

DRIVING DOWNSTREAM GAS SOLUTIONS



GHANA GAS FORUM
2021

MOVENPIC HOTEL, ACCRA

GHANA GAS

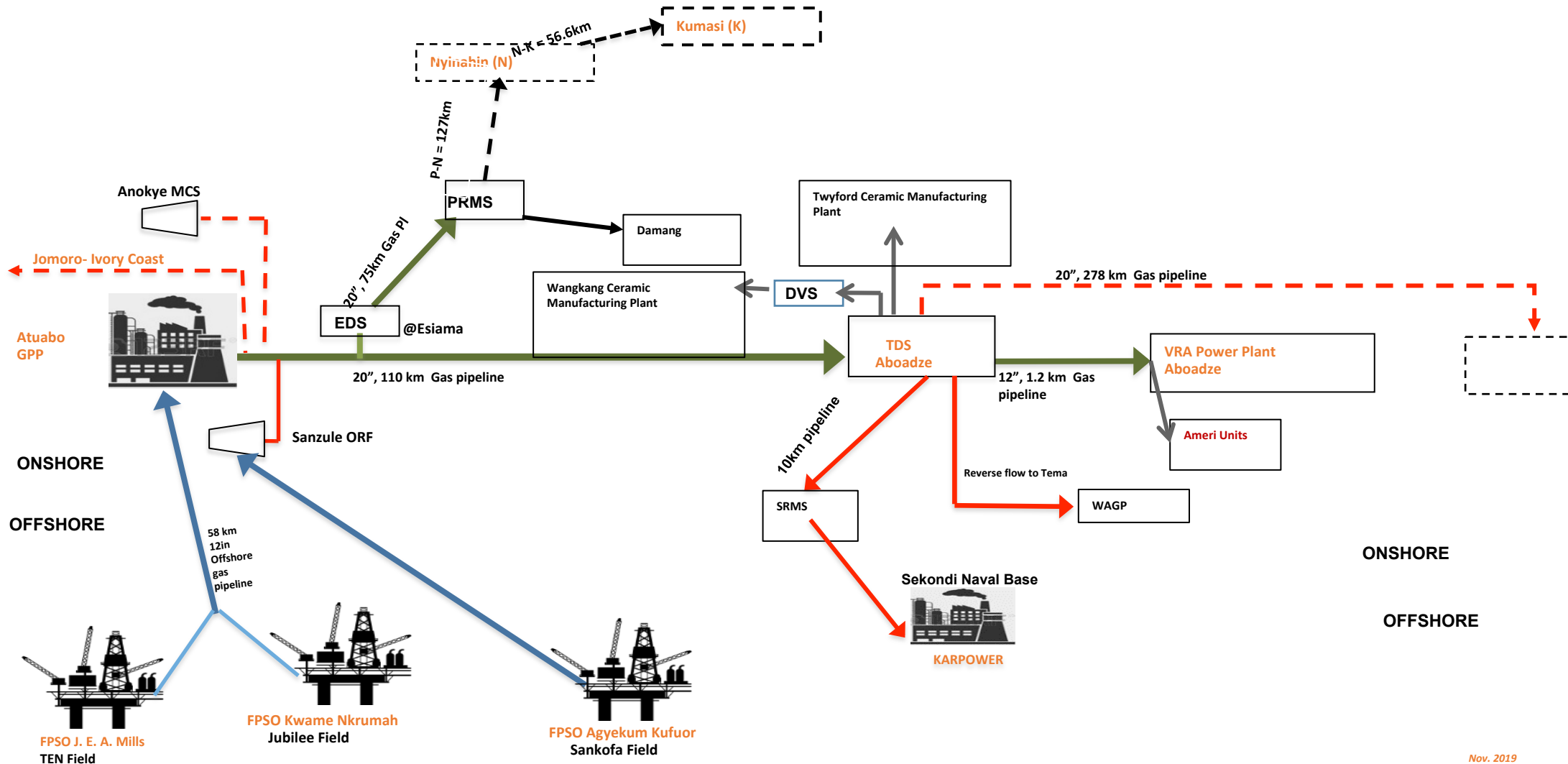


Ghana Gas

- 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.



Existing & Planned Infrastructure



Nov. 2019

Ghana Gas' Infrastructure - Access to Markets

	<u>Gathering</u>	<u>Processing</u>	<u>Transport</u>	<u>Other Prospects</u>
2014	58Km Offshore Pipeline	150 MMScfd Gas Processing Plant	111Km 20" Pipeline (Capacity: 405MMScfd)	NGLs Loading Gantry
2018			Mainline Compressor Station	LPG Bottling Facility
2019 - 2020		Lean Gas Optimization/ GPP Upgrade	Inland Pipeline to Tarkwa, Nyinahin (Bauxite) and Kumasi Pipeline to West of GPP to Ivory Coast	Ammonia /Urea Production Plant
>2020	New Offshore Pipelines for new Indigenous Gas	2nd Train Processing Plant	Localized Distribution Pipelines (Tema + Tak'di)	Calm Buoy/Jetty/ SBM near Bottling Plant

Institutions and Regulators

Policy Formulation

- The Ministry of Energy is the sector ministry responsible for the formulation, coordination and monitoring of the implementation of energy policies through its sector agencies

1. Regulators

Regulator	Activity
<ul style="list-style-type: none"> • Petroleum Commission 	<ul style="list-style-type: none"> • Regulates upstream activities. The Petroleum Commission (PC) was established under the Petroleum Commission Act, 2011, (Act 821), to regulate and manage the utilization of petroleum resources and to coordinate policies in relation to them. The Petroleum Commission is also responsible for promoting and enforcing Local Content and Local Participation in the upstream petroleum sector in Ghana.
<ul style="list-style-type: none"> • Energy Commission 	<ul style="list-style-type: none"> • Technical regulator of the Energy sector
<ul style="list-style-type: none"> • Ghana Standards Authority 	<ul style="list-style-type: none"> • Promotes standardization of measurement equipment such as weighbridges, and other products (e.g. LPG)
<ul style="list-style-type: none"> • National Petroleum Authority 	<ul style="list-style-type: none"> • Regulate petroleum downstream industry in Ghana
<ul style="list-style-type: none"> • Public Utilities Regulatory Commission (PURC) 	<ul style="list-style-type: none"> • Economic regulation of the Energy sector (Gas and utility tariffs)
<ul style="list-style-type: none"> • Environmental Protection Agency 	<ul style="list-style-type: none"> • Environment related permits and activities

2. Institutions

GNPC - Ghana National Petroleum Corporation

The Ghana National Petroleum Corporation (GNPC) was established under the P.N.D.C.L.64 in 1984 and was mandated to advise Government on petroleum matters and to promote the exploration and orderly development of the petroleum resources of the country. Currently, the GNPC is the National Oil Company (NOC) and a commercial operator holding the Government's interests in petroleum operations/Agreements in Ghana. Under the Petroleum Revenue Management Act 2011, Act 815, a specific percentage of the net cash flow from the carried and participating interests is ceded to the GNPC for use in its operations.

Gas Supply Sources in Ghana

Currently, there are three (3) sources of gas supply to Ghana. These are; Domestic (indigenous) source, Regional source (e.g. WAGPCO) and LNG imports

*Ghana is currently utilizing gas from the first two (domestic and regional) sources. LNG imports is yet to commence. However, contracts have been signed for infrastructure development and supply of LNG to Ghana

Current Domestic Gas Production Fields in Ghana

1. Jubilee Field

Operator of the field is Tullow Ghana Ltd on behalf of the Jubilee Partners which consist of Tullow Ghana Limited, GNPC, Kosmos Energy, Anadarko and PetroSA Ghana. Under Jubilee Gas Sales Agreement, Ghana is to receive 200Bcf of gas at zero cost from the Jubilee field. This volume of gas is called Jubilee Foundation Volume Gas. This foundation volume gas is supplied under Reasonable Endeavours/Interruptible supply regimes.

2. Tweneboah-Enyenra-Ntomme (TEN) Field

This field, located about 20km West of the Jubilee Field, was discovered in 2009. The Field is operated by Tullow Ghana Ltd on behalf of the TEN Partners which consist of Tullow Ghana Limited, GNPC, Kosmos Energy, Anadarko and PetroSA Ghana.

NB: Jubilee and TEN raw gas is supplied to Ghana Gas' GPP at Atuabo for processing before lean gas obtained from the processing activity is delivered to downstream customers.

3. Sankofa – Gye Nyame Field (SGN)

This involves the development of the Sankofa and Gye Nyame gas fields located about 60km Offshore Cape Three Points (OCTP). It holds an estimated reserve of about 1.45 trillion cubic feet of non-associated gas. The field is operated by ENI Ghana limited on behalf of the partners which consist of ENI Ghana Limited, Vitol Ghana Limited and GNPC.

4. Regional Gas Supply Source to Ghana

Natural gas is also supplied from Nigeria to Ghana through the West African Gas Pipeline operated by the West African Gas Pipeline Company (WAPCO). This pipeline, which is about 678km starts from Nigeria and passes through Benin and Togo to Ghana. There are two delivery points in Ghana, that is, Tema and Takoradi.

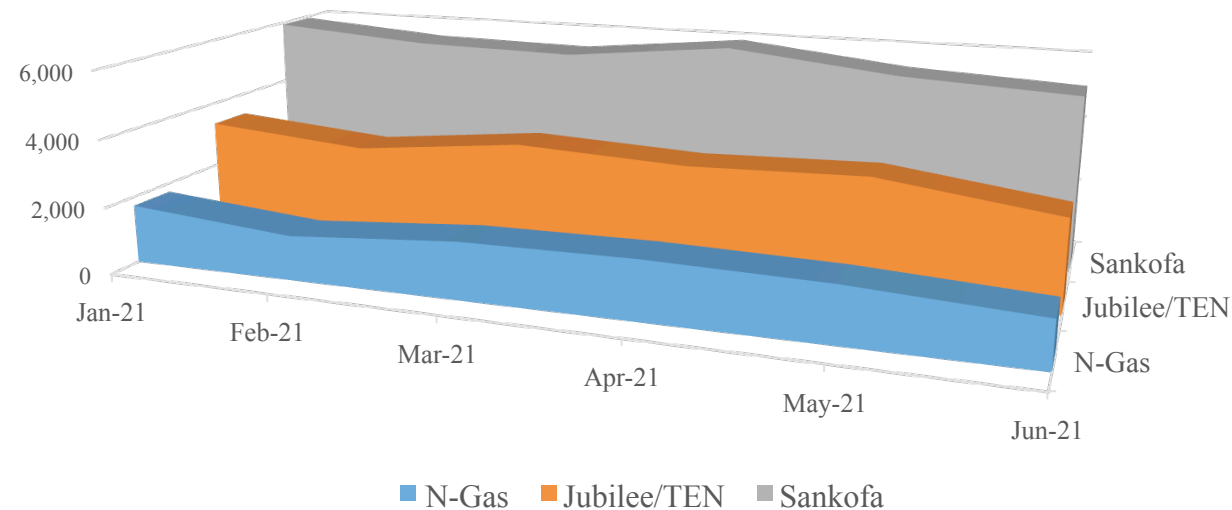
Gas Demand & Supply

Gas Consumption in H1

	Unit	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21
Jubilee/TEN	MMScf	3,344	2,944	3,469	3,246	3,385	2,718
Sankofa	MMScf	5,937	5,573	5,484	5,985	5,428	5,169
N-Gas	MMScf	1,736	1,324	1,690	1,744	1,647	1,368
Total	MMScf	11,017	9,841	10,643	10,975	10,460	9,255
Avg. Daily Consumption	MMScf	355	351	343	366	337	308

Overall Average Daily Gas Consumption at **344 MMScf/d** vs forecasted at **356 MMScf/d**

Gas Consumption from Sources



Total Gas Consumption
(62,192 MMScf)

Indigenous Gas contributed 85%
(52,682 MMScf) of total gas consumed

Regional Source (N-Gas) contributed 15%
(9,509 MMScf)

Gas-to-Power (95%)
Gas-to-Non Power (5%)

Gas Commercialization

✍ With the Government's "No flaring" policy, it is the priority of Government to monetize or commercialize all indigenous/domestic gas resources. The development of indigenous gas is given utmost priority.

✍ Natural gas from upstream is supplied to the GPP at Atuabo (Midstream) from the Jubilee and/TEN field. The gas is exported from the FPSOs at about 150 Bar pressure and is received at the GPP inlet between 130 – 140 Bar pressure. The products obtained from processing (fractionation) of this raw gas at the GPP are

1. Lean Gas (Sales gas)

✍ This is made up of mainly methane (CH₄) and small percentage of Ethane (C₂H₆). This is transported at a pressure of about 50 Barg on the onshore pipeline to Ghana Gas' TRMS, and subsequently to Aboadze for power generation, and industrial customers for heating purposes. It exists as gas at room temperature.

✍ It can however be liquefied (LNG) at very low temperatures (-162°C or -260°F) or compressed (CNG) at high pressures of 200 – 250 Barg.

2. Liquefied Petroleum Gas (LPG)

✍ It is made up of Propane (C₃H₈) and Butane (C₄H₁₀) is liquid at room temperature. This is transported by Dedicated Bulk Road Vehicles (BRVs) from Atuabo to various retail outlets operated by Oil Marketing Companies for domestic and commercial use.

✍ LPG, like natural gas, has no smell. Accordingly, before it is transported onto the local market, it is spiked with a chemical, Mercaptan, which is a Sulphur compound, to give it a smell for easy detection when there is leakage at homes or commercial place.

4. Condensate

Also known as Natural Gasoline. Also transported by Dedicated BRVs from Atuabo to Tema Oil Refinery (TOR) to be used as feedstock for blending into other petroleum products.

5. Iso-pentane

There is an ongoing project to commercialize this product.

Gas Marketing and Utilization

1. Marketing

- ✎ Marketing is defined as the performance of business activities that direct the flow of goods and services from producer to consumer in order to satisfy customers and accomplish the firm's objective.
- ✎ Marketing of petroleum products involves distribution to Bulk Distribution Companies (BDCs) and Oil Marketing Companies (OMCs) such as GOIL, BOST, Shell, Total and all other local distribution/marketing companies, who then distribute the product to consumers.

2. Gas Utilization

Channel through which natural gas are marketed includes: Domestic market, Commercial market , Industrial market , Chemical feedstock – fertilizer production, petrochemical industry, Export and Power generation

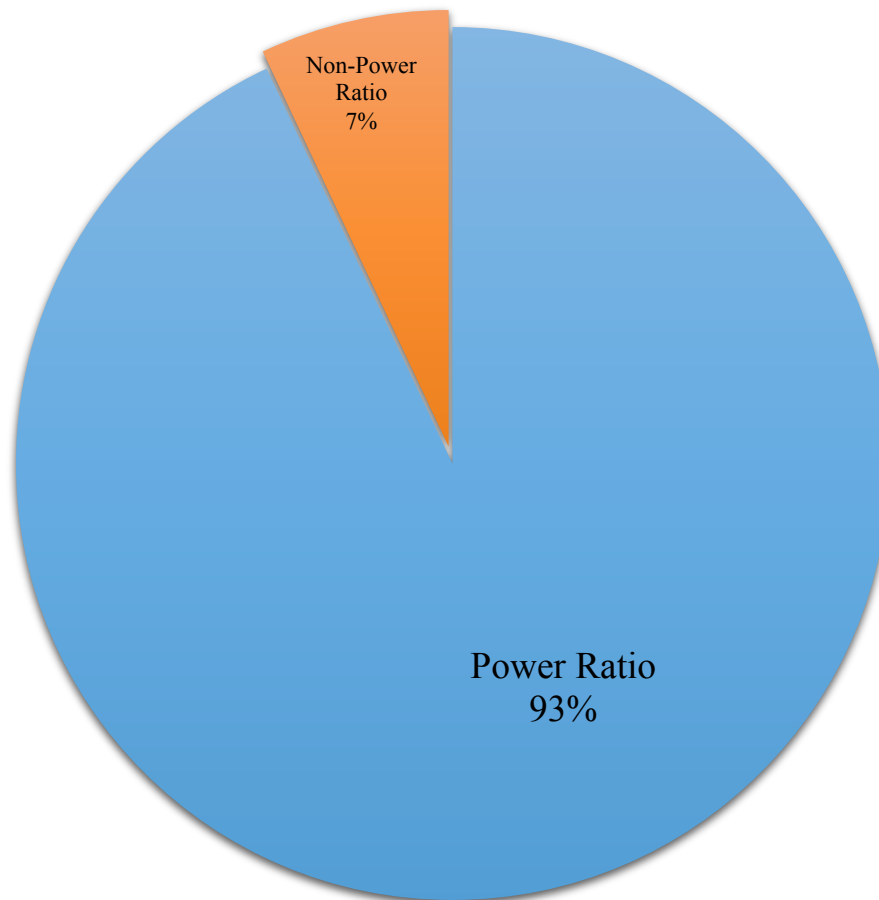
3. Domestic market

The three major uses of natural gas in residential premises are cooking, water heating, and space heating. In much of the developed world, it is supplied through pipes to homes, where it is used for many purposes including ranges and ovens, gas-heated clothes dryers, heating/cooling, and central heating. Heaters in homes and other buildings may include boilers, furnaces, and water heaters

4. Commercial market

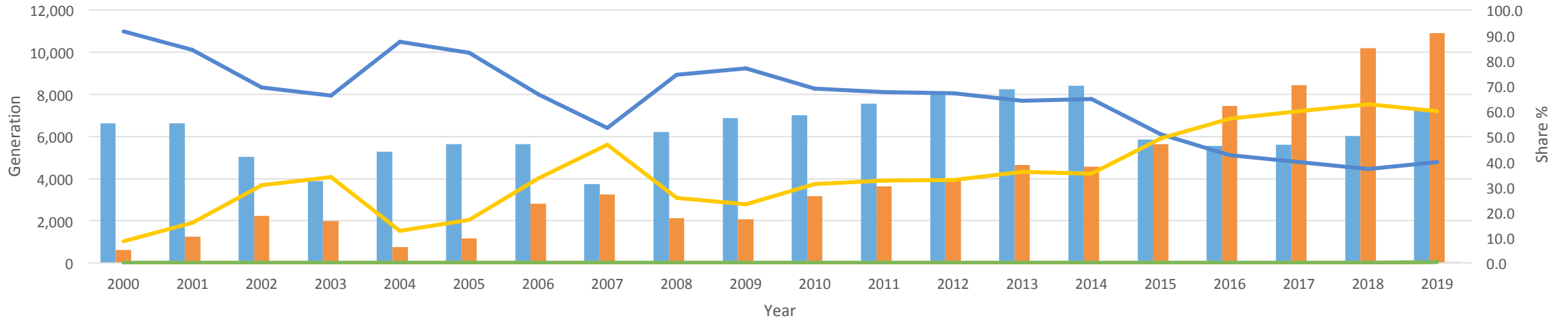
Commercial uses of natural gas are very similar to residential uses. The commercial sector includes public and private enterprises, like office buildings, schools, churches, hotels, restaurants, and government buildings. The main uses of natural gas in this sector include space-heating, water heating, and cooling. For restaurants and other establishments that require cooking facilities, natural gas is a popular choice to fulfil these needs

Downstream Demand



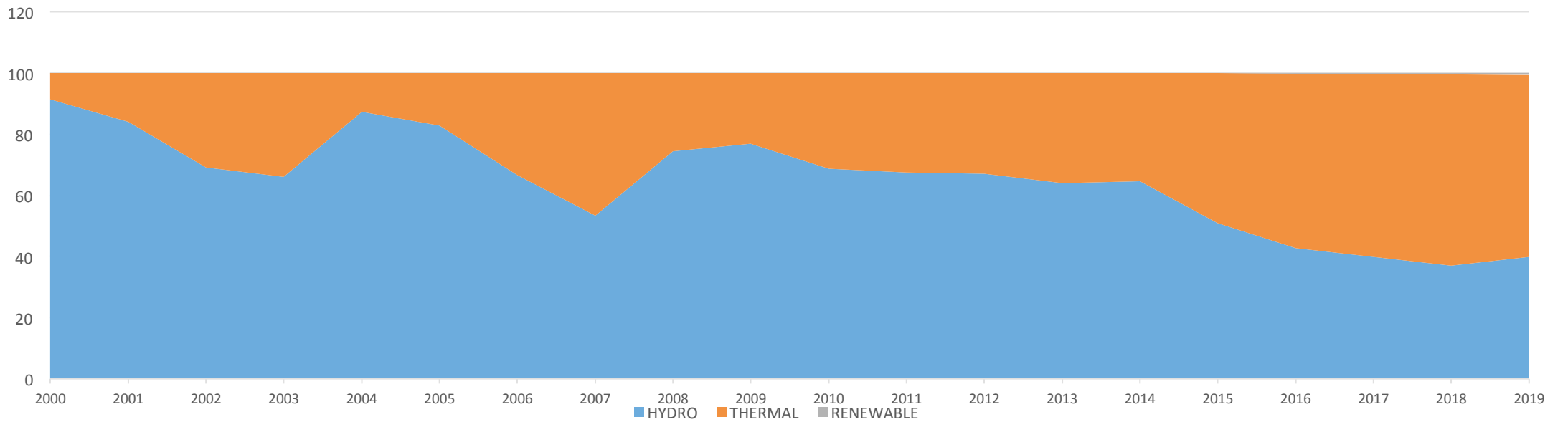
	2016	2017	2018	2019	2020	Average
Power Ratio	99%	94%	93%	89%	92%	93%
Non-Power Ratio	1%	6%	7%	11%	8%	7%

Grid Electricity Generation (MW)

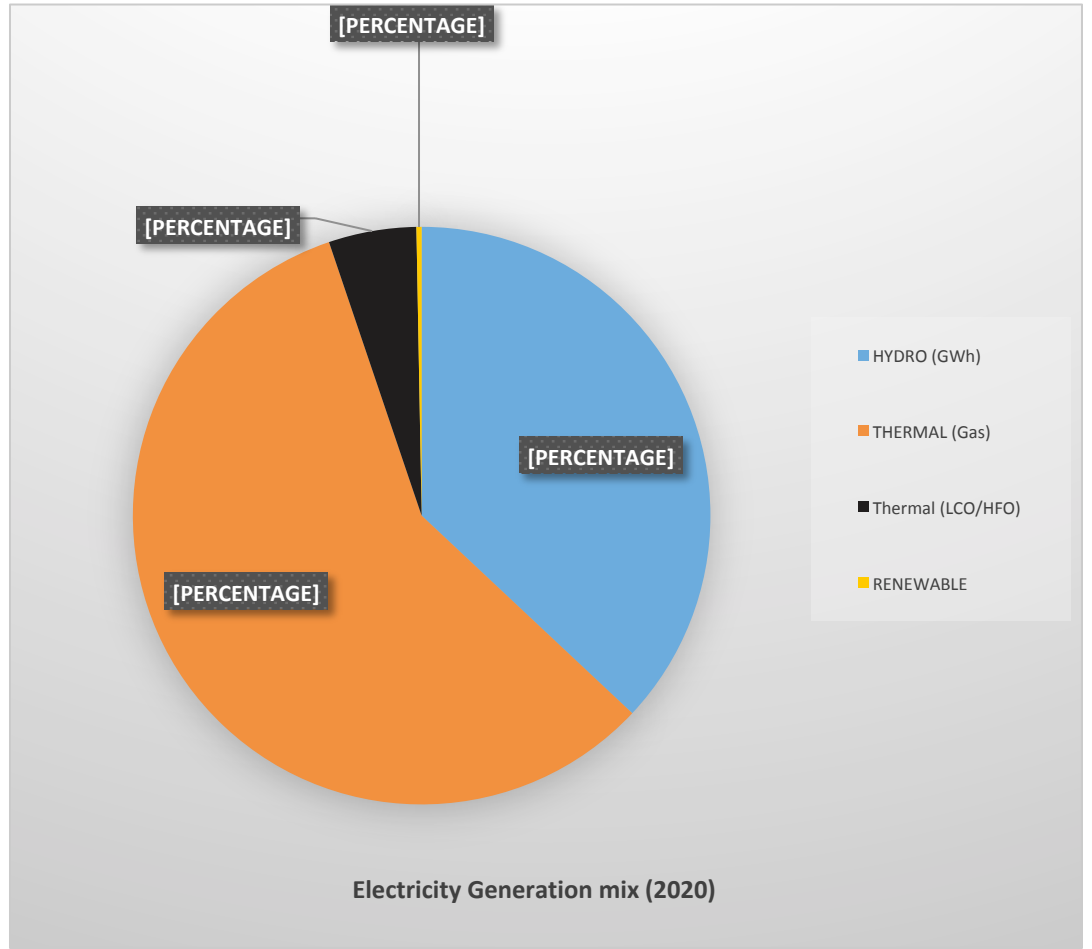
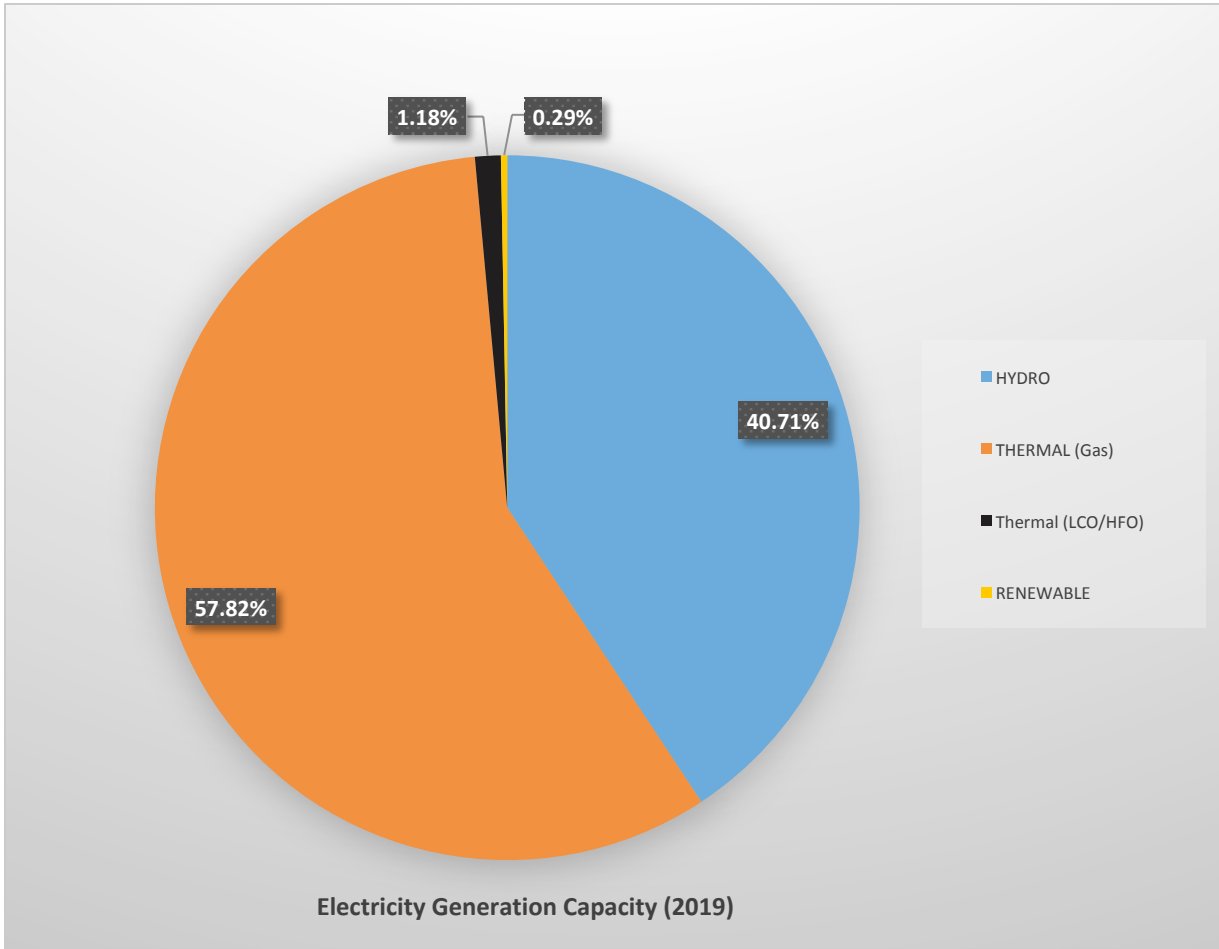


■ GENERATION
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 — SHARE%
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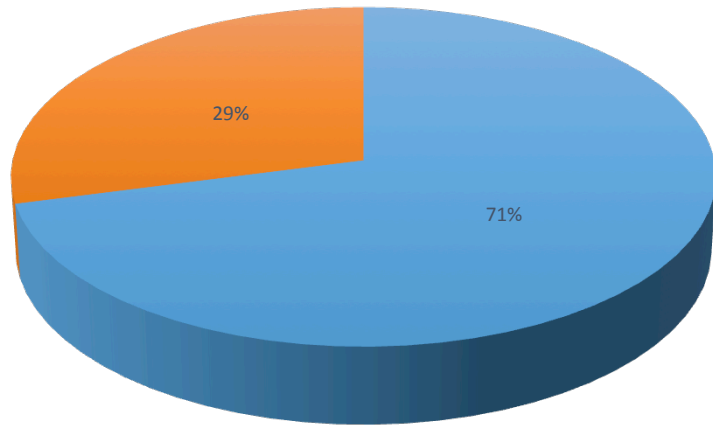
ENERGY GENERATION CAPACITY (% SHARE)



■ HYDRO
 ■ THERMAL
 ■ RENEWABLE

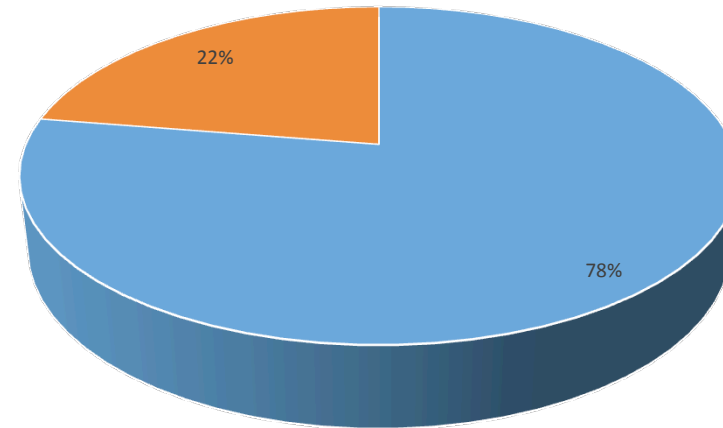


Domestic Vs Regional Supply 2019



■ Domestic Supply ■ Regional Supply (N-Gas)

Domestic Vs Regional Gas Supply 2020



■ Domestic Supply ■ Regional Supply (N-Gas)

Take Home

In accordance with the SDG goal 7, Global Energy drive would focus on the following factors;

- Availability / Accessibility
- Affordability
- Sustainability

The Role of Gas



GHANA GAS
GHANA NATIONAL GAS COMPANY

Thank You

Ghana National Gas Company