gmail.com
4	Baraka Majengo	U11067A	DSM	barakagimajengo@gmail.com
5	Samson M Saidow	U11076A	Arusha	samsonsaidow@gmail.com
6	John Msyani	U12155A	DSM	johnenock95@gmail.com
7	Brayson Lema	U12141A	DSM	brysn.lema47@gmail.com

Source: CSA GROUP (<https://www.csagroup.org>)

4.3.1.10 Natural Gas Quality of Service

The Authority continued to monitor the quality of services delivered by regulated entities to customers during the period under review. Overall, regulated entities complied with quality-of-service standards in the delivery of natural gas to customers with exception of some anomalies. The anomalies include fluctuation of power supply which affected the continuous supply of CNG at PAET mother station and difficulties in buying a token for recharging natural gas meters for domestic customers. TPDC engaged eGA to create an online electronic recharging system for domestic customers. PAET is underway to procure a natural gas-powered generator to resolve power fluctuation challenges at CNG facilities.

4.4. Health, Safety and Environment

The Authority monitored regulated entities compliance with Health, Safety and Environmental (HSE) requirements. HSE indicators that were monitored include near misses, incidents, accidents, lost time injury, hydrocarbon spillage effluents discharge to water bodies and the amount of flared gas to the environment. During the FY2021/22, no significant HSE issues were reported by regulated entities.

4.4.1. Near Miss, Incidents, Accidents and Lost Time Injury

Analysis of the HSE performance of regulated entities during FY 2021/22 indicates that there were no fatalities and lost workday cases that resulted in Lost Time Injury (LTI). TPDC Songosongo gas processing plant reported the occurrence of one (1) injury and M&P natural gas facilities reported the occurrence of five (5) injuries in the FY 2021/22. HSE performance of regulated entities in FY 2021/22 improved compared to the previous year as shown in **Table 21**.

Table 21: Number of Near Miss, Incidents, Accidents and Lost Time Injury

Facility	Number of near misses, incidents, accidents and lost time injury					
	Near miss	Incidents	Accidents	Lost Time Injury	Injuries Occurred	Target Set
Gas Plants						
TPDC - Madimba	6	12	4	0	0	0
TPDC – Songosongo	16	19	0	0	1	0
SONGAS	4	7	0	0	0	0
M&P	6	3	0	0	5	0
Transmission Pipelines						
TPDC	17	0	0	0	0	0
SONGAS	0	0	0	0	0	0
M&P	0	0	0	0	0	0
Distribution Pipelines						
TPDC	6	0	0	0	0	0
PAET	0	0	0	0	0	0
Filling Station						
PAET	0	0	0	0	0	0
Anric CNG	7	0	0	0	0	0
Dangote CNG	0	1	0	0	0	0
Total FY 2021/22	62	42	4	0	1	0
Total FY 2020/21	52	37	12	0	1	0

Source: M&P, SONGAS, PAET & TPDC

4.4.2. Emergency Response Plan Performance

During the reporting period, the Authority monitored the implementation of emergency response plans of the regulated entities. The emergency response plan contains contact person, evacuation procedures, how to act during an emergency, risk mitigation, communication flow and procedures during and after emergency occurrences. Overall, there was an improvement in performance by regulated entities from the previous financial year. Regulated entities executed their respective emergency response plans as shown in **Table 22**.

Table 22: Emergency Response Plan Performance

Facility	Emergency Response Plan Performance						
	Planned HSE Drills	Performed HSE Drills	Performed within a set time	Performance against Plan in (%)	Response Rate (%)	The target set in (%)	Actual accident occurred
Gas Plant							
TPDC-M	4	5	5	125	100	100	0
TPDC -S	4	5	4	100	100	100	0
SONGAS	12	7	7	58	100	100	0
M&P	25	25	25	100	100	100	0
Transmission Pipelines							
TPDC	4	4	4	100	100	100	0
SONGAS	2	2	2	100	100	100	0
M&P	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Distribution Pipelines							
TPDC	4	4	4	100	10	100	0
PAET	2	0	0	0	0	0	0
Filling Station							
PAET	1	1	1	100	100	100	0
Anric CNG	4	4	4	100	100	100	0
Dangote CNG	2	2	1	100	97.5	100	0
Total/Average FY 2021/22	64	59	57	92	97	100	0
Total/Average FY 2020/21	109	98	96	90	98	100	0

Source: M&P, SONGAS, PAET & TPDC

4.4.3. Environment Performance Indicators

The Authority continued to monitor the level of compliance of regulated entities operations concerning hydrocarbon spillage, effluents discharge to water bodies and the amount of flared gas to the environment as shown in **Table 23**. Also, the Authority monitored the performance of regulated entities against gas leak survey plans. During the FY 2021/22, natural gas facilities complied with monitored parameters as shown in **Table 24**.

Table 23: Environment Performance Indicators

Environmental Parameters	Standard (UNEP technical publication)	TPDC MADIMBA	TPDC SONGOSONGO	SONGAS	M&P
Hydrocarbon spills into the environment (g/kg)	100g/kg	0	0	0	0
Effluents discharge to water bodies (mg/L)	40mg/L	0	4.5	2	0
Flared Gas (MMscf)		8.779	10.62	39.9	0.44

Source: M&P, Songas, PAET & TPDC

Table 24: Natural Gas Leak Monitoring

Facility	Natural Gas Leak Performance Monitoring				
	No. of gas leaks survey planned	No. of gas leaks survey conducted	No. of significant gas leaks occurred	No. of an unplanned gas release	Number of Planned gas release
Gas Plants					
TPDC – M	48	48	0	0	0
TPDC – S	365	365	0	0	0
SONGAS	365	365	0	1	1
M&P	48	48	0	2	1
Transmission Pipelines					
TPDC-BVS	24	24	0	0	0
TPDC-GRFs	365	365	0	0	0
SONGAS	4	4	0	0	0
M&P	48	48	0	0	0
Distribution Pipelines					
TPDC - PRS	48	48	3	0	4
PAET	365	365	0	0	0
CNG Filling Station					
PAET	52	52	0	0	0
Anric Gas	365	365	7	2	0
Dangote CNG	24	24	0	0	12

Source: M&P, SONGAS, PAET & TPDC

5. LOCAL CONTENT

In the year ended 30th June 2022, the Authority continued to monitor compliance with Local content requirements by regulated entities in the mid and downstream natural gas sub-sector. The performance of regulated entities was based on their compliance with the Petroleum (Local Content) Regulations 2017.

5.1. Local Content Performance

Local content performance by regulated entities considered the number of local employees, local staff trained, local financial services, and local insurance policies utilized and procurements awarded. The Authority evaluated the performance of TPDC, PAET, Songas, M&P, Anric Gas and Dangote to local content requirements. Overall, regulated entities complied with local content requirements as shown in **Annex 11**.

5.2. Local Suppliers and Service Providers Database

During the period under review, the number of local business entities registered in the LSSP Database by the Authority increased by 46% from 737 in FY 2020/21 to 1357. This is due to increased awareness and participation of local companies in oil and gas projects such as the EACOP project. To fasten the registration process for local business entities, the Authority established an online registration platform known as Common Qualification System (CQS).

6. FINANCIAL PERFORMANCE

This section highlights the financial performance of four (4) natural gas-regulated entities during the FY 2021/22 in comparison with the previous year. Financial performance was assessed based on revenue generation and costs incurred in natural gas processing, transmission and distribution. The Authority evaluated the financial performance of Pan African Energy Tanzania Limited (PAET), Tanzania Petroleum Development Corporation (TPDC), Maurel Prom (M&P) and Songas Limited

6.1. Revenue Generation

During the period under review, total revenue generated from the sale of natural gas increased by 8% from TZS 961 billion recorded in FY 2020/21 to TZS 1,042 billion in FY 2021/22. The revenue for both entities increased whereby, Songas increased by 21%, M&P by 18%, PAET by 9% and TPDC by 4%. **Figure 14** shows revenue generation by companies for three financial years.

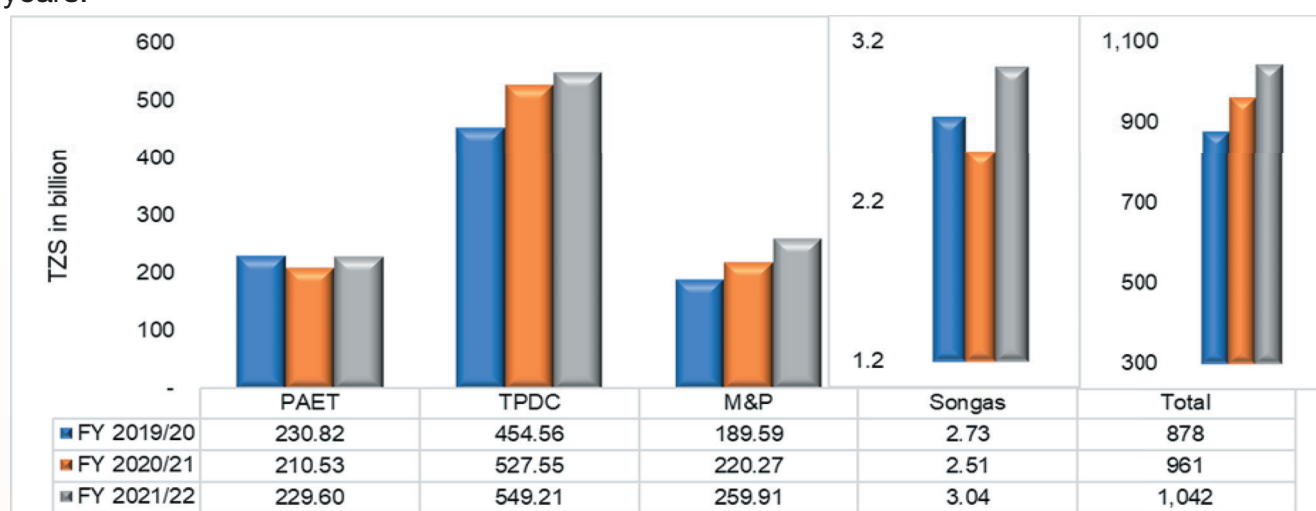


Figure 14: Revenue Generation

The increase in revenue generation was attributed to the new gas-fired power plant (Ubungo III) and the increased use of natural gas for gas-fired power plants to offset hydropower plants due to inadequate rainfalls.

6.2. The Natural Gas Operation Costs

In FY 2021/22, the overall costs of processing, transmission and distribution of natural gas increased by 6% from TZS 165 billion recorded in FY 2020/21 to TZS 175 billion in FY 2021/22. During the year under review, overall costs for TPDC increased by 3%, M&P by 18% and Songas Limited by 5% due to various reasons such as increased natural gas production, high maintenance costs caused by inflation of price and capital-intensive activities like pigging and engine overhaul. Operation cost for PAET decreased by 0.2% due to fewer maintenance activities carried out during the year under review. **Figure 15** shows the total costs of natural gas processing, transmission and distribution for three years period from FY 2019/20 to FY 2021/22.

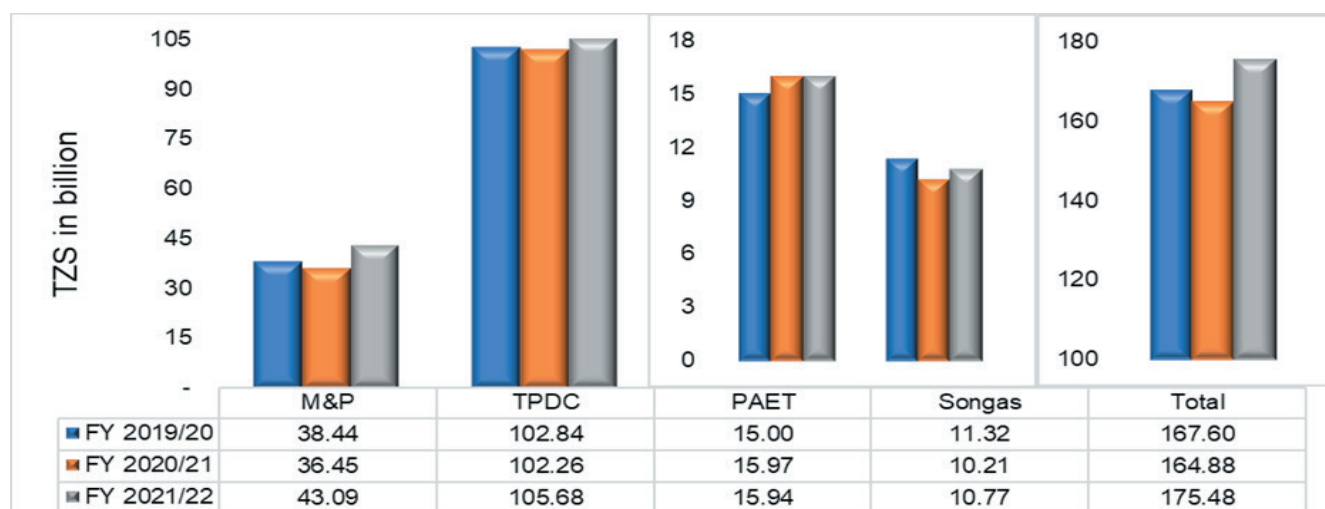


Figure 15: Total Natural Gas Operation Costs

6.2.1. Processing Costs

During FY 2021/22, total costs for natural gas processing increased by 11% from TZS 81 billion in FY 2020/21 to TZS 90 billion. In general, processing costs increased due to increased natural gas production and consumption. **Figure 16** shows the trend of natural gas processing costs for three years from FY 2019/20 to FY 2021/22 and **Table 25** shows costs incurred in natural gas processing in FY 2021/22.

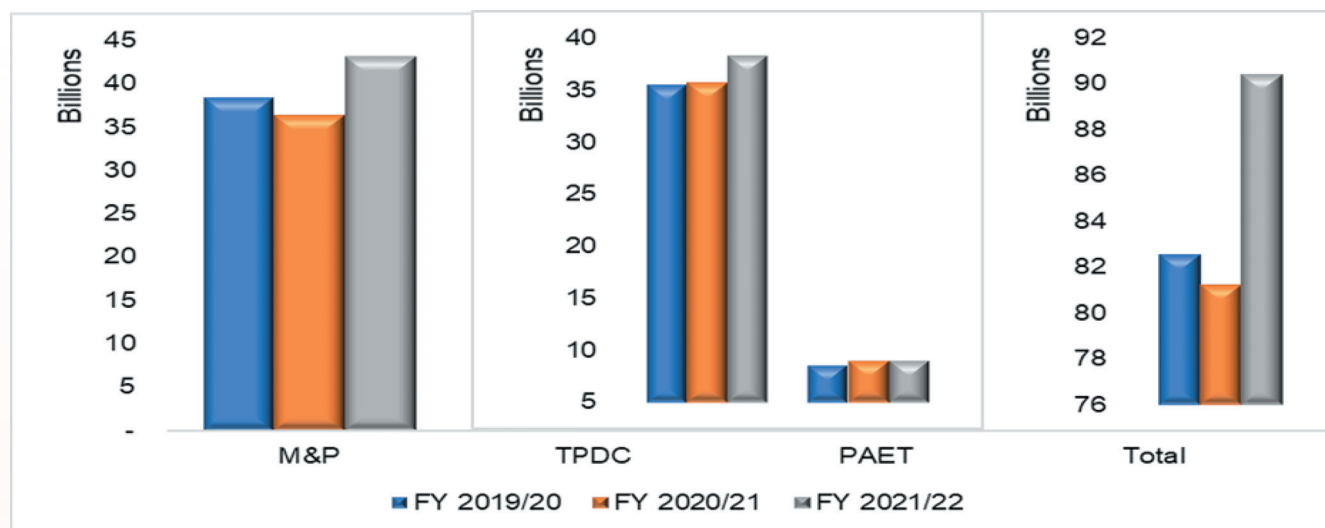


Figure 16: Processing Cost of M&P, TPDC and PAET

Table 25: Processing Costs (TZS in billion).

Description	TPDC	PAET	M&P	Total FY 2021/22
Salaries and Other Staff Cost	3.01	3.85	11.83	18.69
Repair and Maintenance	12.78	1.15	2.72	16.65
Depreciation Cost	21.04	0.01	4.91	25.96
Other O&M Costs	1.33	4.10	23.63	29.06
Total	38.15	9.11	43.09	90.36

*Other O&M costs include all costs apart from those mentioned in the above table

Based on the analysis made, the major cost item in natural gas processing for TPDC was depreciation while PAET and M&P's major cost items in natural gas processing were Other O&M. **Figure 17** shows the processing costs structure of TPDC, PAET and M&P in FY 2021/22.

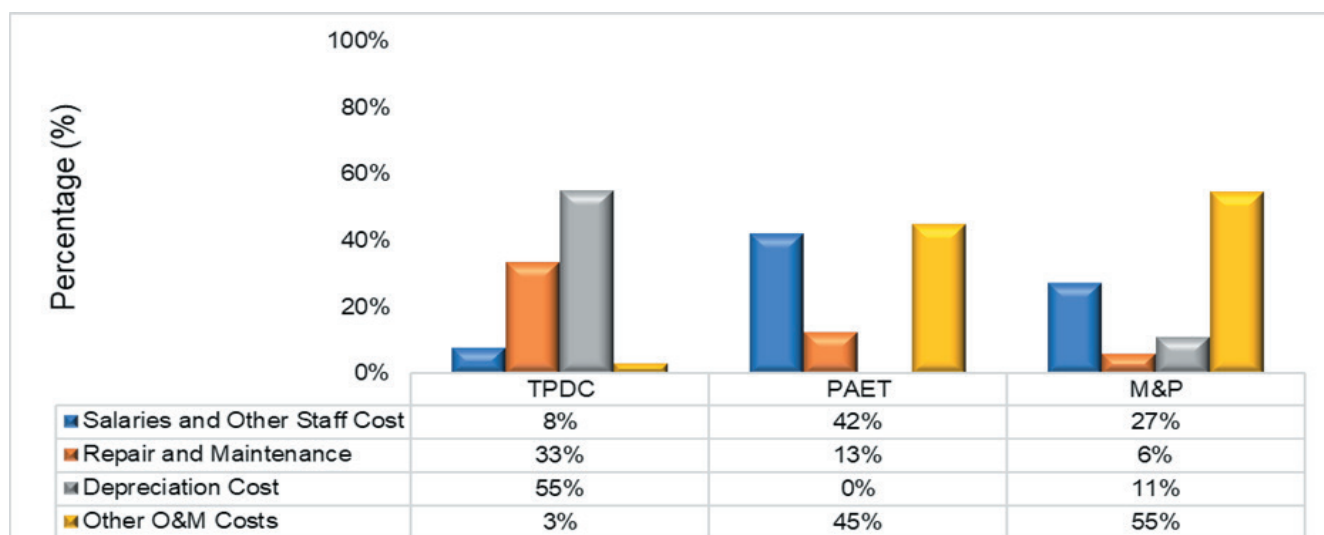


Figure 17: Processing Cost Structure of TPDC, PAET and M&P in FY 2021/22

6.2.2. TPDC Processing Costs

During the year under review, natural gas processing costs for TPDC increased by 7% from TZS 35.6 billion in FY 2020/21 to TZS 38.2 billion in FY 2021/22. The major cost item was depreciation, which was 55% of total natural gas processing costs. **Figure 18** shows TPDC's processing cost structure by percentage for three years.

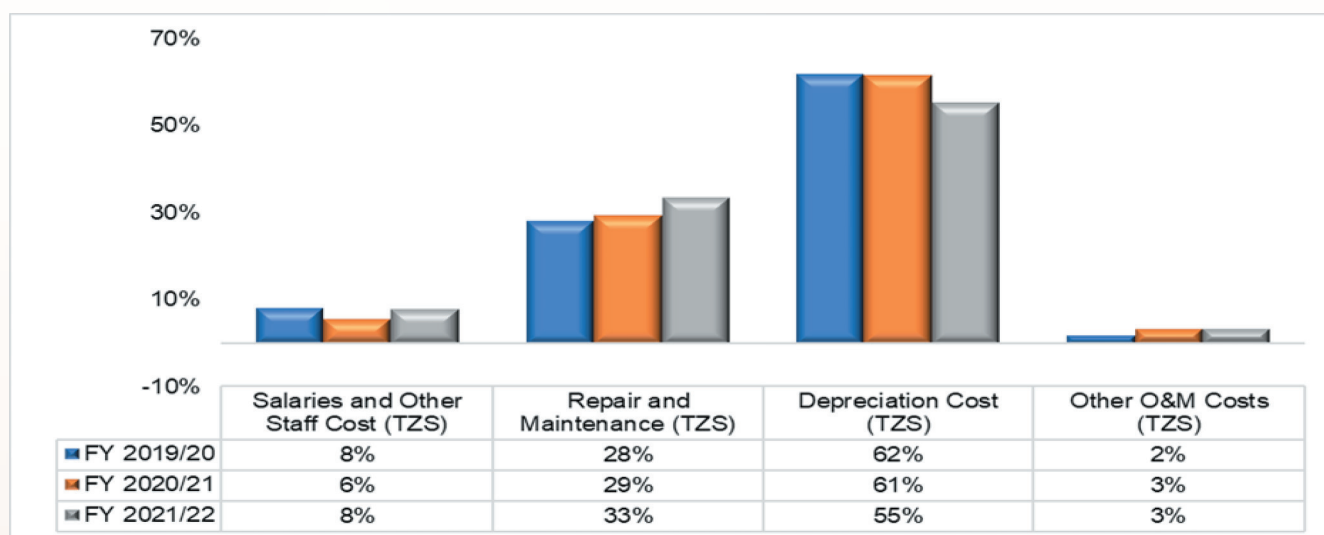


Figure 18: TPDC's Processing Cost Structure by Percentage

6.2.3. PAET Processing Costs

During the year under review, natural gas processing cost for PAET decreased by 0.1% from TZS 9.12 billion in FY 2020/21 to TZS 9.11 billion in FY 2021/22. The major cost item was another O&M, which was 45% of total natural gas processing costs. **Figure 19** shows PAET's processing costs structure by percentage for three years.

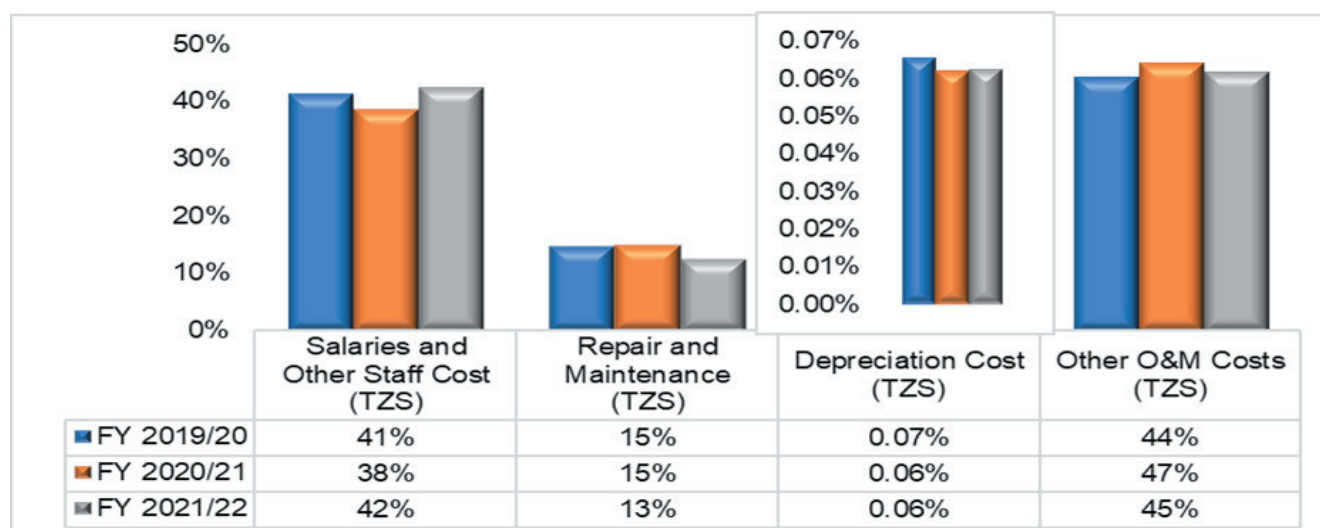


Figure 19: PAET's Processing Cost Structure by Percentage

6.2.4. M&P Processing Costs

During the period under review, natural gas processing costs for M&P increased by 18% from TZS 36.4 billion in FY 2020/21 to TZS 43.1 billion in FY 2021/22. The major cost item was Other O&M, which was 55% of total natural gas processing costs. This was due to the non-separation of cost segments such as transmission and processing costs. **Figure 20** shows M&P's processing costs structure by percentage for three years.

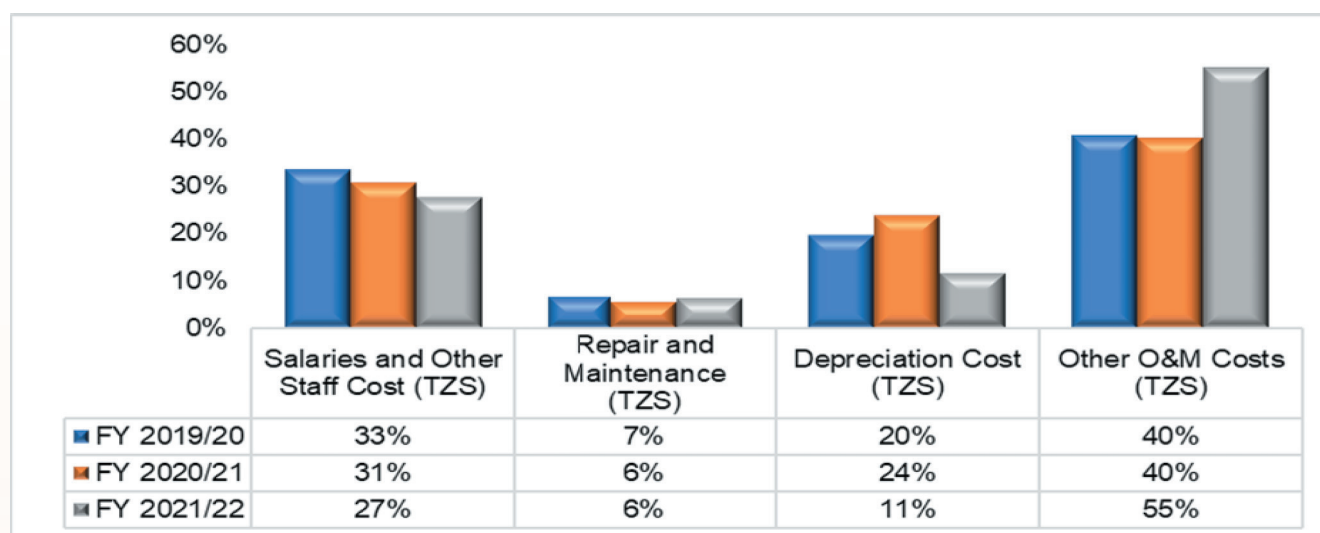


Figure 20: M&Ps' Processing Cost Structure by Percentage

6.3. Transmission Costs

During FY 2021/22, natural gas transmission costs increased by 2% from TZS 75.0 billion recorded in FY 2020/21 to TZS 76.3 billion. Generally, the increase was due to pigging activities, erosion control and repair & maintenance of pipelines. This amount excludes costs for M&P since the company has not separated its transmission cost from the processing costs. **Table 26** shows the total transmission costs incurred in FY 2021/22 and **Figure 21** shows transmission costs for three years from FY 2019/20 to FY 2021/22.

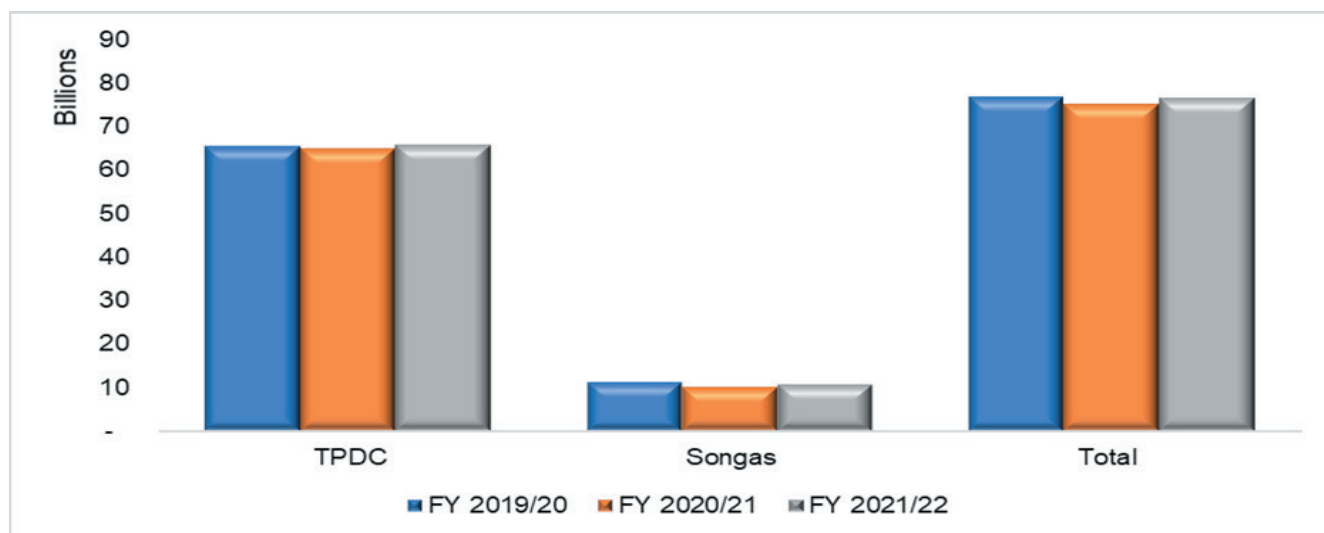


Figure 21: Transmission Cost of TPDC and Songas

Table 26: Transmission Costs (TZS in billion).

Description	TPDC	Songas	Total FY 2021/22
Salaries & related Staff Cost	1.94	0.22	2.16
Repair and Maintenance	6.56	1.48	8.04
Depreciation Cost	57.02	9.06	66.08
Other O&M Costs	-	-	-
Total	65.51	10.77	76.28

6.3.1. TPDC Transmission Costs

During the year under review, natural gas transmission cost for TPDC increased by 1% from TZS 64.8 billion in FY 2020/21 to TZS 65.5 billion in FY 2021/22. The increase was due to high costs incurred for erosion control, repair and maintenance of the pipeline during the period under review. **Figure 22** shows the trend of TPDC's natural gas transmission costs for three years.

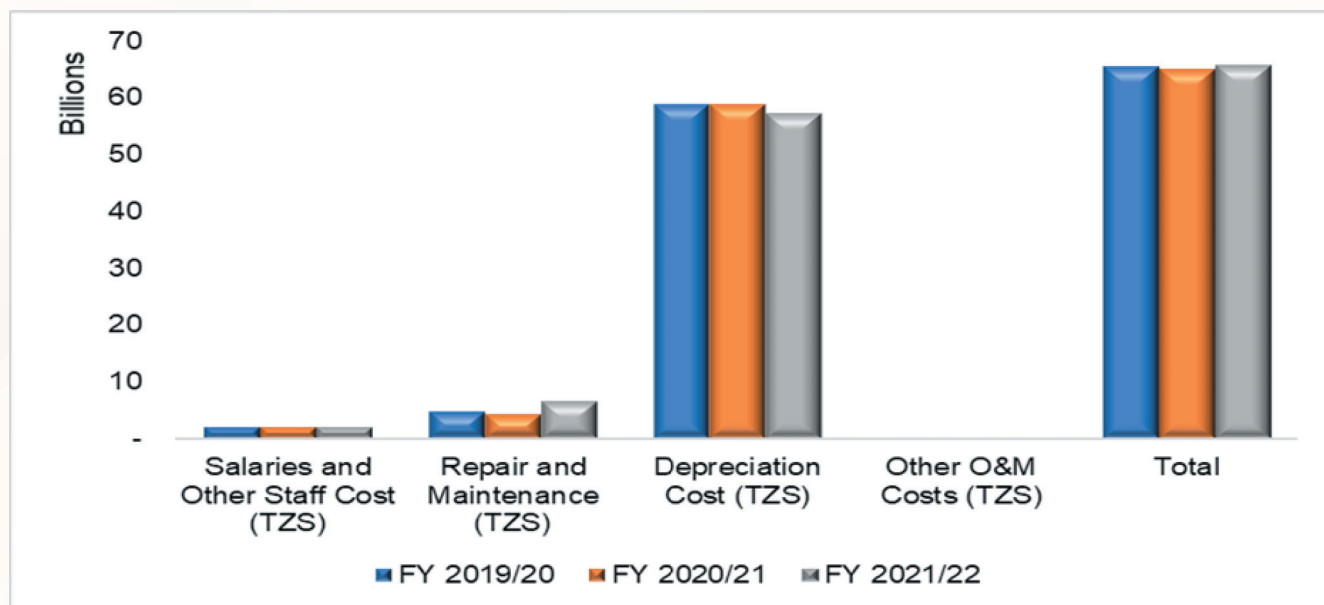


Figure 22: TPDCs' Transmission Costs

6.3.2. Songas Transmission Costs

In FY 2021/22, natural gas transmission costs for Songas increased by 5% from TZS 10.2 billion in FY 2020/21 to TZS 10.8 billion in FY 2021/22. The increase was due to the cost incurred for pigging activity conducted in FY 2021/22. **Figure 23** shows the trend of Songas' natural gas transmission costs for three years.

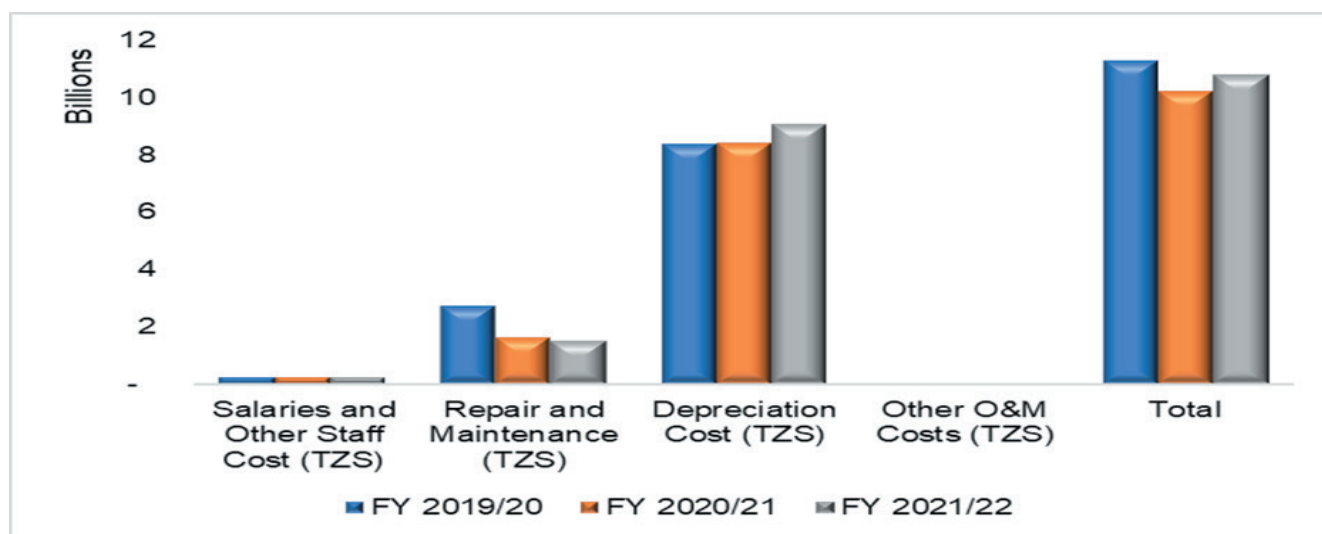


Figure 23: Songas' Transmission Cost

6.4. Distribution Costs

During FY 2021/22, total natural gas distribution costs increased by 2.4% from TZS 8.6 billion in FY 2020/21 to TZS 8.9 billion. **Figure 24** shows the trend of distribution costs for three years from FY 2019/20 to FY 2021/22.

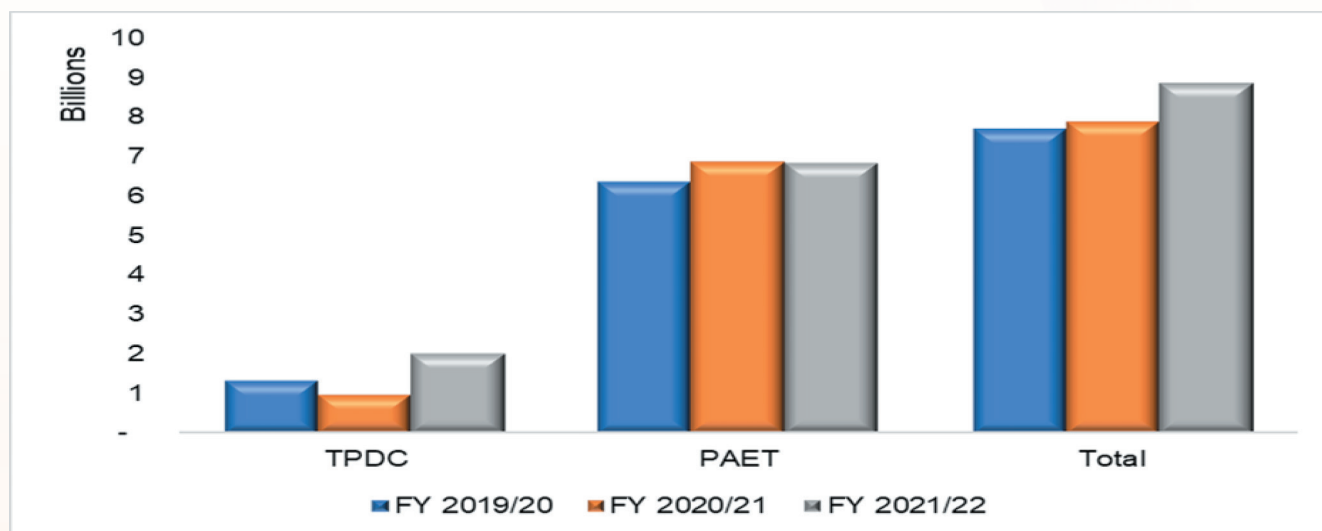


Figure 24: Total Distribution Costs of TPDC and PAET

The increase in natural gas distribution costs was due to the construction of new distribution lines connecting 970 households' customers. **Table 27** shows total distribution costs incurred in FY 2021/22.

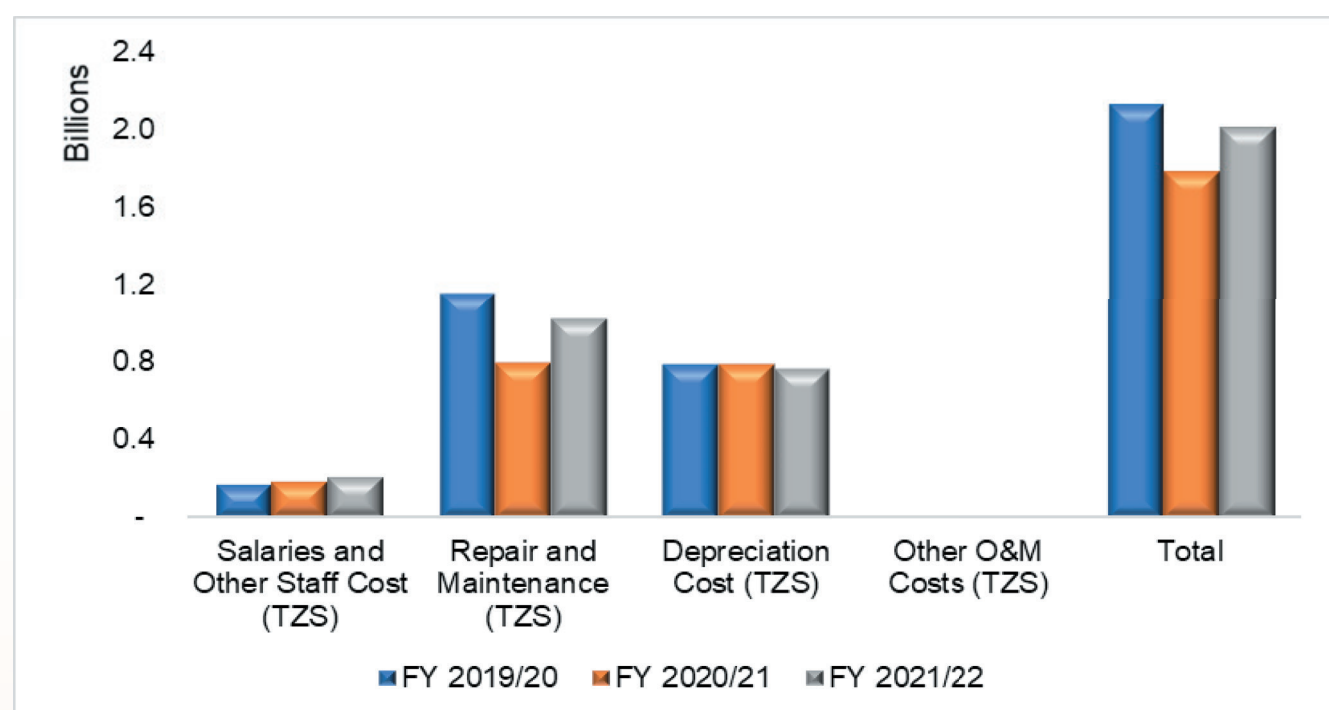
Table 27: Distribution Costs (TZS in billion).

Description	TPDC	PAET	Total FY 2021/22
Salaries and Other Staff Cost	0.21	1.31	1.52
Repair and Maintenance	1.03	0.27	1.30
Depreciation Cost	0.77	1.56	2.33
Other O&M Costs	-	3.70	3.70
Total	2.02	6.84	8.85

*Other O&M costs include all costs apart from those mentioned in the above table

6.4.1. TPDC Distribution Costs

During the year under review, natural gas distribution cost for TPDC increased by 12% from TZS 1.8 billion in FY 2020/21 to TZS 2.0 billion in FY 2021/22. **Figure 25** shows the trend of TPDC's distribution costs for three years.

**Figure 25:** TPDCs' Distribution Costs

6.4.2. PAET Distribution Costs

During the period under review, natural gas distribution cost for PAET decreased by 0.2% from TZS 6.85 billion in FY 2020/21 to TZS 6.84 billion in FY 2021/22 due to fewer unplanned maintenance activities. **Figure 26** shows the trend of PPAET's distribution costs for three years.

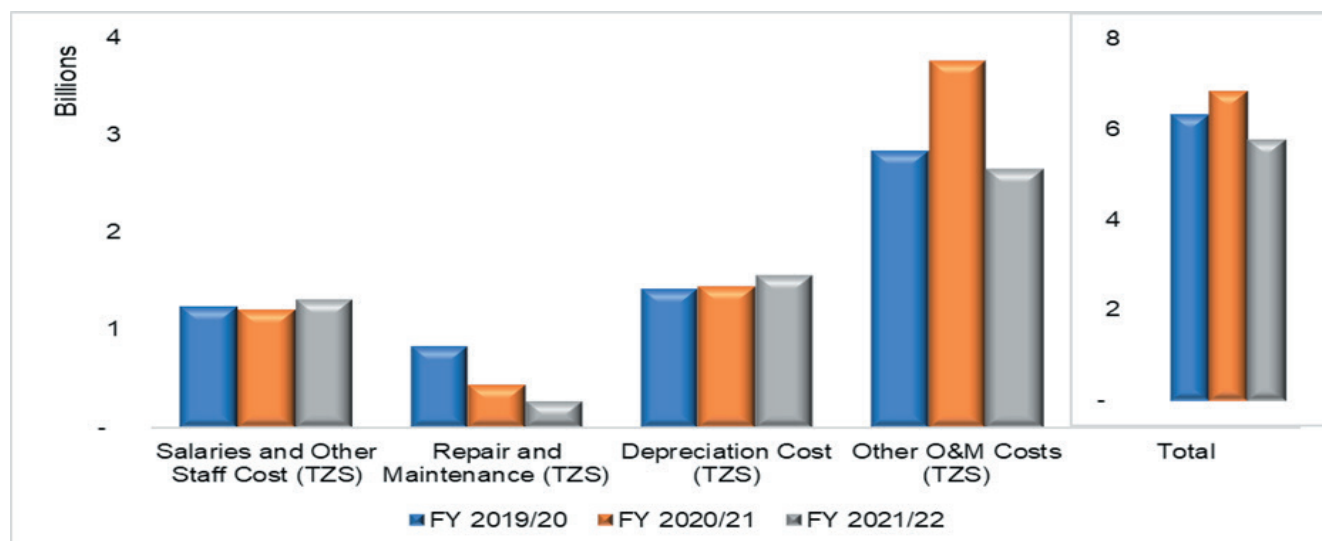


Figure 26: PAET's Distribution Costs

6.5. Ratio Analysis

A financial ratio analysis was done to assess the overall financial performance of regulated utilities. Financial performance analysis of regulated entities considered current ratio, net profit margin and return on assets.

6.5.1. Current Ratio

During the period under review, PAET recorded a current ratio of less than 1:1 implying that it was not in a good position to meet short-term obligations. Current ratios for TPDC, M&P and Songas were 1:1.2, 1:1.1 and 1:1.6, respectively, which indicate a good position to pay short-term obligations as well as good Utilisation of current assets in working capital management. **Figure 27** shows the current ratios for three financial years.

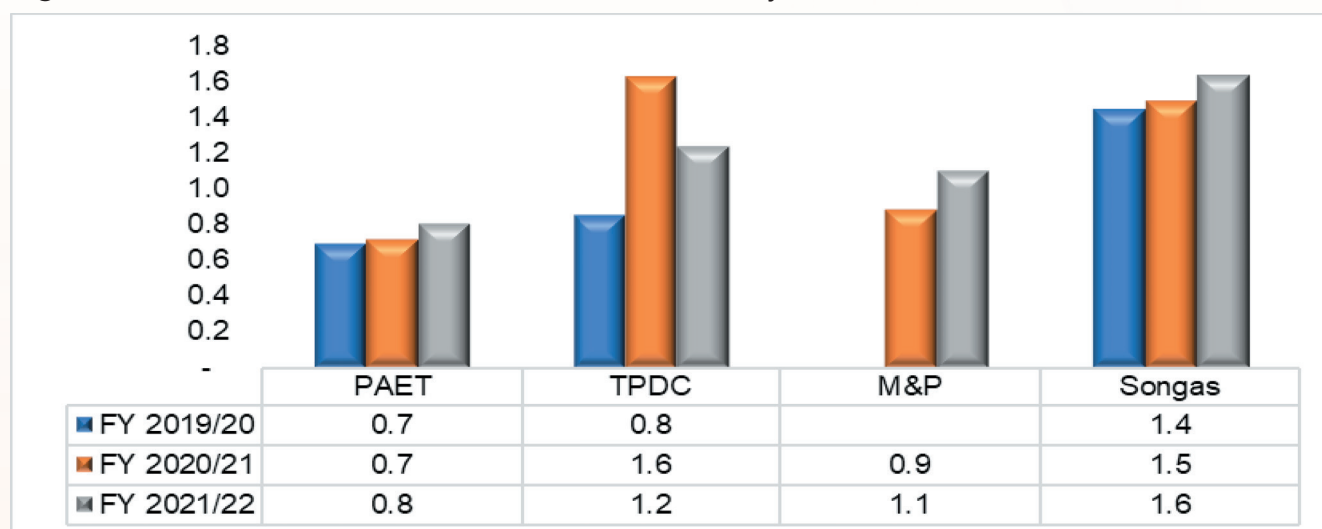


Figure 27: Current Ratios

6.5.2. Net Profit Margin

During the year under review, PAET attained a good margin of 29%, M&P a margin of 54% and Songas realized an average margin of 13% and TPDC achieved a net profit margin of 8%.

A 10% net profit is considered an average, a 20% margin is good and a 5% margin is low. **Figure 28** shows the trend of the net profit margin of regulated entities for three years.

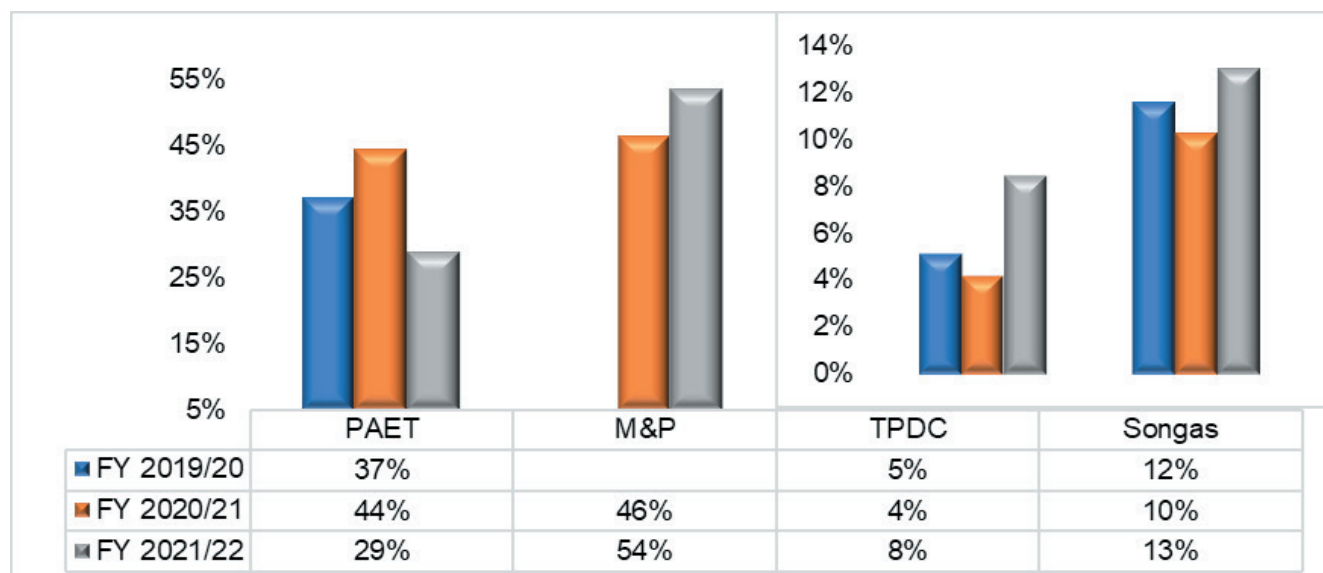


Figure 28: Net Profit Margin

6.5.3. Return on Assets

During the year under review, the return on assets attained by PAET, Songas and M&P were 14.6%, 11.6%, and 15.6%, respectively, whilst TPDC recorded a return on assets of 2.5%. The return on assets for Songas, M&P and TPDC increased by 2.7%, 2.6% and 1.89%, respectively, whilst that of PAET decreased by 8.9%. **Figure 29** shows the three-year trend of return on assets.

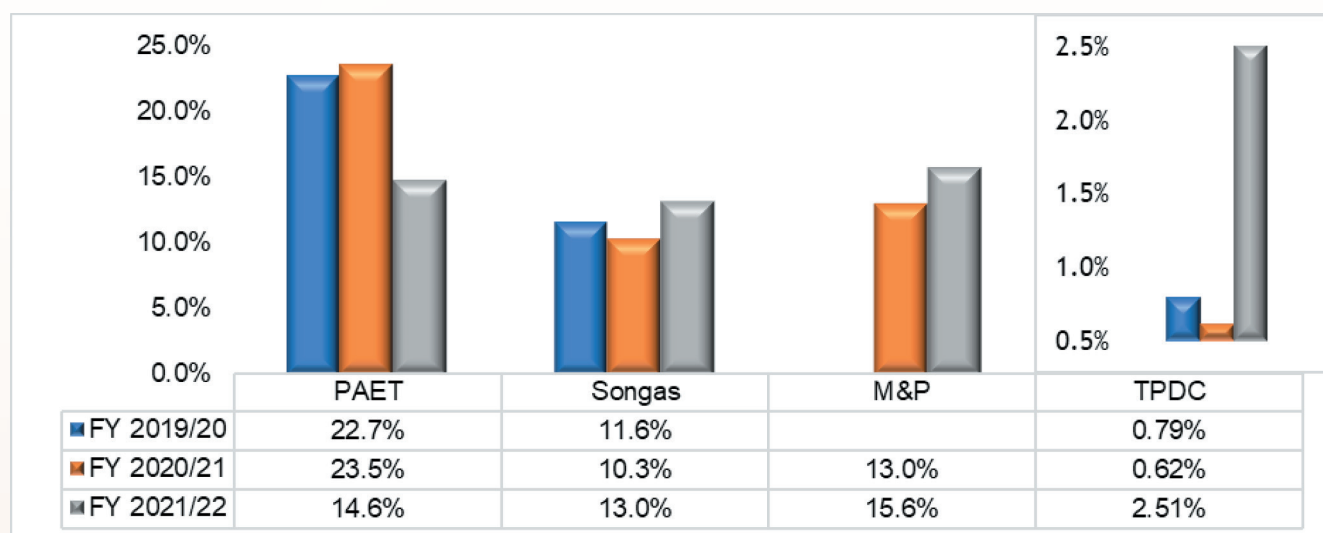


Figure 29: Return on Assets

7. NATURAL GAS SUPPLY AND DEMAND BALANCE

The natural gas market in Tanzania expanded in FY 2021/22 as compared to the previous year due to an increase in consumption of natural gas as a result of new customer connections and increased demand for power generation, industries, residential and CNG-Vehicles as shown in **Table 28**. The significant increase in household connections was due to the implementation of several natural gas distribution projects in the Dar es Salaam and Mtwara regions.

Table 28: Natural Gas Customer Categories

FY	Power Plants	Industries	Households	Commercial	Institution	CNG Filling Stations
2020/21	9	48	437	1	8	1
2021/22	11	52	1407	1	8	3

Natural gas demand is expected to increase due to the implementation of various projects for industrial heating, commercial, institutional, household cooking and CNG vehicles Mtwara, Lindi, Coast and Dar es Salaam regions.

7.1. Natural Gas Supply

The total natural gas consumed during FY 2021/22 was 72,533.56MMscf compared with 60,619.12MMscf in 2020/21, which is equivalent to an increase of 20%. This increment was due to an increase in natural gas consumption in power generation, industries, CNG vehicles, commercial, institutions and households as shown in **Figure 27** and illustrated in **Table 29**.

Table 29: Comparison of Natural Gas Exported for the FY 2020/21 and FY 2021/22

S/N	Processing Plant	Processed Gas (MMscf)		Increment (%) from FY 2020/21 to 2021/22
		2020/21	2021/22	
1.	TPDC Madimba	26,919.2	30,798.15	6.4%
2.	TPDC Songo Songo	8,842.1	12,249.00	5.6%
3.	Songas	23,978.4	28,440.94	7.4%
4.	Maurel Prom (M&P)	879.5	1,045.48	0.3%
	Total	60,619.12	72,533.56	19.7%

Source: TPDC, Songas & M&P

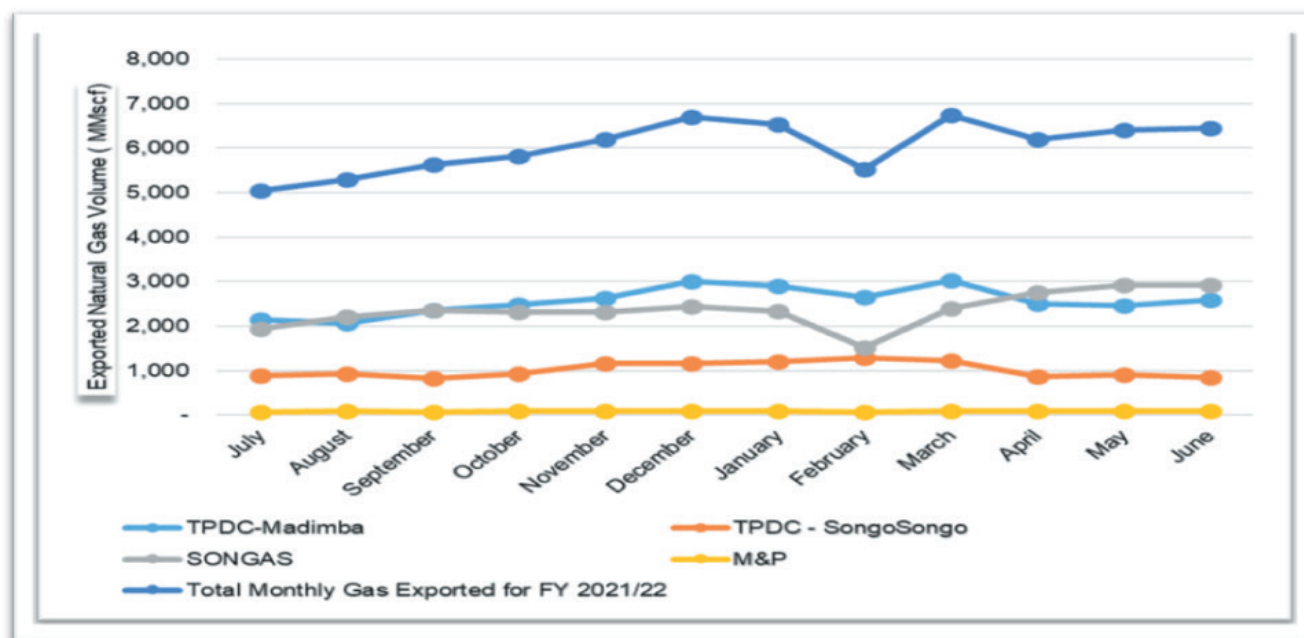


Figure 30: Total Monthly Gas Exported for FY 2021/22

7.2. Natural Gas Customers

In the FY 2021/22, end users of natural gas were power generation plants, industries, commercial customers, households, institutions and CNG vehicles. **Figure 28** indicates natural gas consumed by various customer categories.

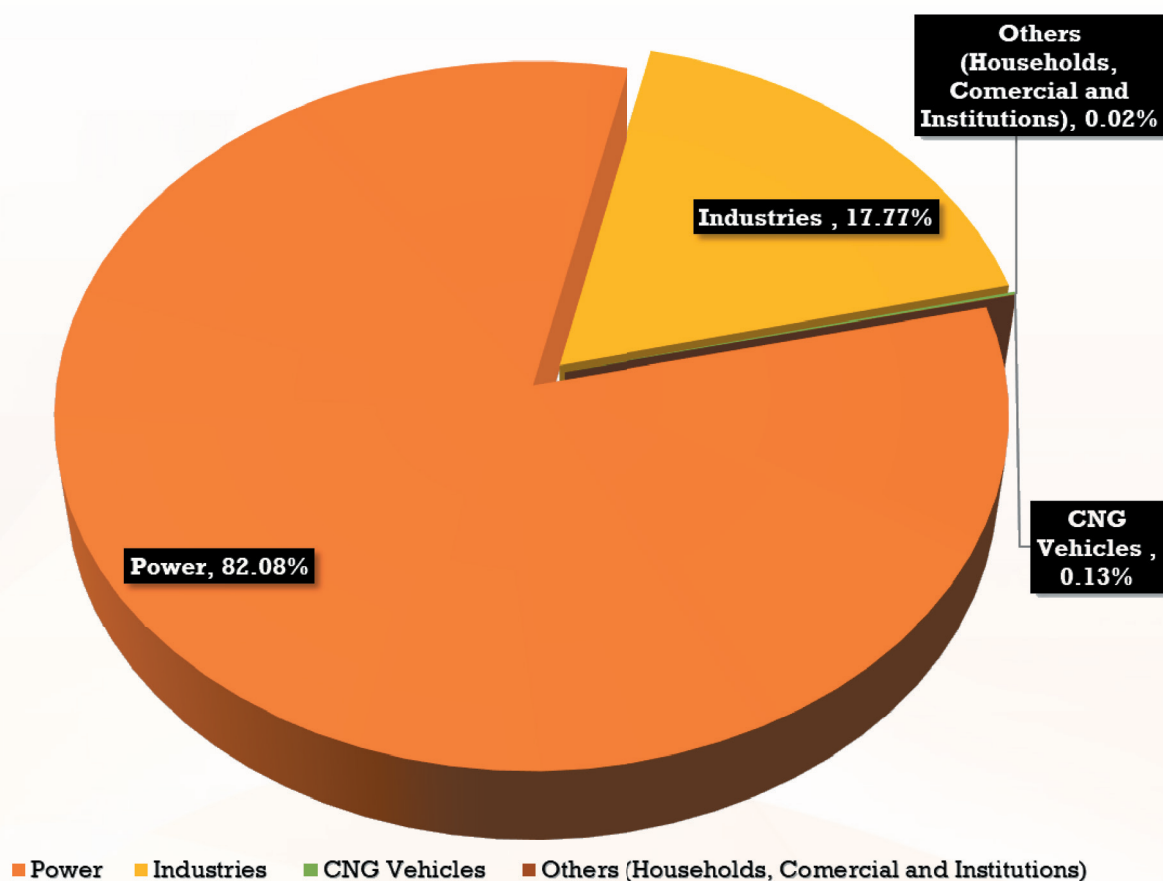


Figure 31: Natural Gas supplied to Power, Industrial and other Customers

7.3. Benchmarking of Natural Gas Prices for Industrial Customers

Natural gas prices for industrial customers were benchmarked against USA's average monthly industrial customer prices. During the period under review, the average natural gas price for industrial customers was 8.44\$/MMBtu compared to 6.60\$/MMBtu in the USA. Major industrial natural gas consumers in the FY 2021/22 were steel, cement and ceramic industries whose average natural gas prices were 8.44\$/MMBtu, 5.87\$/MMBtu and 6.03\$/MMBtu, respectively as indicated in **Figure 29**.

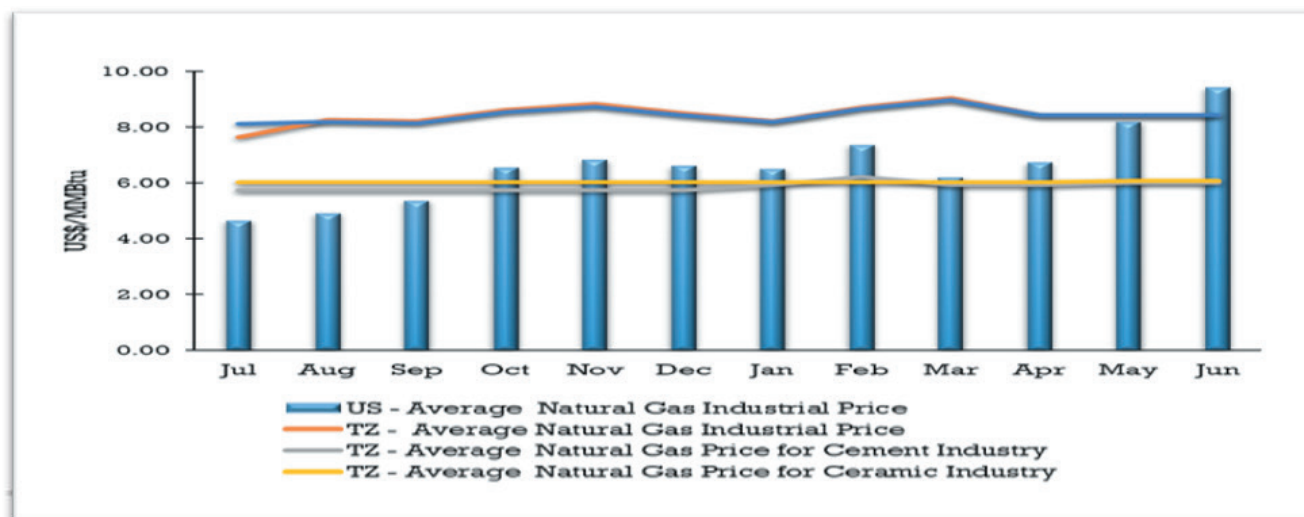


Figure 32: Natural Gas Prices for major industrial customers

7.4. Benchmarking of Natural Gas Prices for Power Generation

The natural gas prices for power generation customers were benchmarked against USA's average monthly power generation customer prices. During the period under review, the average monthly natural gas price of M&P sold to TANESCO power plant in Mtwara was 5.36U\$/MMBtu and the average price of TPDC natural gas sold to TANESCO power plants was 5.42U\$/MMBtu. However, the USA power generation average monthly natural gas price was 5.81U\$/MMBtu in the FY 2021/22 which was higher compared to 3.01 U\$/MMBtu in the previous year. **Figure 30** shows a comparison of the average monthly natural gas for power generation in Tanzania and the USA.

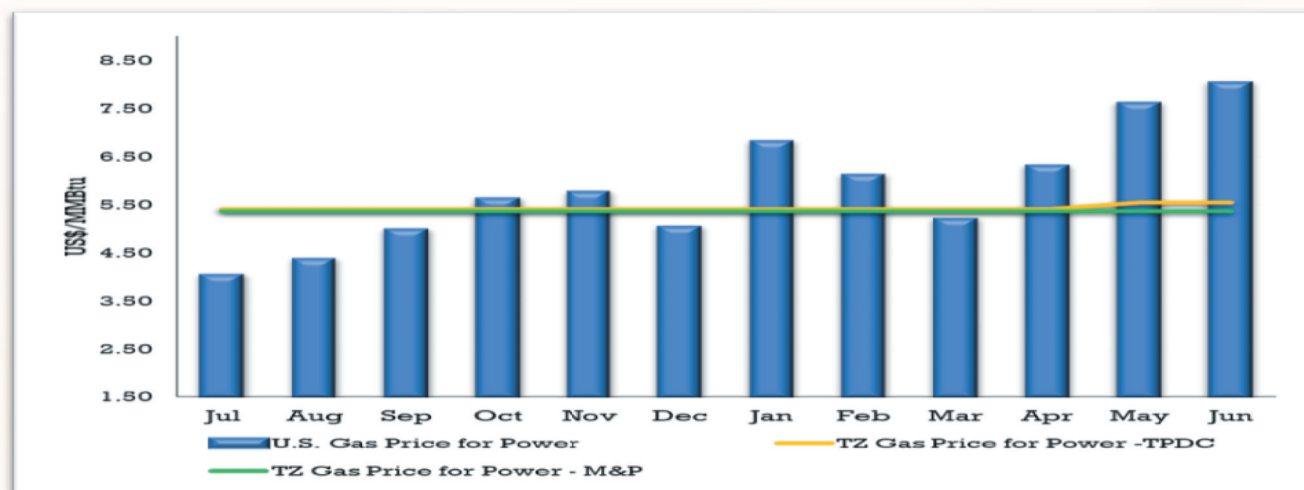


Figure 33: Natural Gas Prices for Power generation Benchmarked to US prices

8. REGULATORY IMPACT ON THE SUB-SECTOR

The regulatory impact to the natural gas subsector contributed by the Authority in the FY 2021/22 was as follows:-

- (a) Regulatory tools available contributed to safe operations of the natural gas infrastructure by regulated entities;
- (b) The Common Qualification System (CQS) increased the number of registered local companies to participate in the natural gas subsector;
- (c) The Licensing and Order Information System (LOIS) easily facilitated applicants to apply for construction approvals and operational licences;
- (d) Increased awareness and coordination in managing CNG activities among key stakeholders;
- (e) Increased number of CNG potential players to invest in the mid and downstream natural gas sub-sector.

9. FUTURE OUTLOOK OF THE SUB-SECTOR

The natural gas sub-sector is expected to grow in the near future due to the number of ongoing natural gas projects and planned to be implemented as follows: -

- (a) Construction of CNG filling stations in Dar-es-salaam and Coast Region (Mkuranga and Bagamoyo). Hence, the number of CNG filling stations is expected to increase from the existing ones;
- (b) Distribution pipelines projects for connection of industries, hotels and households at Mnazi Mmoja in Lindi and Mwenge to Mbezi in Dar es Salaam;
- (c) Emerging trans-border natural gas transmission pipeline projects. These projects aim to supply natural gas in Kenya and Uganda.

The successful implementation of the above projects will increase natural gas consumption and customer base. Similarly, more vehicles are expected to be converted to use natural gas due to the increased number of CNG filling stations, CNG conversion workshops and CNG-FSI.

10. ACHIEVEMENTS, KEY OBSERVATIONS AND RECOMMENDATIONS

Achievements, key observations and recommendations for improvement of the mid and downstream natural gas sub-sector during the FY 2021/22 were as follows: -

10.1. Achievements

- (a) Increase of 20% in natural gas processed from 60,619.2 MMscf recorded in FY 2020/21 to 72,533.56 MMscf in FY 2021/22 due to increased demand for natural gas for power generation, households use, industries and the use of CNG vehicles for both existing and new customers;
- (b) Natural gas contributed more than 60% of the power generated and supplied to the National Grid;
- (c) Development and operationalization (in March 2022) of Common Qualification System (CQS), the online system for registering local suppliers, service providers and local professionals in the oil and gas industry;
- (d) Registration of 620 new local business entities in the Local Suppliers and Service Providers (LSSP) database which is equivalent to an increase of 84%;
- (e) Increase of regulated entities revenues by 8% due to increased consumption of natural gas-fired power plants to offset hydropower plants during the dry season;
- (f) Issuance of three (3) new operational licences, two (2) for CNG filling stations and one (1) for natural gas processing plant; and four (4) construction approvals for natural gas supply lines to industries in Dar es Salaam;
- (g) Improvement in compliance with safety and technical requirements by regulated entities from 94% to 95%; and
- (h) Use of the National Petroleum and Gas Information System (NPGIS) for regulatory information by regulated entities.

10.2. Key Observations and Recommendations

Key observations made in the mid and downstream natural gas sub-sector during the period under review and recommendations thereof are as follows: -

- (a) The need of improving coordination in controlling CNG operations among mandated regulatory entities. The Authority should continue engaging key stakeholders in managing the CNG business value chain including the development of required tools such as guidelines, standards and procedures. Furthermore, the Authority coordinated the development of the Memorandum of Understanding between EWURA, CRB and TBS and Guidelines for managing CNG activities;
- (b) Risks posed by the interference of gas pipeline right of way by wayleave users. The Authority coordinated the development of the guidelines for the Protection of Underground Infrastructure in the Shared Wayleave joint management of wayleaves; and
- (c) The importance of increasing investments in natural gas distribution to meet natural gas demand and future markets. The Authority will continue to improve regulatory tools including tariff methodology that attracts private investments in natural gas distribution projects. It is recommended that the Government should consider providing incentives such as subsidies or tax exemption for imported CNG equipment and CNG conversion kits to create markets and promote private investments. Further, intensive awareness programs on the use of CNG as an alternative, cleaner and cheaper fuel should continue.

ANNEXES

Annex 1: Natural Gas Regulatory Tools

S/N	Citation / Title	GN Number	Date Published
1.	Petroleum (Natural Gas) (Transmission and Distribution Activities) Rules, 2018	GN 176/2018	May 4, 2018
2.	Petroleum (Natural Gas)(Licensing Fees) Rules, 2020	GN 301/2020	May 1, 2020
3.	Petroleum (Natural Gas) (Supply and Marketing Services) Rules, 2019	GN 219/2019	March 25, 2019
4.	Petroleum (Compressed Natural Gas) (Supply and Marketing Services) Rules, 2019	GN 220/2019	March 22, 2019
5.	Petroleum (Natural Gas) (Processing) Rules, 2019	GN 221/2019	March 22, 2019
6.	The Petroleum (Natural Gas) (Storage) Rules, 2019	GN 182/2019	March 15, 2019
7.	The Petroleum (Natural Gas) (Regulatory Accounting and Reporting Standards) Rules, 2019	GN 183/2019	March 15, 2019
8.	The National (Petroleum and Natural Gas) (Information System) Rules, 2019	GN 184/2019	March 15, 2019
9.	Petroleum (Natural Gas) Customer Services Charter Guidelines, 2019	N/A	2019
10.	Petroleum (Natural Gas Pricing) Regulations, 2020	GN 353/2020	May 15, 2020
11.	The Petroleum (Natural Gas Midstream and Downstream) General Regulations, 2020	GN 270/2020	April, 17 2020
12.	The Petroleum (Corporate Integrity Pledge) Regulations, 2019	GN 782/2020	November 1, 2019
13.	The Energy and Water Utilities Regulatory Authority (Compounding of Offences) Regulations, 2020	GN 397/2020	May 29, 2020
14.	The Petroleum (Local Content) Regulations, 2017	GN 197/2017	May 5, 2017
15.	The EWURA Consumer Complaints Settlement Rules, 2020	GN 428/2020	June 5, 2020
16.	The Energy and Water Utilities Regulatory Authority (Electricity and Natural Gas) (Tariff Application and Rate Setting) Rules, 2021	GN 396/2021	May 21, 2021
17.	The developed tools include the Petroleum (Natural Gas) Midstream and Downstream Investment Guidelines 2022	N/A	2022
18.	Protection of Underground Infrastructure in shared wayleave Guidelines, 2022	N/A	2022

Annex 2: Natural Gas TBS Standards

S/N	CITATION / TITLE	STATUS	APPLICATION
1.	TZS 2255:2018 (1st Ed) Petroleum and natural gas industries	Published	Steel pipe for pipeline transportation systems
2.	TZS 1792: 2016 (1st Ed) Safety and control devices for gas burners and gas\burning appliance — Particular requirements — Part 3	Published	Gas/air ratio controls, pneumatic type
3.	TZS 1970: 2017 – ISO 15649: 2001 (1st ed) Petroleum and natural gas industries	Published	Piping
4.	TZS 1790:2016 – ISO 23550:2011 (1st ed) Safety and control devices for gas burners and gas\burning appliances	Published	General requirements
5.	TZS 1791:2016-ISO 23551-1:2012 Safety and control devices for gas burners and gas\burning appliances — Particular requirements — Part 1	Published	Automatic and semi\automatic valves
6.	TZS 1790:2016-ISO 23550:2011 Safety and control devices for gas burners and gas\burning appliances	Published	General requirements
7.	TZS 1920-5:2016-ISO 1042-5:2004 Petroleum and natural gas industries — Cement and materials for well cementing — Part 5	Published	Determination of shrinkage and expansion of well cement formulations at atmospheric pressure
8.	TZS 1920-4:2016-ISO 1042-4:2004 Petroleum and natural gas industries — Cement and materials for well cementing — Part 4	Published	Preparation and testing of foamed cement slurries at atmospheric pressure
9.	TZS 1920-3:2016-ISO 1042-3:2003 Petroleum and natural gas industries — Cement and materials for well cementing — Part 3	Published	Testing of deep water well cement formulations
10.	TZS 1920-1:2016-ISO 1042-1:2009 Petroleum and natural gas industries — Cement and materials for well cementing — Part 1	Published	Specification
11.	TZS 1307: 2010 ISO 11439: 2000 Gas cylinders	Published	High-pressure cylinders for the on\ board storage of natural gas as a fuel for automotive vehicles
12.	TZS 1187 (Part 5): 2010(1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 5	Published	Manual cylinder valve
13.	TZS 1187 (Part 1): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components part 1	Published	General requirements and Definitions
14.	TZS 1187 (Part 17): 2010(1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 17	Published	Flexible fuel line
15.	TZS 1187 (Part 16): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 16	Published	Rigid fuel line
16.	TZS 1187 (Part 2): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 2	Published	Performance and general test method
17.	TZS 1187 (Part 11): 2010 Road vehicles\Compressed Natural Gas \CNG\ fuel system components part 11	Published	Gas/ air mixer

S/N	CITATION / TITLE	STATUS	APPLICATION
18.	TZS 1187 (Part 10): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components part 10	Published	Gas\ flow adjuster
19.	TZS 1187 (Part 12): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 12	Published	Pressure relief valve \PRV\
20.	TZS 1187 (Part 8): 2010 Road vehicles \Compressed Natural Gas \CNG\ fuel system components part 8	Published	Pressure indicator
21.	TZS 1187 (Part 9): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 9	Published	Pressure regulator
22.	TZS 1187 (Part 15): 2010 Road vehicles\Compressed Natural Gas \CNG\ fuel system components part 15	Published	Gas\ tight housing and ventilation hose
23.	TZS 1187 (Part 13): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 13	Published	Pressure relief device \PRD\
24.	TZS 1187 (Part 14): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 14	Published	Excess flow valve
25.	TZS valve187 (Part 6): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 6	Published	Automatic valve
26.	TZS 1187 (Part 3): 2010 (1st Ed) Road vehicles\Compressed Natural Gas \CNG\ fuel system components Part 3	Published	Check valve
27.	(TBS) standards (ISO 11439:2013) Gas cylinders-High-pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles and conversion components	Published	Gas Cylinders
28.	TZS 1307: 2010-ISO 11439: 2000 - Gas cylinders – high-pressure cylinders for the on-board storage of natural gas as a fuel automotive vehicle	Published	Gas Cylinders
29.	TBS standards (TZS 1187:2010-1/ISO 15500-1) – Converted CNG vehicle safety requirements	Published	General Requirements and Definitions
30.	TZS 2672:2021/ISO 16440:2016 - Petroleum and natural gas industries – Pipeline transportation systems – Design, construction and maintenance of steel-cased pipelines	Published	General Requirements
31.	TZS 2275: 2020- ISO 23874: 2006 - Natural gas – Gas chromatographic requirements for hydrocarbon dew point calculation	Published	Performance Requirements

Annex 3: Natural Gas Construction Approvals

SN.	Applicant Name	Approval No.	Date Of Issue	Type of Construction Approval
1	Tanzania Petroleum Development Corporation	NGCA-2018-01	31-May-18	Connection of natural gas supply for Coca-Cola and BIDCO to National Natural Gas Infrastructure in Dar es Salaam Region
2	Dangote Cement Limited Tanzania	NGCA-2018-02	9-Nov-18	Connection of natural gas supply for Compressed Natural Gas Mother Station, CNG Storage Cylinders and CNG Dispensing facilities to National Natural Gas Infrastructure at Dangote Cement Factory in Mtwara Region
3	Tanzania Petroleum Development Corporation	NGCA-2018-03	9-Nov-18	Connection of natural gas supply for Lodhia Steel Industry to National Natural Gas Infrastructure at Mwanambaya in Mkuranga, Coastal Region.
4	Tanzania Petroleum Development Corporation	NGCA-2019-01	3-Apr-19	Connection of natural gas supply for University of Dar es Salaam households and cafeteria to National Natural Gas Infrastructure
5	Tanzania Petroleum Development Corporation -	NGCA-2019-02	3-Apr-19	Connection of natural gas supply for University of Dar es Salaam, Lufungila and Mlalakuwa households to National Natural Gas Infrastructure
6	Tanzania Petroleum Development Corporation	NGCA-2019-03	22-Jun-19	Connection of natural gas supply for Mtwara households and institutions to National Natural Gas Infrastructure Mtwara Region
7	Pan African Energy (T) Limited	NGCA-2020-01	4-Mar-20	Connection of natural gas supply to Pasta Industries Limited, Vingunguti within Dar es Salaam
8	Pan African Energy (T) Limited	NGCA-2020-02	4-Mar-20	Connection of natural gas supply by virtual pipeline (Compressed Natural Gas) to Mikoani Edible Oil in Mbagala, Dar es Salaam

Annex 4: List of regulated entities and their scope of operations

Regulated service provider	Scope of regulated service	Location	Year commenced service
PAET	Distribution Network	Dar es Salaam	2004
Songas Ltd	Processing Plant	Songosongo (Lindi)	2004
Songas Ltd	Transmission Pipeline	Songosongo to Dar es Salaam	2004
M&P	Processing Plant	Mnazi Bay (Mtwara)	2009
M&P	Transmission Pipeline	Mnazi bay to TANESCO in Mtwara	2009
TPDC	Processing Plant	–Madimba (Mtwara)	2015
TPDC	Processing Plant	Songo (Lindi)	2016
TPDC	Transmission Pipeline	Mtwara to Dar es Salaam	2015
TPDC	Marine Transmission Pipeline	Songosongo to Somanga Fungu gas Junction	2016
TPDC	Distribution Network	Mtwara, Lindi, Coastal and Dar-es-Salaam	2016
PAET	CNG Filling Station	Dar-es-Salaam	2009
Dangote Cement Factory	Compressed Natural Gas (Own Use) Operations and CNG Filling Station	Mtwara	2021
Anric Gas Technology Limited	CNG Filling Station	Dar-es-Salaam	2021

Annex 5: Number of Cathodic protection test points installed

Transmission Pipeline Segment	CP test points planned for testing	Voltage reading range	CP test points conducted	CP test points complied	CP test points reported mal-functioned	CP test points complied in (%)	Target 100%
TPDC (From SS/ Madimba to Wazo hill)	8	850mV- 1200mV	8	8	1	87.5	100
M&P	3	2.0mV-2.5mV	-	-	-	-	100
SONGAS	8	850mV- 1200mV	8	8	0	100	100

Annex 6: List of Households customers connected with gas

SN	Gas Supply area	Date of installation (Year)	Number of Households connected	Number of Households using gas	Usage	The installed capacity of the network	Supplier
1	MTWARA	2019	125	120	cooking	10	TPDC
2	MTWARA	2021	300	220	cooking	10	TPDC
3	DSM	2013	72	72	cooking	15	TPDC
4	DSM	2019	36	25	cooking	15	TPDC
5	DSM	2020	101	80	cooking	15	TPDC
6	DSM	2022	100	85	cooking	15	TPDC

Annex 7: List of commercial and institutional customers connected to the gas network

SN	Name of customer	Date of installation	Average consumption (Mscfd)	Annual consumption MMscf	Usage	Location	Supplier
1	Tanruss Investments Limited (Serena Hotel)		0.024	8.46	Boiler + Burner	Posta	PAET
2	Tanzania Prisons Services (Keko Prison)		0.003	1.04	Heating (Kitchen)	Keko	PAET
3	Mtwara tech	2021			Cooking	MTWARA	TPDC
4	Mtwara college	2021			Cooking	MTWARA	TPDC
5	Cafeteria 1	2020			Cooking	DSM	TPDC

Annex 8: List of thermal power generation customers using natural gas

SN	Name of power generation customer	Year of installation	Installed capacity (MW)	Maximum consumption (MMscfd)	Average consumption (MMscfd)	Gas odorization status	Location	Supplier
1	KINYEREZI I	2015	150	30	13.26	Not odorized	DSM	TPDC
2	KINYEREZI II	2016	185	37	35	Not odorized	DSM	TPDC
3	UBUNGO II	2015	129	30	25	Not odorized	DSM	TPDC
4	KINYEREZI I EXTENSION	2015	185	37	NA	Not odorized	DSM	TPDC
5	TANESCO -Mtwara Power Plant	2006	24	2.4	2.4	Not odorized	Mtwara	M&P
6	Somanga Fungu	2010	7.5	7.74	0.14	Yes	DSM	SONGAS
7	Songas		180	46	7.90	Yes	Ubungo	PAET
8	TanESCO (Ubungo 1)		102	22	12.4	Yes	Ubungo	PAET
9	TanESCO (Tegeta 45)		45	10	5.6	Yes	Tegeta	PAET
10	TanESCO (Ubungo 3A)		100	22	18.4	Yes	Ubungo	PAET
11	TanESCO (Ubungo 3B)		20	4	2.5	Yes	Ubungo	PAET

Annex 9: List of Industrial customers connected to the gas network

SN	Name of customer	Date of installation (Year)	Average consumption (Mscfd)	Usage	Gas odorization status	Location	Supplier
1	Aluminium Africa (ALAF)		0.39	Boiler +Power	Ok Ok	Chang'ombe	PAET
2	Azam Bakeries Co Ltd		0.06	Boiler	Ok	Kipawa	PAET
3	Bautech Company Ltd 1		0	Boiler	Ok	Vingunguti	PAET
4	Bora Industries		0.01	Boiler	Ok	Chang'ombe	PAET
5	East Coast Oil & Fats Ltd		0.47	Boiler	Ok	Kurasini	PAET
6	Iron and Steel Limited		0.11	Heating	Ok	Mikocheni	PAET
7	Kamal Steel Ltd		0.14	Heating	Ok	Chang'ombe	PAET
8	Kioo Glass		2.67	Heating	Ok	Chang'ombe	PAET
9	MM Integrated Steel (MM1)		0.15	Heating	Ok	Mikocheni	PAET
10	MM Integrated Steel -2		0.19	Heating	Ok	Mikocheni	PAET
11	MM Integrated Steel (MM3)		0.14	Heating	Ok	Mikocheni	PAET
12	Murzah Oil Mills Unit 1		-	Boiler	Ok	Vingunguti	PAET
13	Murzah Oil Mills Unit 2		0.10	Boiler	Ok	Vi1ngunguti	PAET
14	Murzah Oil Unit Mills Unit 4		0.01	Boiler	Ok	Vingunguti	PAET
15	Murzah Soap and Detergent Unit 3		0.21	Boiler	Ok	Buguruni	PAET
16	Namera Group of Industries		0.06	Boiler	Ok	Gongo la mboto	PAET
17	Nampak (T) Ltd		0.01	Boiler	Ok	Ilala Bungoni	PAET
18	Nida Textile Mills Ltd		0.46	Boiler	Ok	Tabata	PAET
19	OK Plast Ltd		0.13	Boiler	Ok	Vingunguti	PAET
20	SBC Tanzania - Pepsi		0.23	Boiler	Ok	Kiwalani	PAET
21	Serengeti Breweries Ltd		0.10	Boiler	Ok	Chang'ombe	PAET
22	SilAfrica Tanzania T Ltd		0.03	Boiler	Ok	Chang'ombe	PAET
23	Steel Masters Ltd		0.10	Heating	Ok	Chang'ombe	PAET
24	Tanpack Tissues Ltd		0.13	Boiler	Ok	Mikocheni	PAET
25	Tanzania Breweries (TBL)		0.29	Boiler	Ok	Ilala Karume	PAET
26	Tanzania Cigarette Company (TCC)		0.37	Boiler + Power	Ok	Chang'ombe	PAET
27	Tanzania Cuttleries Manufacturer Ltd		0.02	Heating	Ok	Chang'ombe	PAET

SN	Name of customer	Date of installation (Year)	Average consumption (Mscfd)	Usage	Gas odorization status	Location	Supplier
28	Tanzania-Chinese Textile (TCFT)		0.001	Boiler	Ok	Ubungo	PAET
29	VOT Tanzania		0.02	Boiler	Ok	Kurasini	PAET
30	Gaia Eco Solution		0.11	Boiler	Ok	Vingunguti	PAET
31	Said S Bakhresa & Co Ltd		-	Boiler	Ok	Buguruni	PAET
32	Soap & Allied Industries L		0.01	Boiler	Ok	Chang'ombe	PAET
33	A-one		0.89	Boiler +Power	Ok	Kiwalani	PAET
34	Royal Soap & Detergent Industry Ltd		0.31	Boiler	Ok	External - Ubungo	PAET
35	Jumbo Packaging		0.02	Boiler	Ok	Vingunguti	PAET
36	Mikoani Edible oil		0.17	Boiler	Ok	Mbagala	PAET
37	Tanzania Pasta Industries		0.07	Boiler	Ok	Vingunguti	PAET
38	Tanga Pharmaceutical		0.01	Boiler	Ok	Vingunguti	PAET
39	Quaim Steel Industry		0.001	Boiler	Ok	Chang'ombe	PAET
40	Tanzania Portland Cement Limited (AG)		5.46	Heating Kilns	Ok	Tegeta Wazo	PAET
41	Raddy Fiber Manufacturing	2022	0.01	Power and Heating	Odorized	MKURANGA	TPDC
42	Dangote Cement factory	2018	12.32	Power and Heating	Not odorized	MTWARA	TPDC
43	Goodwill ceramic factory	2017	3.90	Power and Heating	Not odorized	MKURANGA	TPDC
44	Lodhia steel ltd	2019	0.26	Heating	Odorized	MKURANGA	TPDC
45	Knauf Gypsum factory	2020	0.22	Heating	Odorized	MKURANGA	TPDC
46	Coca-Cola	2019	0.09	Heating	Odorized	DSM	TPDC
47	MM Integrated Steel Mills (MMI 2)	2010	0.12	Heating	Odorized	DSM	PAET
48	MM Integrated Steel Mills (MMI 3)	2014	0.13	Heating	Odorized	DSM	PAET

Annex 10: List of Natural Gas Pipelines Way Leave Interferences

SN	Type of facility	Encroachment/ Erosion	Location	Wayleave owner	Marker posts visibility	Natural Gas Supplier
1	Main gas pipeline	Encroachment	Mwakaringa road	TARURA	Visible	PAET
2	Main gas pipeline	Encroachment	Toyota area	TRC	Visible	PAET
3	Main gas pipeline	Encroachment	Buguruni kwa Mnyamani	TRC	Visible	PAET
4	Main gas pipeline	Encroachment	Mikocheni light industries	TARURA	Visible	PAET
5	Main gas pipeline	Erosion	Tabata Relini	TRC	Visible	PAET
6	Main gas pipeline	Erosion	Ukonga area	TRC	Visible	PAET
7	Main gas pipeline	Erosion	Mission (KTM)	Tanroads	Visible	PAET
8	Main gas pipeline	Erosion	Mabibo bridge	TRC	Visible	PAET
9	Pipeline	1	Salasala, Dar es Salaam	TanESCO	Visible	Songas
10	Mtwara -Dar Transmission Pipeline	Erosion	Mangamba-Mtwara (AA KP 15)	TPDC	Visible	TPDC
11	Mtwara -Dar Transmission Pipeline	Erosion	Mbae-Mtwara (AA KP 18/19)	TPDC	Visible	TPDC
12	Mtwara -Dar Transmission Pipeline	Erosion	Mbuyuni-Mtwara (AA KP 21/22)	TPDC	Visible	TPDC
13	Mtwara -Dar Transmission Pipeline	Erosion	Kilimahewa -Mtwara (AA KP 22/23)	TPDC	Visible	TPDC
14	Mtwara -Dar Transmission Pipeline	Erosion	Singino-Mtwara (AA KP 24/25)	TPDC	Visible	TPDC
15	Mtwara -Dar Transmission Pipeline	Erosion	Haikata-Mtwara (AA KP 25/26)	TPDC	Visible	TPDC
16	Mtwara -Dar Transmission Pipeline	Erosion	Mabatini-Mtwara (AA KP 27/28)	TPDC	Visible	TPDC
17	Mtwara -Dar Transmission Pipeline	Erosion	Changarawe-Mtwara (AA KP 41/42)	TPDC	Visible	TPDC
18	Mtwara -Dar Transmission Pipeline	Erosion	Ndumbwe-Mtwara (AA KP 42/43)	TPDC	Visible	TPDC
19	Mtwara -Dar Transmission Pipeline	Erosion	Pangatena-Lindi (AA KP 57/58)	TPDC	Visible	TPDC
20	Mtwara -Dar Transmission Pipeline	Erosion	Moka -Lindi (AA KP 126)	TPDC	Visible	TPDC
21	Mtwara -Dar Transmission Pipeline	Erosion	Kiwawa-Kilwa (AA KP 205)	TPDC	Visible	TPDC

SN	Type of facility	Encroachment/ Erosion	Location	Wayleave owner	Marker posts visibility	Natural Gas Supplier
22	Mtwara -Dar Transmission Pipeline	Erosion	Matandu-Kilwa (Near BVS No. 8)	TPDC	Visible	TPDC
23	Mtwara -Dar Transmission Pipeline	Erosion	Mkuranga (AB KP 131/132)	TPDC	Visible	TPDC
24	Mtwara -Dar Transmission Pipeline	Erosion	Gongolamboto- Dar es Salaam (AB KP 188/189)	TPDC	Visible	TPDC
25	Mtwara -Dar Transmission Pipeline	Erosion	Kimara Golani- Dar es Salaam (AC KP 4/ 5)	TPDC	Visible	TPDC
26	Mtwara -Dar Transmission Pipeline	Erosion	Kimara Baruti -Dar es Salaam (AC KP 9/ 10)	TPDC	Visible	TPDC
27	Mtwara -Dar Transmission Pipeline	Erosion	Makongo Juu -Dar es Salaam (Mbezi River)	TPDC	Visible	TPDC
28	Mtwara -Dar Transmission Pipeline	Erosion	Goba -Dar es Salaam (Before & After BVS No. 16)	TPDC	Visible	TPDC
29	Mtwara -Dar Transmission Pipeline	Erosion	Goba Kunguru Street -Dar es Salaam	TPDC	Visible	TPDC
30	Mtwara -Dar Transmission Pipeline	Erosion	Wazo -Near Tegeta Station -Dar es Salaam	TPDC	Visible	TPDC
31	Mtwara -Dar Transmission Pipeline	Encroachment -Sand Mining	Tegeta River -Dar es Salaam	TPDC	Visible	TPDC
32	Mtwara -Dar Transmission Pipeline	Encroachment - Sand Mining	Kinyerezi Kanga Street, Dar es Salaam	TPDC	Visible	TPDC
	Mtwara -Dar Transmission Pipeline	Encroachment- Excavation by DAWASA	Goba-Kinguru Street, Dar es Salaam	TPDC	Visible	TPDC
33	Mtwara -Dar Transmission Pipeline	Encroachment -Excavation of Fish Ponds	Ziwani-Mtwara	TPDC	Visible	TPDC
34	Mtwara -Dar Transmission Pipeline	Encroachment - Commercial Activities	Kinyerezi Stands- Dar es Salaam	TPDC	Visible	TPDC

Annex 11: Table Local Content Performance

S/N	Requirements	TPDC		PAET		SONGAS		M&P		ANRIC CNG		DANGOTE CNG	
			%		%		%		%		%		%
1	Number of local employees out of total employees	415/415	100	106/107	99	72/72	100	92/98	93.87	8/10	80	14/14	100
2	Number of local staff trained out of total employees	294/415	71	36/36	100	2/6	33	89/98	90.81	10/10	100	10/14	71
4	Number of local financial services utilized out of total financial services	10/12	83	2/2	100	3/3	100	3/3	100	3/5	75	3/4	75
5	Number of local insurances services utilized out of all insurance services awarded	1/1 (NIC)	100	4/5	80	4/4	100	3/3	100	3/3	100	1/2	50
6	Number of procurements awarded to nationals out of the total number of procurements	38/40	93	40/48	55.6	5/6	83	44/44	100	4/6	66.67	0	0

Annex 12: Integrity of CNG Facilities

S/N	Operator	Type of devices	No. of device available	No. of device re-calibrated	Inspection	Number of plans for s leak test	Number of conducted gas leak tests	Calibration in %	Target %
1	PAET	PSV	93	93	N/A	N/A	N/A	100	100
		Meter	1	1	N/A	N/A	N/A	100	100%
		CNG dispenser	1		N/A	N/A	N/A		
		CNG cylinders (mother station)	44	N/A	44	360	360	100	100
		CNG-Cylinders (Trailers)	N/A	N/A	670	360	360	100	100
		CNG-V inspected before refuelling	N/A	N/A	64574	64574	64574	100	100
		CNG-V Complied with refuelling	N/A	N/A	64458	64458	64458	100	100
2	DANGOTE -CNG	refuelling	N/A	N/A	116	N/A	N/A	100	100
		PSV	8	8	N/A	N/A	N/A	100	100
		Meter	2	2	N/A	N/A	N/A	100	100
		CNG dispenser	2	2	2	24	24	100	100
		CNG cylinder	3	3	3	24	24	100	100
		CNG-V inspected before refuelling	N/A	N/A	8271	8271	8271	100	100
		CNG-V Complied with the refuelling	N/A	N/A	8271	8271	8271	100	100
3	ANRIC -CNG	CNG-V denied refuelling	N/A	N/A	0	0	0	100	100
		PSV							
		Meter							
		CNG dispenser	1	1		24	24	100	100
		CNG cylinder	50	0					
		CNG-V inspected before refuelling	N/A	N/A	1680	1680	1680	100	100
		CNG-V Complied with refuelling	N/A	N/A	1680	1680	1680	100	100
		CNG-V denied refuelling	N/A	N/A	5				




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