Natural Gas Statistics

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GECF

Content

- What is Natural Gas?
- Data Collection
- Production and Marketable Production
- Gas Processing and Related Data
- Data Measurement Units

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What is Natural Gas?

- Natural gas is composed almost entirely of Methane, but does contain small amounts of other hydrocarbon gases such as ethane, propane, butane, pentane and non-hydrocarbon impurities.
- It is a colorless, shapeless, and odorless combustible, gaseous mixture composed of simple hydrocarbon compounds, usually found in deep underground reservoirs.
  - The “rotten egg” smell associated with natural gas is due to the addition of an odorant called Methanethiol (also called Mercaptan) to facilitate the detection of natural gas during leakages for example.

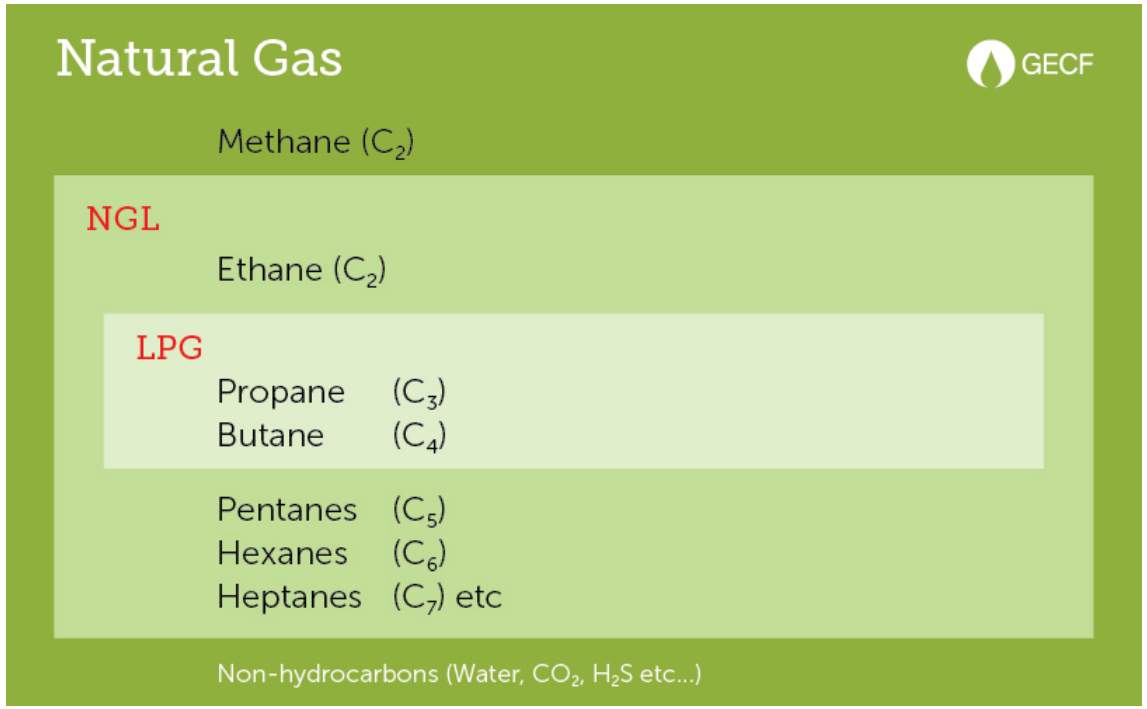

Image Source(s): GECF

What is Natural Gas?

Natural gas can be mainly found natural in underground reservoirs

- Associated gas (from fields producing both liquid and gaseous hydrocarbons), or
- Non-associated gas (from fields producing only gaseous hydrocarbons)
  - ➢ But includes also coal-related gases (seam gas and colliery gas), dissolved gas, shale gas

What are the major uses of natural gas?

- Power generation for industrial and residential usage;
- Fuel for furnaces and boilers in a variety of manufacturing industries;
- Feedstock for Petrochemicals plants, methanol;
- Fuel used in Natural Gas Vehicles (NGVs)/CNG

Image Source(s): GECF, NGT News, Angel Publishing

What is Natural Gas?

Conventional & Unconventional Gas

- Both conventional and unconventional gases are the same in terms of their chemical composition which is majorly methane.
- The notion 'unconventional gas' is used to signify the fact that these types of gas resources are found within the source rock where they are generated and cannot move due to ultralow permeability while for conventional gas they migrated, over a geological timeframe, through a suitable path and accumulate in a reservoir rock capped by a seal.
  - ➢ Because of their unusual geological locations, they require special technologies and techniques before they can be extracted.

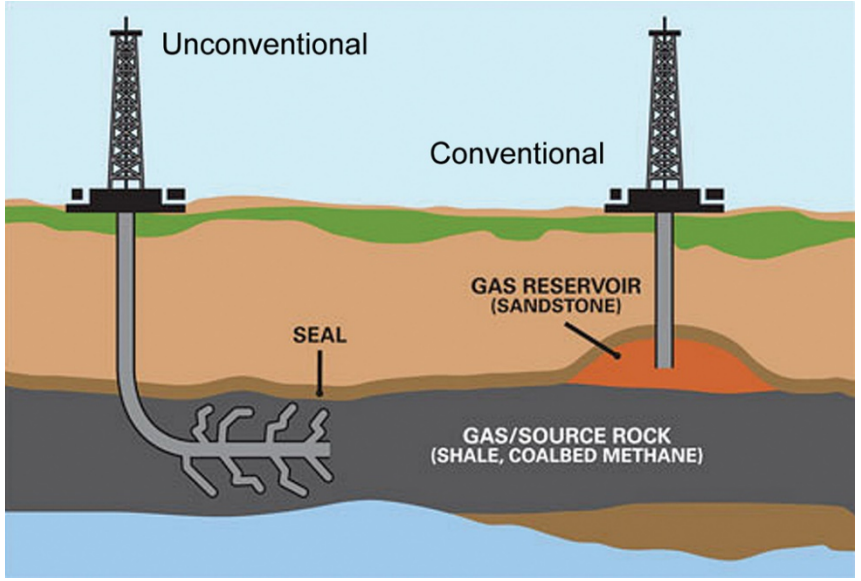

Image Source(s): World Information Transfer, Inc.

What is Natural Gas?

LNG / GTL

- Liquefied Natural Gas (LNG) is natural gas in liquid form. Produced natural gas can be cooled (liquefied) to about -161°C (-260°F) at normal pressure after pre-treatment to condense into liquid. This makes the transportation of natural gas to long distant markets possible since LNG takes up about 1/600th the volume of its gaseous form.
- LNG is usually transported in cryogenic vessels and kept in liquid form by auto-refrigeration, whereby any heat additions are balanced by the energy lost from LNG vapor vented out of storage and used to power the vessel. Once at its destination, the LNG is re-gasified and supplied to end users.
- Gas to liquids (GTL) is a chemical process in which natural gas is converted to gasoline or diesel fuel. The conversion results in synthetic super clean liquid fuels. The final product is easier to transport and targets wider markets of petroleum products.

Image Source(s): GECF, Shell (Qatar)

What is Natural Gas?

Gas Value Chain

- E&P companies explore, drill and extract natural gas from the ground.
- Then the transmission companies link the gas fields to major consuming areas either via pipelines or LNG.
- Local Distribution Companies (LDCs) deliver the natural gas to our respective homes.

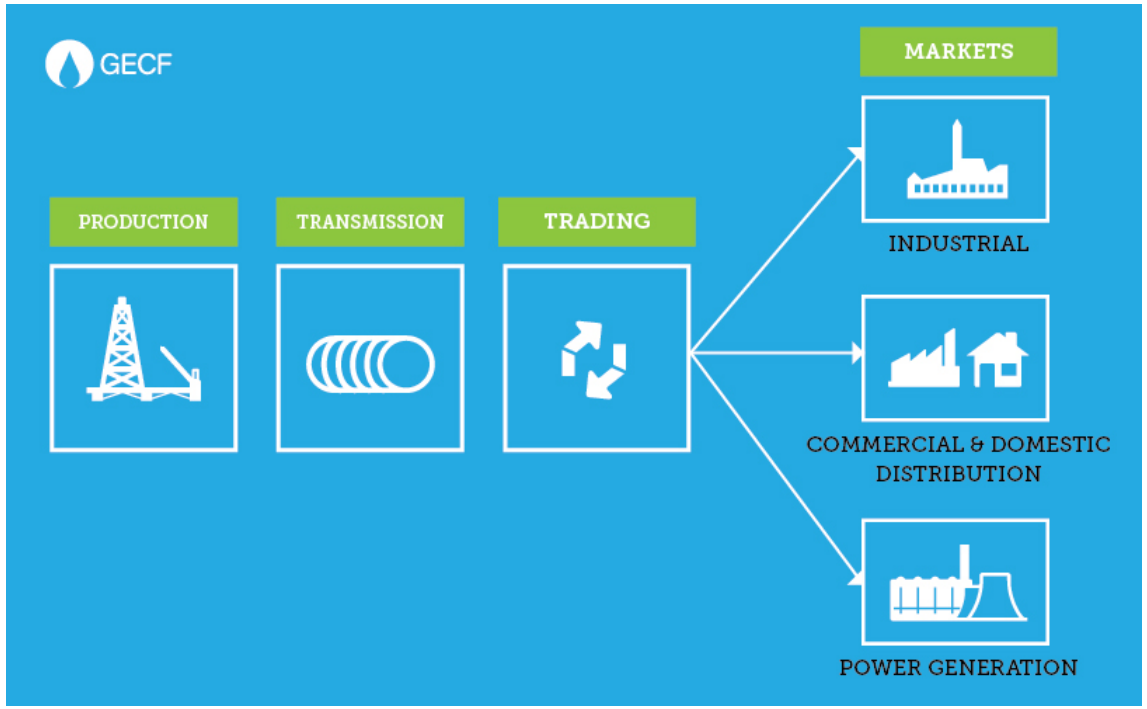

Image Source(s): GECF

What is Natural Gas?

Why is natural gas the fastest growing and preferred energy source?

- It is abundant
  - The natural gas resources base can last for about 234 years at the current consumption rates (supported by the technological innovation that allowed additional extraction in unconventional rock formations like shale, tight sands and coal beds)
- It is clean
  - 45% less CO2 emissions than coal and 30% less CO2 emissions than oil when combusted
  - On a kilowatt hour basis, natural gas produces up to 65% less emissions than coal and 25% less emissions than oil when used to generate electricity.
- It is versatile
  - Natural gas can be used in variety of ways from electricity generation, running of the manufacturing plants, feedstock for a range of products, heating & cooling as well as fuels for transportation.
  - Even where renewable energy sources are used for power generation, natural gas is always there to complement the unreliable nature of renewable energy sources when for example the sun does not shine or the wind does not blow enough to make meaningful power generation.
- It is affordable
  - On an energy-equivalent basis and the recent gas prices, abundant supplies of natural gas are available at lower prices when compared to energy content of other fossil fuels.
- It is efficient
  - Of all the conventional energy sources, natural gas is the most efficient (reaching up to 60% efficiency) when combusted in the internal combustion engine of gas fired power plants. This allows the utility companies to generate more electricity with less fuel consumption.

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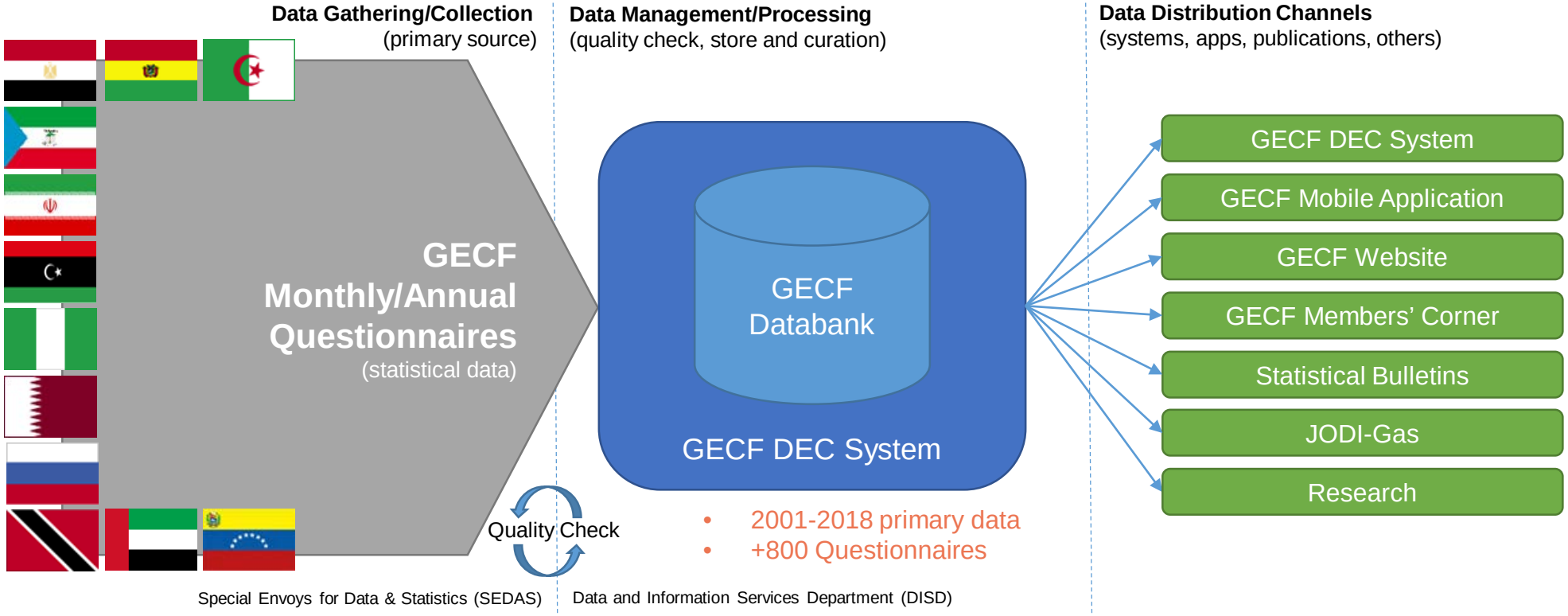
Data Collection

GECF Data Exchange Mechanism



Data Collection

GECF Data Exchange Mechanism: Monthly Questionnaire

Natural Gas Balance

- Indigenous Production
  - ✓ Associated
  - ✓ Non-Associated
- Production From Other sources
- Backflows
  - ✓ Reinjection
  - ✓ Flared
- Shrinkage
- Plants Own Use & Losses
- Marketed Production
- LNG Production
- LNG Plant Self Consumption & Losses
- Imports
  - ✓ Pipeline
  - ✓ LNG
- Exports
  - ✓ Pipeline
  - ✓ LNG
- Stock Change
- Statistical Difference
- ✓ Domestic Consumption
  - o Petrochemicals
  - o Power Generation
  - o Industrial Use
  - o Refineries
  - o Domestic Sector
  - o CNG Vehicles
  - o Derivatives
  - o Others

Natural Gas Liquids Production

- ✓ Period (Country/Month/Year)
- ✓ Field Name / Gas Plant Site
- ✓ Condensate
- ✓ LPG
  - o Field LPG
  - o Gas Plant LPG
- ✓ Other NGL
- ✓ Totals

Definitions and Conversion Factors

Data Collection

GECF Data Exchange Mechanism: Monthly Questionnaire

Reserves & Production
- Conventional Proven Reserves
- Conventional Yet-to-Find
- Unconventional Resources
- Chemical Composition of Natural Gas
- Enhanced Oil Recovery
- Gross Natural Gas Production
- Gas Production and Expansion Plans
- Oil Production
- Natural Gas Liquids Production
- Liquefied Natural Gas Production

Exploration & Development
- Seismic and other survey activities
- Exploratory Drilling
- Developing Drilling

Transportation & Storage
- Major Natural Gas Pipelines
- Additions to and withdrawals from gas storage

LNG
- LNG Characteristics
- Existing Liquefaction Terminals
- Under construction, planed o proposed liquefied terminals
- Existing Regasification Plants
- Under construction, planed o proposed regasification plants

Trade
- Gas Imports
- Gas Exports

Demand, Balances & Uses
- Total Natural Gas Demand
- Utilization of Natural Gas
- Natural Gas Balance

Contracts, Prices & Plans
- Contracts
- National Average Natural Gas Prices
- Natural Gas Production and Expansion Plans

Macroeconomics
- Macroeconomic Data
- GDP by Sector

Definitions and Conversion Factors

Comments

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Production and Marketable Production

Gross Production (GECF)

- Production of associated and Non-Associated Natural Gas wet or dry within the boundaries including off and on-shore fields. Associated Natural Gas is the Natural Gas produced in association with crude oil. Non-Associated Natural Gas is Natural Gas originating from fields producing hydrocarbons only in gaseous form.

Production (JODI-Gas) = Marketable Production (GECF)

- Refers to dry, marketable production within national boundaries including offshore.
- Quantities reinjected, flared and vented in situ are excluded.
- NGLs and impurities such as Sulphur are excluded.
- Included quantities used within the natural gas industry.
- Manufactured gases and biogas should be excluded!
- Two types: Calculated and Observed

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Gas Processing and Related Data

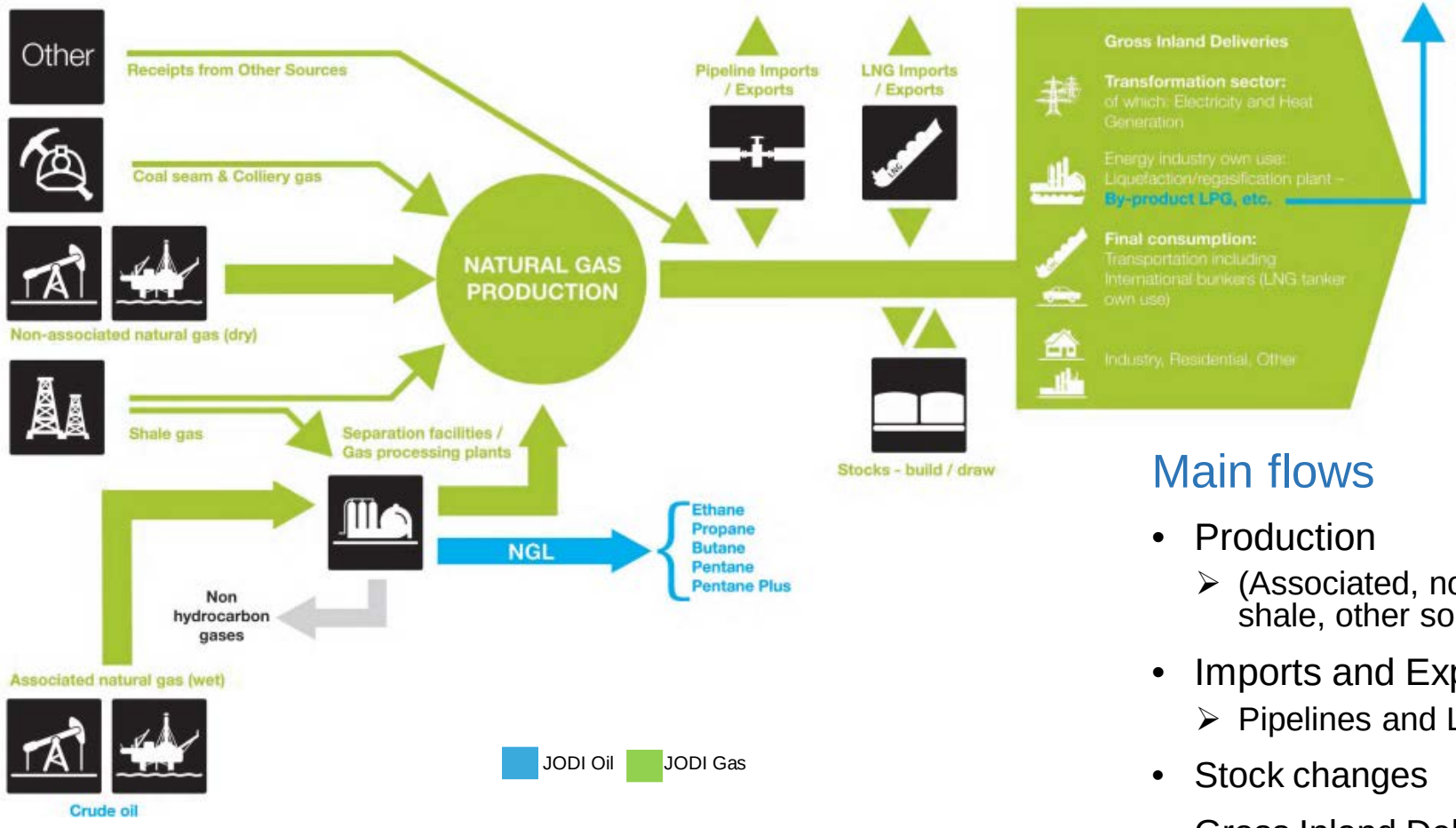


Image Source(s): JODI

Main flows

- Production
  - (Associated, non-associated, coal-related, shale, other sources)
- Imports and Exports
  - Pipelines and LNG
- Stock changes
- Gross Inland Deliveries Observed

Gas Processing and Related Data

JOINT ORGANISATION DATA INITIATVE - GAS QUESTIONNAIRE

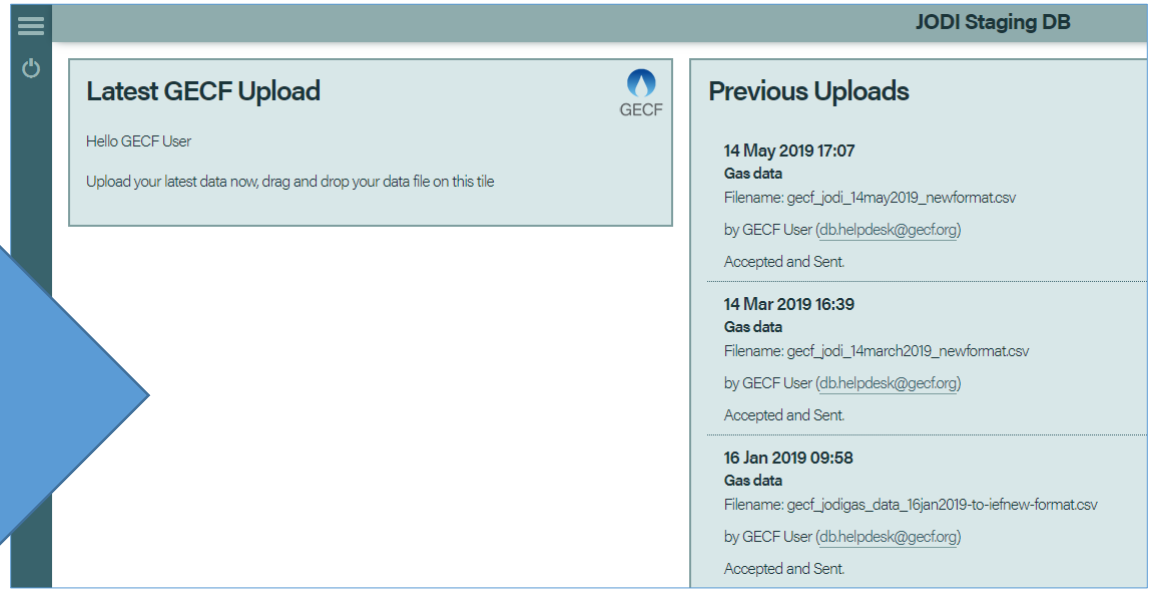
JodiGas

Country
Month
Year

	Natural Gas in million m^3 (at 15°C, 760 mm hg)	Natural Gas in Terajoules	Natural Gas (LNG) in 1000 metric tons
Production			
Receipts from Other Sources			
Imports			
LNG			
Pipeline			
Exports			
LNG			
Pipeline			
Stock Change			
Gross Inland Deliveries (Calculated)	0	0	
Statistical Difference (Calculated)	0	0	
Gross Inland Deliveries Observed			
of which: Electricity and Heat Generation			
Closing stocks			

Mass to volume conversion factor of LNG (if you have specific figure)

m^3/metric ton	LNG
Conversion factor	



Data Submission

- Stage 1: GECF DEM
- Stage 2: JODI-Gas Questionnaire
- Stage 3: GECF MCs Data to JODI World DB

Image Source(s): JODI

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Data Measurement Units

For the reporting process

- Volumetric units: Million Cubic Metres (m3), standard conditions*
- Energy units: TJ, gross basis
- Mass units: tons [LNG trade only]

To consider:

- Conversion between energy units and volumetric/mass units may depend on flow
- Calorific value needed if only one unit is reported (but countries are asked to report in both main units)

* Standard conditions: ISO 13433:1996 (Natural Gas Standard Reference Conditions)

Questions?

GECF

Gas defines GECF.
Data leads the way

Thank You!

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Tornado Tower, 47th, 48th Floor. West Bay, Doha, Qatar. www.gecf.org