

PURC Tariff Proposal

Ghana Gas National Company

Commercial Operations

May 2022

Ghana Gas

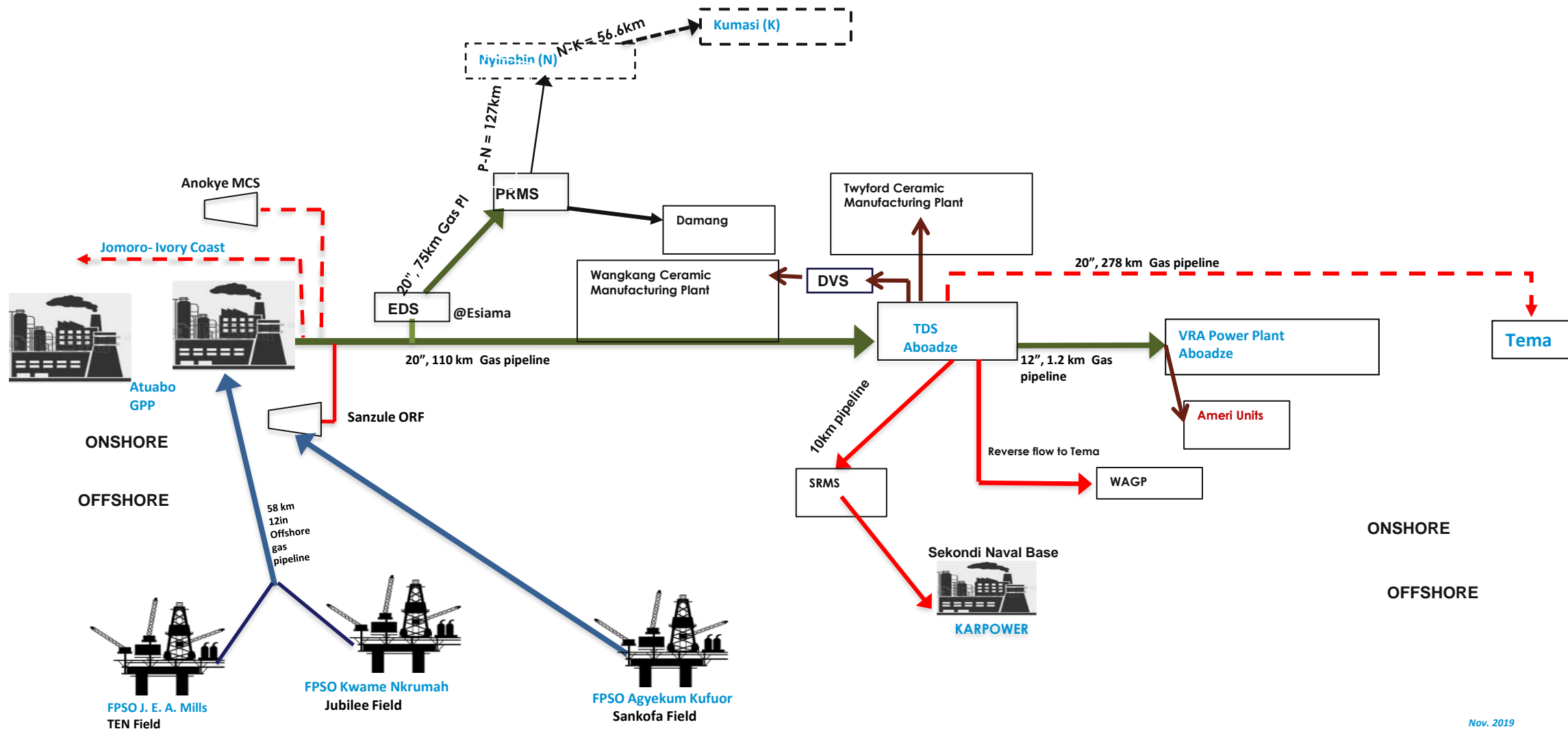
- Ghana National Gas Company Ltd (Ghana Gas) was established in July 2011.
- Ghana Gas has the responsibility to build, own and operate natural gas infrastructure required for;
 - processing,
 - transportation, and
 - marketing of gas products
- **Vision : 'To be the trusted and reliable gas services company'.**
- **Mission:** To contribute to Ghana's Gas economic development by providing and operating the infrastructure required for gathering, processing and delivering natural gas resources, in a safe, cost effective, responsible and reliable manner, to customers.



Presentation Outline

- **Existing & Planned Infrastructure**
 - Assets (Equity & CDB Financed)
- **The Hybrid Tariff Methodology**
- **The Tariff Components**
 - The WACC
 - The Return
 - The Fixed Operating Expenses
 - Depreciation
 - Working Capital Allowance
 - Corporate Taxes
 - Revenue Credits
- **The Usage Tariff**
- **Appendices**
 - Ghana Gas Financed Assets
 - Based on CDB Asset Inclusion
 - Based on no NGL Offsetting
 - Based on LPG Offsetting

Ghana Gas' Infrastructure - Existing & Planned



Ghana Gas' Infrastructure – Equity & CDB Financed

<u>Asset Line</u>	<u>Start Year</u>	<u>Asset</u>	<u>Funding Type</u>	<u>Cost (\$M)</u>
<u>Processing Assets</u>	2014	150 MMScfd Atuabo Gas Processing Plant FEED	CDB/GOG Equity Funded	8.1
	2014	150 MMScfd Atuabo Gas Processing Plant	CDB/GOG Equity Funded	206.5
	2014	150 MMScfd Atuabo Gas Processing Plant	Equity Funded	275.2
	2017	Anokyi LPG Loading Gantry	CDB/GOG Equity Funded	37.2
	2017	GPP Warehouse	CDB/GOG Equity Funded	3.8
	2017	GPP Overhead Compressor	Equity Funded	59.2
	2015	NGL's Export System-FEED	CDB/GOG Equity Funded	12.9
	2019	300 MMScfd GPP Train 2 FEED	Equity Funded	7.0
	2023	300 MMScfd GPP Train 2	Debt Funded	680.0
NGGC Total Processing Asset Cost				1,290.0

Ghana Gas' Infrastructure – Equity & CDB Financed

<u>Asset Line</u>	<u>Start Year</u>	<u>Asset</u>	<u>Funding Type</u>	<u>Cost (\$M)</u>
<u>Transmission Assets</u>	2014	111km 20" Onshore Atuabo-Aboadze Pipeline	CDB/GOG Equity Funded	249.3
	2014	111km 20" Onshore Atuabo-Aboadze Pipeline	CDB/GOG Equity Funded	4.8
	2014	111km 20" Onshore Atuabo-Aboadze Pipeline	Equity Funded	43.0
	2018	1.5km 20" WAGP Interconnection Phase 1	CDB/GOG Equity Funded	4.8
	2017	75km 20" Essiama-Prestea Onshore Lateral Pipeline	CDB/GOG Equity Funded	66.7
	2017	75km 20" Essiama-Prestea Onshore Lateral Pipeline	Equity Funded	1.0
	2019	Anokyi Mainline Onshore Compressor Station	Debt Funded	59.1
	2019	10km 20"Karpower TDS to Sekondi Pipeline	Debt Funded	26.5
	2019	10km 20"Karpower TDS to Sekondi Pipeline (Equity)	Equity Funded	7.3
	2019	35km 20" PRMS to Nyinahin Pipeline	Debt Funded	55.1
	2019	100km 20" PRMS to Nyinahin Pipeline	Debt Funded	157.6
	2021	52km 20" AIS-Ivory Coast Pipeline	Equity Funded	120.0
	2016	278km 20" Takoradi-Tema Pipeline FEED	Equity Funded	14.0
	2022	278km 20" Takoradi-Tema Pipeline	Debt Funded	500.0
	2019	TRMS Expansion (ENI Project)	Requiring Funding	-
	2014	Centralized Assets	CDB/GOG Equity Funded	195.5
	2019	Centralized Assets (Non CDB)	Equity Funded	15.1
	2016	9km 6" TDS to Wangkang Ceramics Ltd Pipeline	Equity Funded	5.1
	2017	1km 4" TDS to Twyford Ghana Ltd Pipeline	Equity Funded	1.6
	2017	Marinus Isopentane GPP Tie-In Works (Phase 1)	Equity Funded	0.8
	2019	77km 12" Tarkwa Damang Pipeline	Private Ownership	79.2
GNGC Total Transmission Asset Cost				1,606.7

The Hybrid Tariff Methodology

Fixed Operating Expense

Return
+
Depreciation
+
Working Capital Allowance
+
Corp Taxes

-Revenue Credits

$$\text{Gas Tariff} = \frac{\text{Total Cost of Service}}{\text{Expected Throughput}}$$

Tariff Methodology – WACC

WACC is determined by calculating the cost of debt and equity and the proportions of debt and equity which should be employed in an efficiently financed Gas supply using the following formula.

$$WACC = \left[\left\{ \frac{E}{D+E} \right\} * K_e \right] + \left[\left\{ \frac{D}{D+E} \right\} * K_d \right]$$

$$K_e = R_f + CDS + \text{Beta} \times (USP)$$

$$K_d = R_{fus} + CDS \times (1-T)$$

	V	D	E	E/V	D/V	Rd	Re	WACC
Gathering	272.70	87.70	184.996	67.84%	32.16%	5.99%	16.22%	12.93%
Processing	603.56	256.42	347.142	57.52%	42.48%	6.17%	15.77%	11.69%
Transmission	693.98	240.25	453.73	65.38%	34.62%	5.70%	10.64%	8.93%
Total	1,570.24	584.37	985.871	62.78%	37.22%	5.95%	13.49%	10.68%

Tariff Methodology – The Return

The Return represents the amount which provides a yield on the company’s equity investment, as well as an amount to recover interest on debt.

Return = Rate Base x Overall Rate of Return

Rate Base: The rate base represents the total net book value of the company excluding all CDB loan financed assets.

Rate of Return: This is a rate derived using the capitalization ratio (Debt/Equity), the cost of debt and the allowed rate of return. It represents the **Weighted Average Cost of Capital (WACC)** of the company.

Net Working Capital= Current Assets – Current Liabilities

GNGC 2022 Rate Base	Gathering	Processing	Transmission	Total
+Gross Asset Cost	\$ 88.8	\$ 341.4	\$ 374.8	\$ 805.0
-Accumulated Depreciation	(\$3.3)	(\$26.6)	(\$21.4)	\$ (41.3)
+Net Working Capital	\$ 0.14	\$ 0.18	\$ 0.25	\$0.57
Rate Base (Net Book Plant & Pipeline Costs)	\$ 85.64	\$ 324.98	\$33.65	\$ 764.27

GNGC 2022 Return	Gathering	Processing	Transmission
Rate Base (Net Book Plant & Pipeline Costs)	\$ 63.8	\$ 204.5	\$212.0
Rate of Returns (WACC)	12.93%	11.69%	7.5%
Return	\$ 7.8	\$ 23.9	\$ 15.9

Tariff Methodology – Fixed Operating Expenses

The Fixed operating expenses are made up of:

1. Operations & Maintenance
2. Insurance
3. General & Administrative

The General and Administrative costs are allocated to the three main service lines in proportion to the capital expenditure.

GNGC 2022 Fixed Expenses	Gathering	Processing	Transmission
O&M (Millions)	\$6.4	\$8.0	\$11.2
Insurance (Millions)	\$1.1	\$1.4	\$1.9
General & Administrative (Millions)	\$31.3	\$39.1	\$55.1
Fixed Expenses (Millions)	\$38.8	\$48.5	\$68.2

GNGC 2022 OPEX	Gathering	Processing	Transmission
Total	\$17.26	\$21.58	\$30.37

Tariff Methodology – Depreciation & Working Capital Allow.

$$\text{Depreciation} = \frac{\text{Asset Cost} - \text{Salvage Value}}{\text{Useful Life of the Asset}}$$

Depreciation of assets solely computed on Non-CDB funded assets only. GNGC cannot therefore recover principal investment in the facility over the useful life of the asset.

GNGC 2022 Depreciation	Gathering	Processing	Transmission
+Gross Asset Cost (Millions)	\$ 88.8	\$ 341.4	\$ 374.8
Depreciation (Millions)	\$3.3	\$16.6	\$21.4

$$\text{Working Capital Allowance} = \frac{(\text{Lag}(\text{days})_t - \text{Lead}(\text{days})_t)}{365} \times \text{OPEX} \times \text{WACC}$$

Lead Days	Lag Days	OPEX	WACC
370	772	\$ 69,200,875.86	10.68%

We estimated our working capital allowance for the year to be **\$8,571,511.56**

Tariff Methodology – Revenue Credits & Total Cost of Service



In terms of Revenue Credits, the revenue derived from the processing of Natural Gas Liquids (NGLs) is used to offset the cost of Gathering and Processing activities.

GNGC 2022	Gathering	Processing	Transmission
NGLs Revenue	\$11.10	\$23.12	\$ -

Ghana Gas’s projected total cost of service for 2022 is **\$ 132.47 Million**, as shown in the table below.

GNGC 2022 Cost of Service	Gathering	Processing	Transmission
+Return	\$7.84	\$23.90	\$15.87
+Fixed Expenses	\$17.26	\$21.58	\$30.37
+Depreciation	\$3.27	\$16.64	\$21.40
+Working Capital Allowance	\$2.1	\$2.7	\$3.80
-NGLs Revenue	(\$11.10)	(\$23.12)	\$ -
Total Cost of Service	\$19.39	\$41.67	\$ 71.40

Furthermore, 50% of Condensate Revenue and 100% LPG Revenue are classified as the offsetting component for the Total Cost of Service in the Tariff build up

Tariff Methodology – Total Cost of Service & Throughput

The Usage tariff is derived by computing the total cost of service against the annual expected through-put for 2022. The expected through-put is **493.59MMScfd** in 2022.

$$\text{Usage Tariff} = \frac{\text{Total Cost of Service}}{\text{Expected Through-put}}$$

GNGC 2022 Expected Through-put	Gathering (Raw Gas)	Processing (Raw Gas)	Transmission (Lean Gas)
Jubilee (MMScfd)	115.00	106.33	105.26
TEN AG (MMScfd)	10.00	9.25	9.15
Sankofa (MMScfd)	-	-	138.60
Total Expected Through-put (MMScfd)	125.00	115.57	253.02
Btu/Scf	1,280.00	1,280.00	1,136.56
Total Expected Through-put (MMBtu/D)	160,372.50	147,932.30	304,896.10
Operational Days Per Year	325	325	325
Total Expected Through-put (MMBtu/Year)	52,000,000.00	48,078,020.10	99,091,243.00

Tariff Methodology – Usage Tariff

Accordingly, the GNGC' Usage Tariff amounts to **\$2.159/MMBtu**, based on a total cost of service of **\$ 132.47Million** and a volume requirement of **52.00BBtu** on Gathering, **48.08BBtu** on Processing, **99.09BBtu** on Transmission in 2022.

2022 GNGC Tariffs	Gathering	Processing	Transmission	Total
Total Cost of Service (\$'M)	19.39	41.67	71.40	132.47
Expected through-put (BBtu)	52.00	48.08	99.09	199.17
Tariff (\$/MMBtu)	0.373	0.867	0.919	2.159

Tariff Methodology – Usage Tariff

GNGC delivered tariff for Gathering, Processing and Transmission services is summarized for the 5-year period as follows;

	2022	2023	2024	2025	2026
Gathering	0.373	0.358	0.149	0.153	0.156
Processing	0.867	0.803	1.205	1.177	1.144
Transmission	0.919	0.872	1.242	1.217	1.160
Total	2.159	2.033	2.596	2.547	2.461



THANK YOU

Ghana National Gas Company

Appendices

Appendices – Ghana Gas Financed Assets

<u>Asset Line</u>	<u>Start Year</u>	<u>Asset</u>	<u>Funding Type</u>	<u>Cost (\$M)</u>
<u>Existing Gathering Assets</u>	2014	Jubilee Tie in Works	Equity Funded	20.3
	2014	45km 12" Shallow Water Offshore Pipeline	Equity Funded	39.5
	2015	14km 12" Deep Water Offshore Pipeline	Equity Funded	29.0
GNGC Total Gathering Asset Cost				88.8

Appendices – Ghana Gas Financed Assets

<u>Asset Line</u>	<u>Start Year</u>	<u>Asset</u>	<u>Funding Type</u>	<u>Cost (\$M)</u>
<u>Existing Processing Assets</u>	2014	150 MMScfd Atuabo Gas Processing Plant	Equity Funded	275.2
	2017	GPP Overhead Compressor	Equity Funded	59.2
	2019	300 MMScfd GPP Train 2 FEED	Equity Funded	7.0
<u>Incoming Processing Asset</u>	2024	300 MMScfd GPP Train 2	Debt Funded	680.0
NGGC Total Processing Asset Cost				1,021.4

Appendices – Ghana Gas Financed Assets

<u>Asset Line</u>	<u>Start Year</u>	<u>Asset</u>	<u>Funding Type</u>	<u>Cost (\$M)</u>
<u>Existing Transmission Assets</u>	2014	111km 20" Onshore Atuabo-Aboadze Pipeline	Equity Funded	43.0
	2017	75km 20" Essiama-Prestea Onshore Lateral Pipeline	Equity Funded	1.0
	2019	Anokyi Mainline Onshore Compressor Station	Debt Funded	59.1
	2019	10km 20"Karpower TDS to Sekondi Pipeline	Debt Funded	26.5
	2019	10km 20"Karpower TDS to Sekondi Pipeline (Equity)	Equity Funded	7.3
	2019	35km 20" PRMS to Nyinahin Pipeline	Debt Funded	55.1
	2019	100km 20" PRMS to Nyinahin Pipeline	Debt Funded	157.6
	2016	278km 20" Takoradi-Tema Pipeline FEED	Equity Funded	14.0
	2019	Centralized Assets (Non CDB)	Equity Funded	15.1
	2016	9km 6" TDS to Wangkang Ceramics Ltd Pipeline	Equity Funded	5.1
	2017	1km 4" TDS to Twyford Ghana Ltd Pipeline	Equity Funded	1.6
	2017	Marinus Isopentane GPP Tie-In Works (Phase 1)	Equity Funded	0.8
<u>Incoming Transmission Assets</u>	2022	278km 20" Takoradi-Tema Pipeline	Debt Funded	500.0
GNGC Total Transmission Asset Cost				886.2

Tariff Methodology – Usage Tariff

GNGC delivered tariff for Gathering, Processing and Transmission services is summarized as follows;

50% of Condensate Revenue and 100% LPG Revenue are classified as an offsetting component in the tariff build up, the proposed tariff would be **\$2.159/MMBtu** as required revenue is **\$ 132.47Million**.

Find detailed breakdown below:

	Proposed Tariff With 50% Condensate NGL Offset (\$/MMBtu)	Existing PURC Tariff (\$/MMBtu)	Variance(\$/MMBtu)	% Change
Gathering	0.373	-	0.373	100%
Processing	0.867	0.336	0.587	158%
Transmission	0.919	0.728	0.191	26%
Total	2.159	1.064	1.095	203%

Appendices – Usage Tariff

Several scenarios have been considered in the allocation of the tariff for 2022:

1. **Tariff Based on CDB Asset Inclusion**
2. Tariff Based on no NGL Offsetting
3. Tariff Based on only LPG as Offset

In event of including CDB assets to GNGC’s asset base, revenue required (total cost of service) would surge to **\$226.77Million**, hence increasing the proposed tariff to **\$3.690/MMBtu** as detailed below.

	Proposed Tariff Without CDB Assets (\$/MMBtu)	Proposed Tariff With CDB Assets (\$/MMBtu)	Variance(\$/MMBtu)	% Change
Gathering	0.373	0.858	0.485	130%
Processing	0.867	1.484	0.617	71%
Transmission	0.919	1.349	0.429	47%
Total	2.159	3.690	1.531	71%

Appendices – Usage Tariff

Several scenarios have been considered in the allocation of the tariff for 2022:

1. Tariff Based on CDB Asset Inclusion
2. **Tariff Based on no NGL Offsetting**
3. Tariff Based on only LPG as Offset

Should NGLs revenue not be classified as an offsetting component in the tariff build up, the proposed tariff would increase to **\$2.854/MMBtu** as required revenue increases to **\$166.69Million**. Find detailed below:

	Proposed Tariff With NGL Offset (\$/MMBtu)	Proposed Tariff Without NGL Offset (\$/MMBtu)	Variance(\$/MMBtu)	% Change
Gathering	0.373	0.586	0.214	57%
Processing	0.867	1.348	0.481	55%
Transmission	0.919	0.919	-	0%
Total	2.159	2.854	0.694	32%

Appendices – Usage Tariff

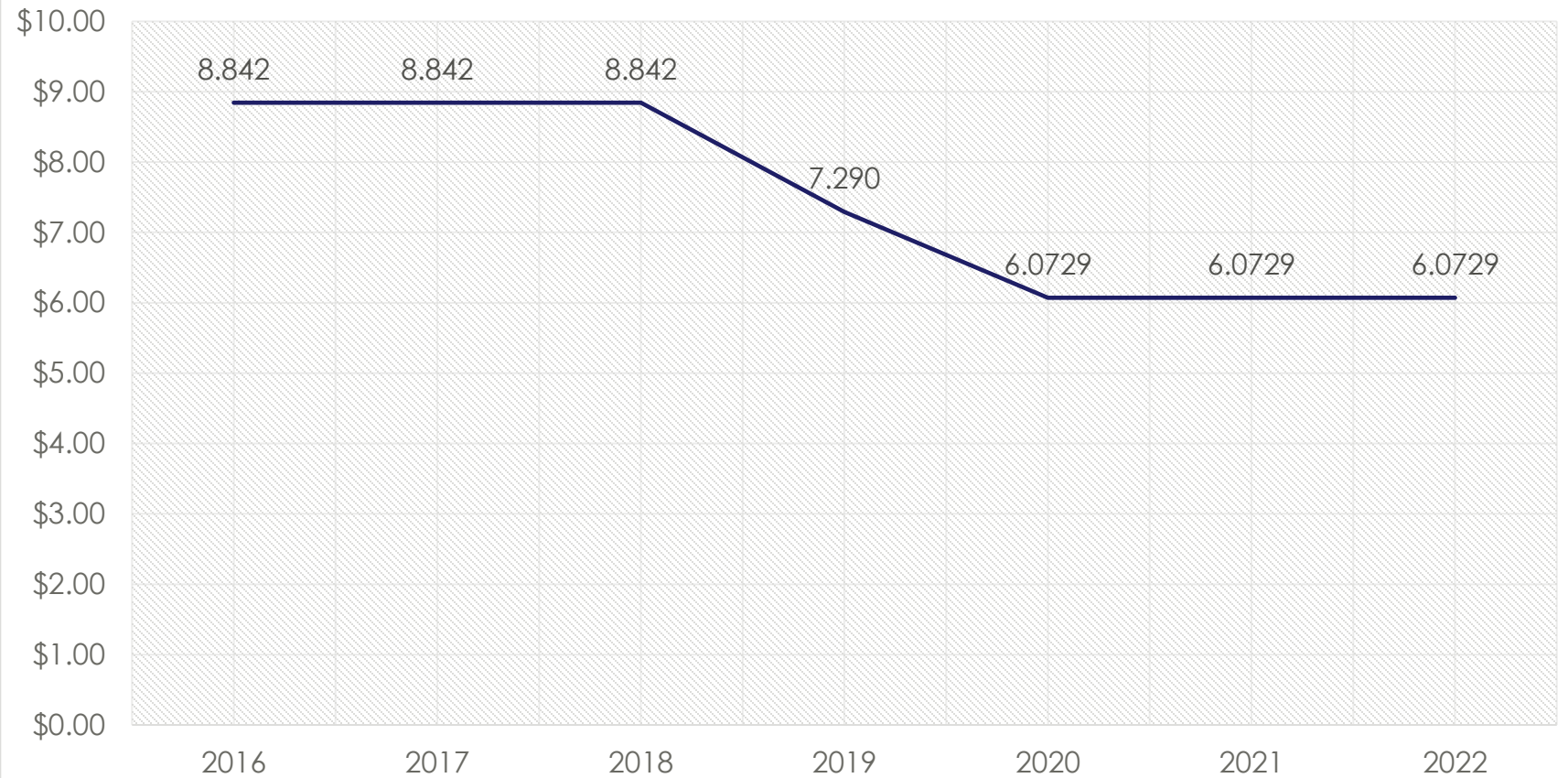
Several scenarios have been considered in the allocation of the tariff for 2022:

1. Tariff Based on CDB Asset Inclusion
2. Tariff Based on no NGL Offsetting
- 3. Tariff Based on only LPG as Offset**

Should LPG revenue be classified as the only offsetting component in the tariff build up, the proposed tariff would increase to **\$2.204/MMBtu** as required revenue increases to **\$134.66Million**. Find detailed below:

	Proposed Tariff With NGL Offset (\$/MMBtu)	Proposed Tariff on only LPG as Offset (\$/MMBtu)	Variance(\$/MMBtu)	% Change
Gathering	0.373	0.387	0.014	4%
Processing	0.867	0.898	0.031	4%
Transmission	0.919	0.919	-	0%
Total	2.159	2.204	0.044	2%

Delivered Gas Price



Price Breakdown (8.842)

Gas Price	\$8.8424/mmbtu
Commodity	\$2.9/mmbtu
Gathering	\$1.3729/mmbtu
Process	\$1.8298/mmbtu
Trans	\$2.0752/mmbtu
PURC levy	\$0.6645/mmbtu

Price Breakdown (7.290)

Gas Price	\$7.29/mmbtu
Commodity	\$2.39/mmbtu
Gathering	\$1.13/mmbtu
Process	\$1.51/mmbtu
Trans	\$1.71/mmbtu
PURC levy	\$0.55/mmbtu