NATURAL GAS

Natural gas statistics

Joint Rosstat - IEA workshop on Energy Statistics

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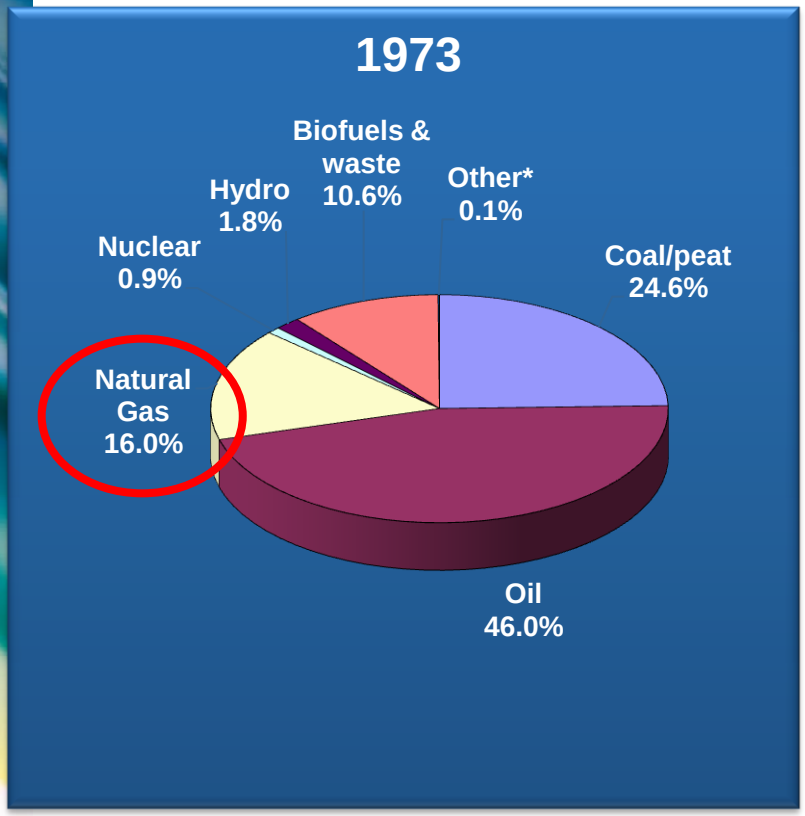
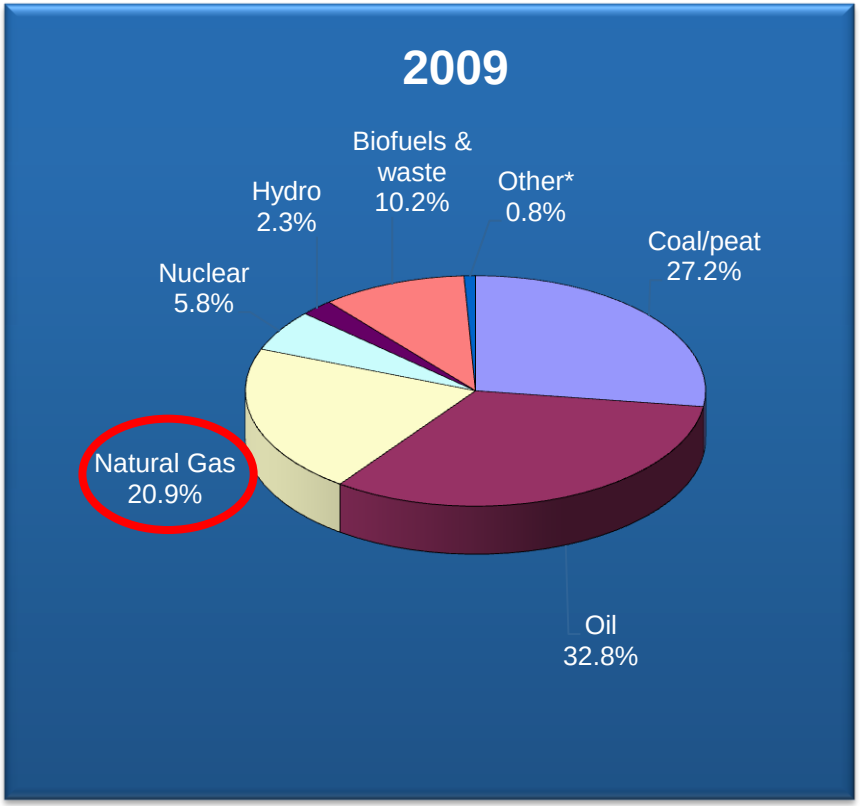
Overview

- The importance of gas in the world
- The Natural Gas Chain
  - ✓Basic Concepts
  - ✓Natural Gas Production
  - ✓Supply and Consumption
- Structure of the Questionnaire
  - ✓Table description and definitions
  - ✓Relations within the questionnaire
  - ✓Specific problems

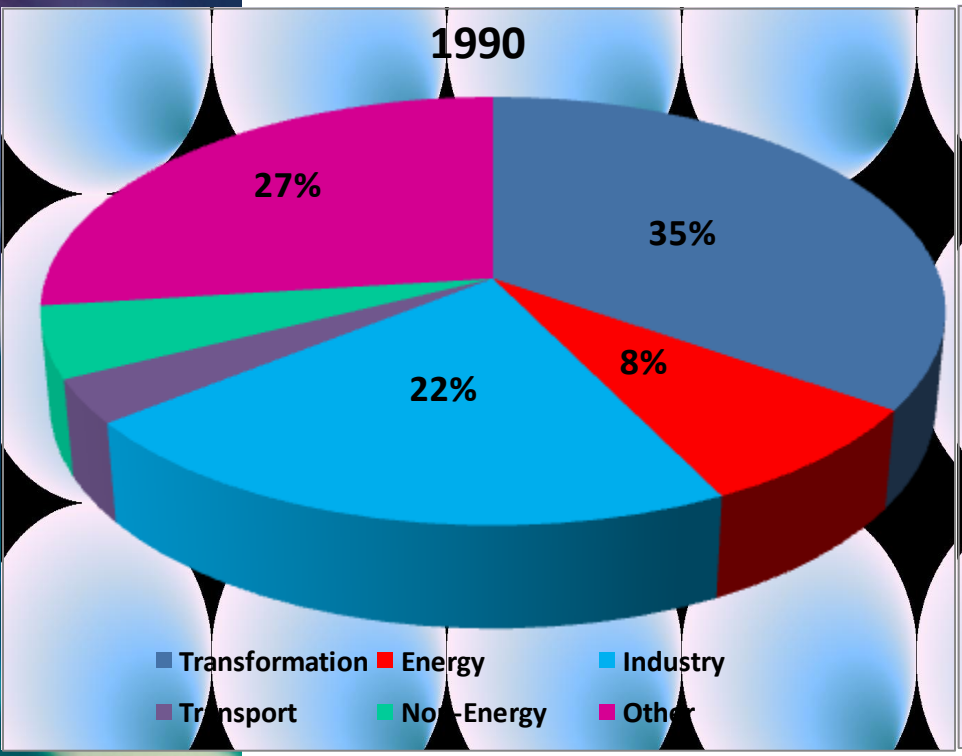
World - Share of natural gas in the energy mix

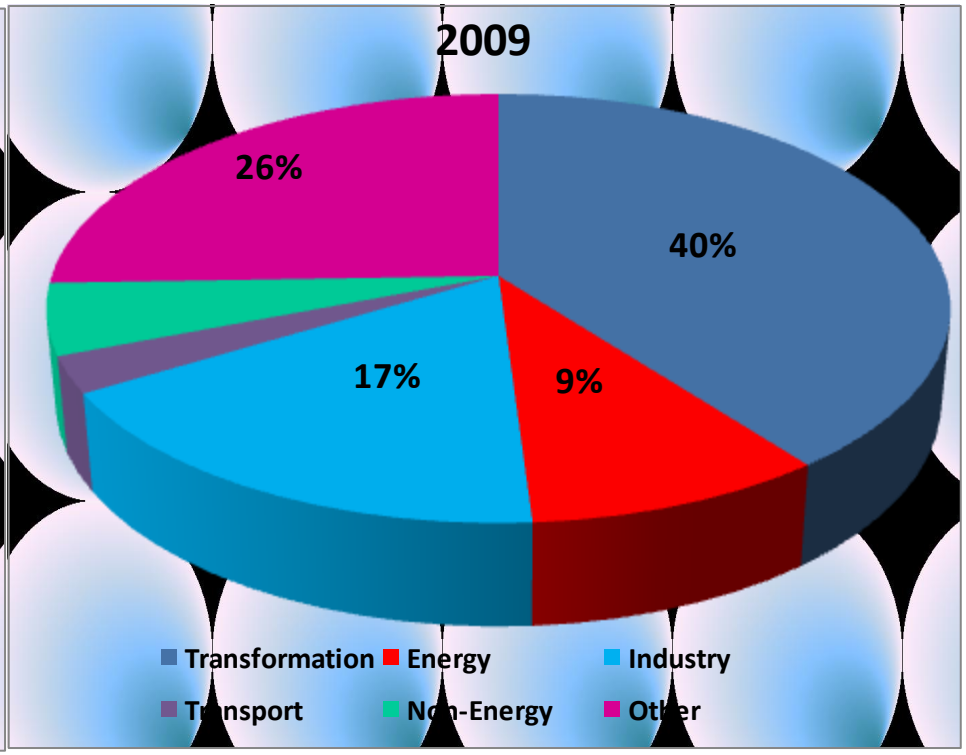




Increase in the share of natural gas in the world

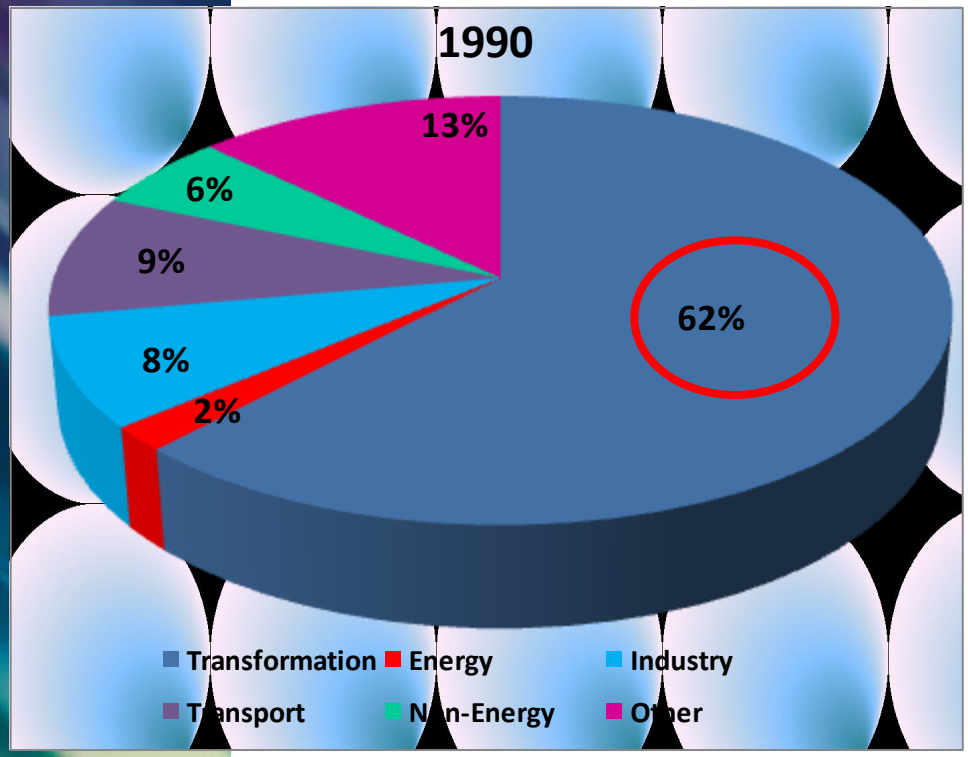
World – Use of natural gas

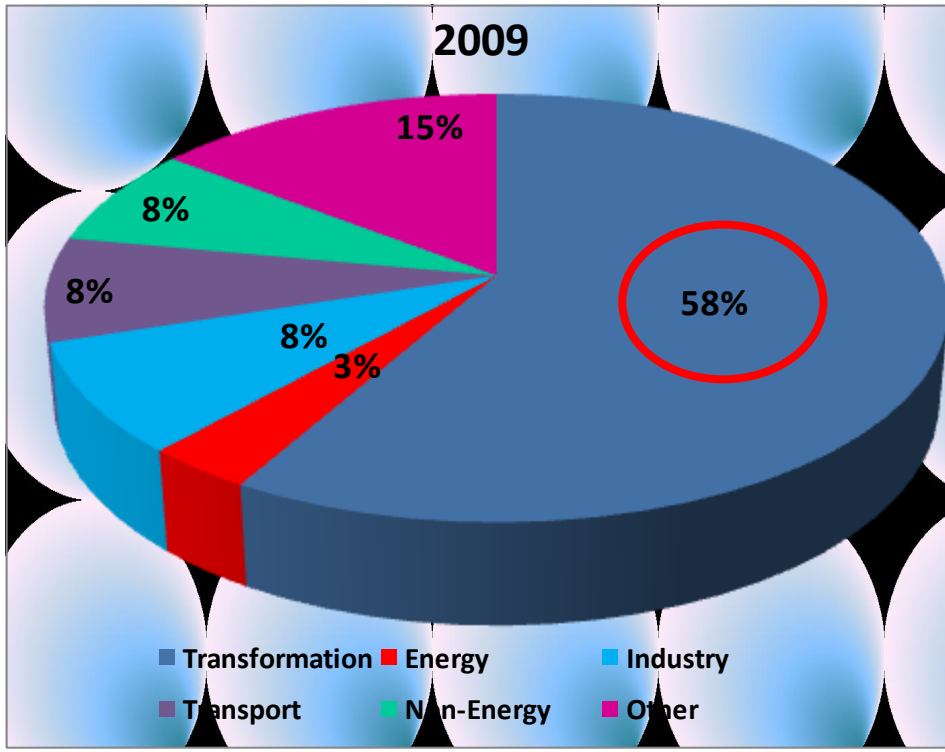




Natural gas use mainly for power generation (transformation)

Russia – Use of natural gas

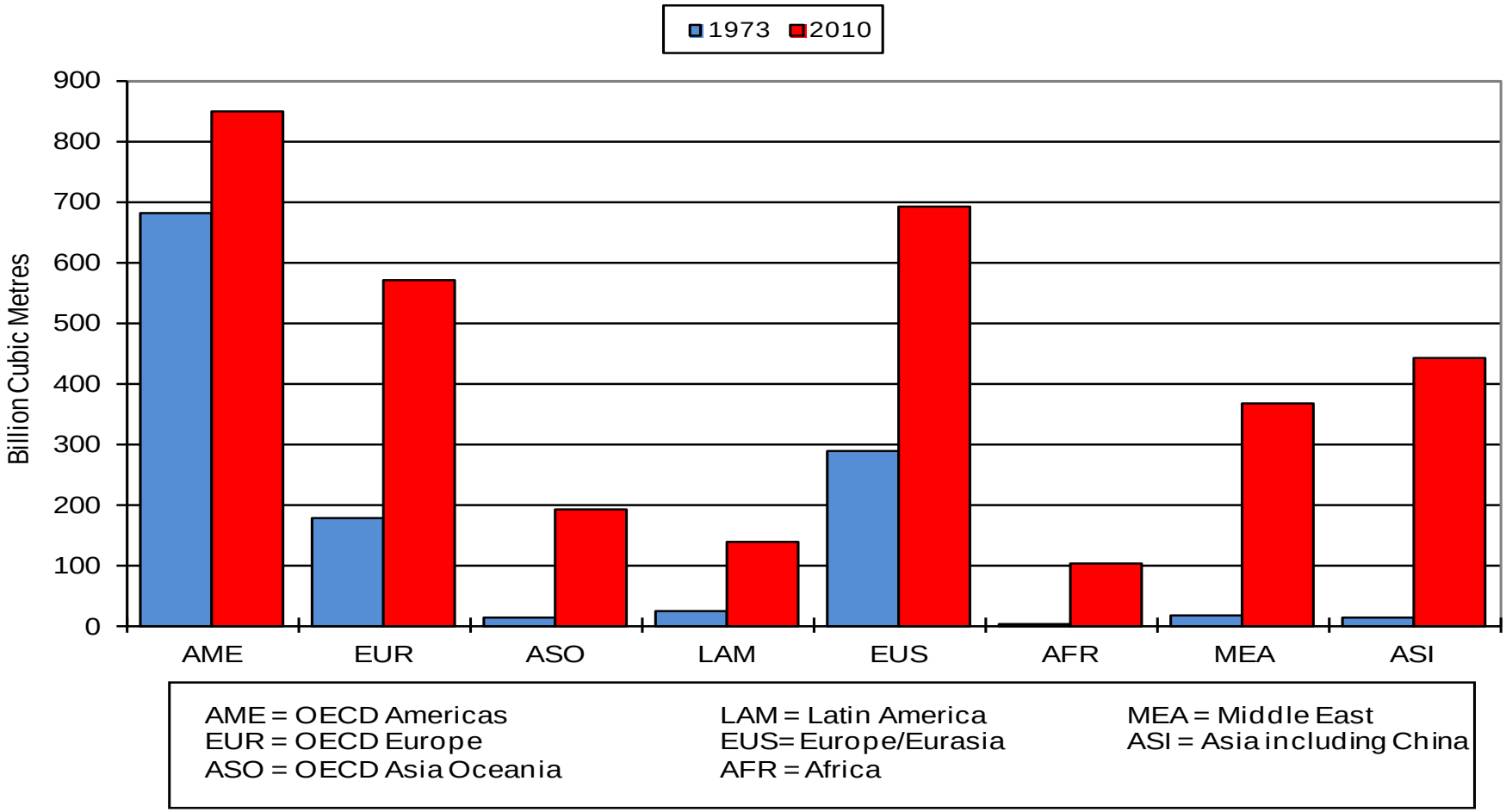




Around 60% of Natural gas used for power generation

World Regional Growth

Natural Gas Consumption



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Basic concepts

- Natural gas comprises several gases, but consists mainly of **methane**
- As a gas expands or compresses according to temperature and pressure, it is important that when measuring natural gas the **temperature and pressure** are taken into account
- Gas is usually measured in :
  - ✓ energy unit : TJ - Gross Calorific Value
  - ✓ Volume : million m^3
- Eurostat/IEA use **Standard Conditions**:
  - ✓ **Standard Conditions = 15 degrees C and 760 mm Hg**

Basic concepts (2)

- For conversion we need to know how many kJ there are per m^3
- When reporting data in a balance, specific kJ/m^3 conversion factors need to be known for the various flows:

  - Indigenous Production
  - Imports
  - Exports
  - Stock changes
  - Inland Consumption (obs)

Basic concepts (3)

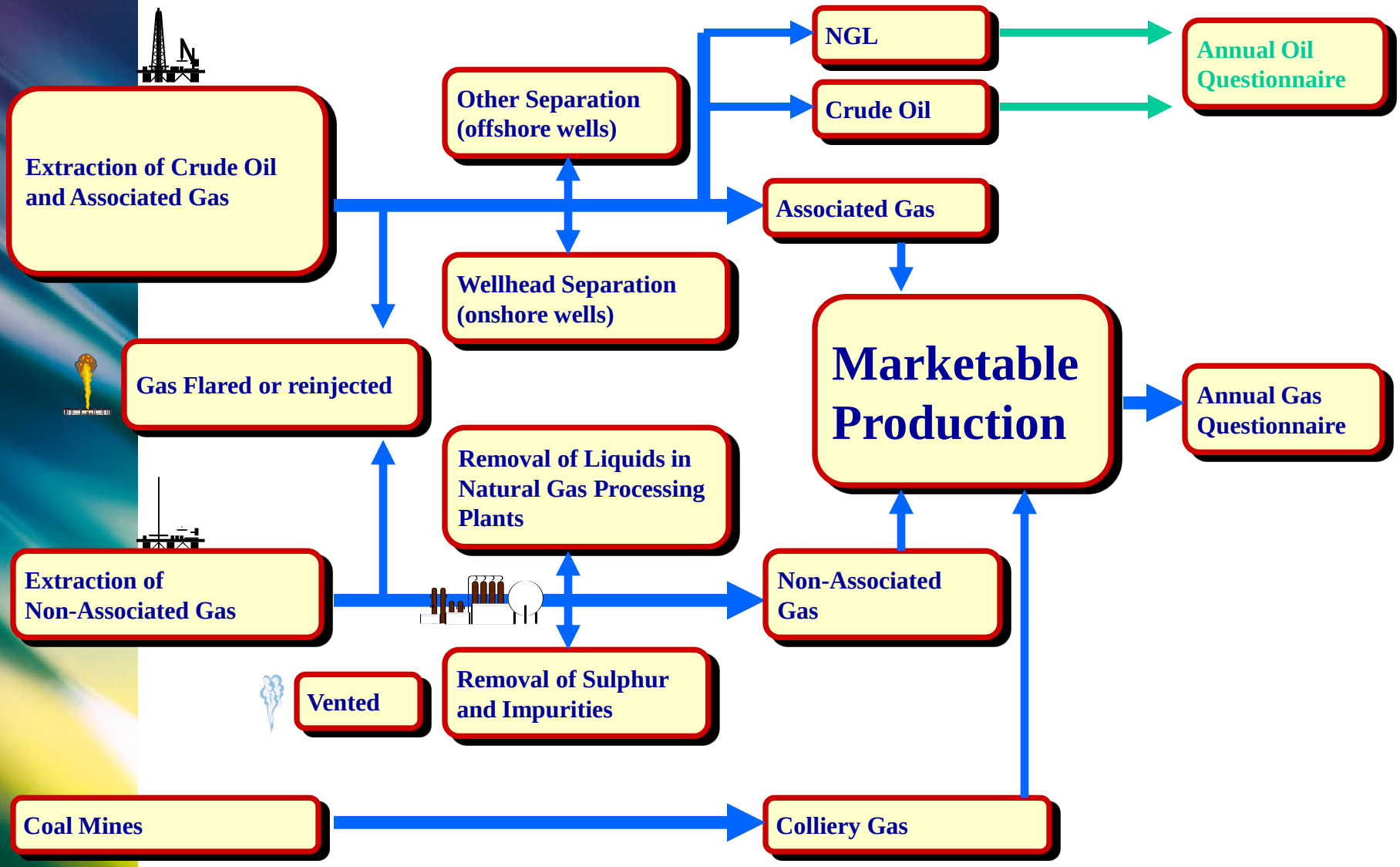
- **What is the difference between Gross and Net Calorific Value?**

  Net Calorific value =

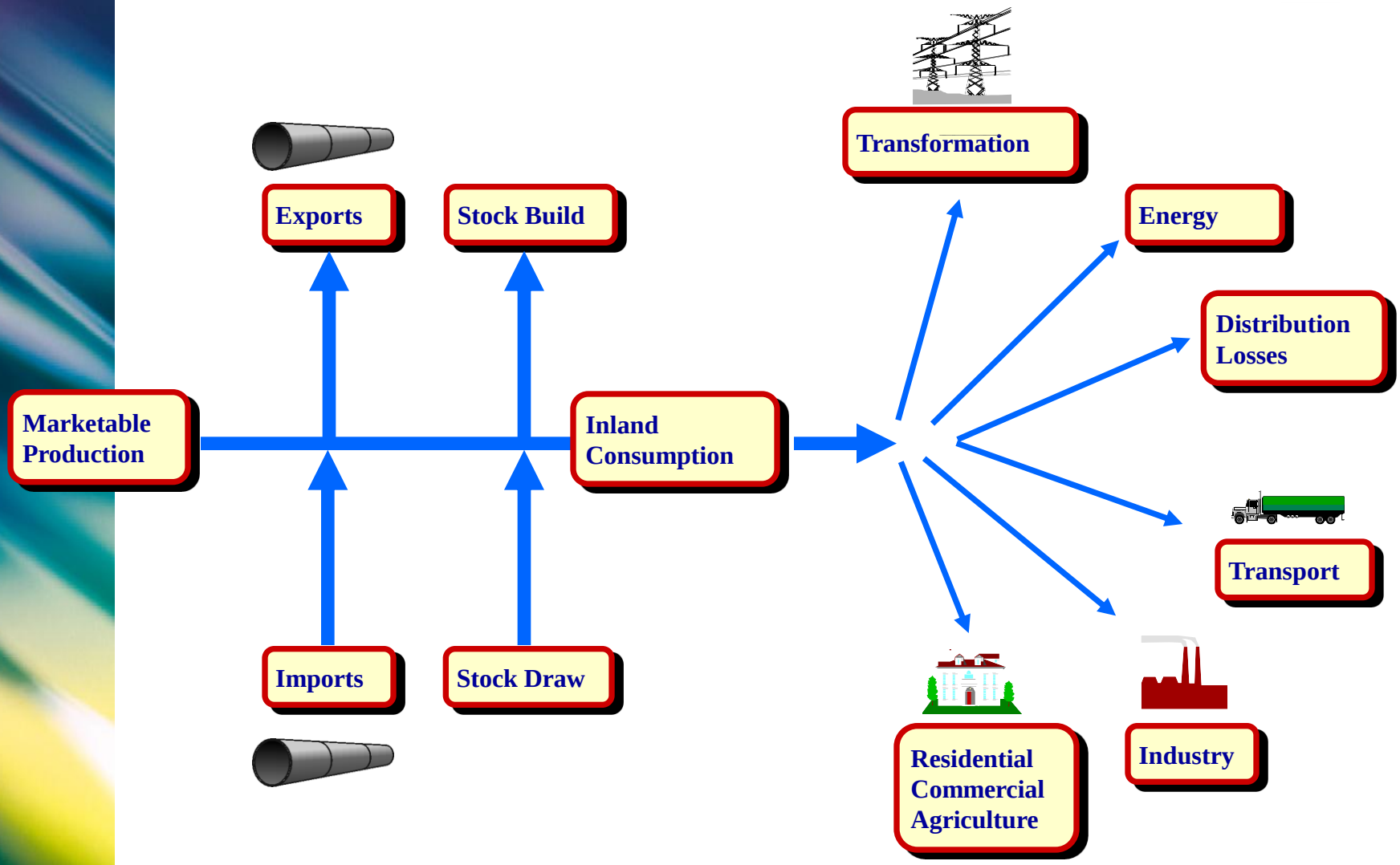
  Gross Calorific Value – **latent heat** of vaporisation of the water vapour produced during combustion of the gas.

- For gas the difference between Net and Gross is about **10%**

Natural gas production



Natural gas - supply and consumption



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The natural gas questionnaire

- 2 units (million m^3, TJ)

- **5 tables**
  - ✓ Supply of Natural Gas
  - ✓ Consumption of Natural Gas
    - Net Inland Consumption by Sector
    - Total Final Consumption by Sector
  - ✓ Imports by Origin
  - ✓ Exports by Destination
  - ✓ Gas Storage Capacity

Supply of natural gas

				Million m^3 (at 15°C, 760 mm Hg)	TJ (Gross Calor. Value)	Average GCV (kJ/m^3)	Average NCV (kJ/m^3)
				A	B	C	D
+	Indigenous Production		1				
	of which	Associated Gas	2				
		Non-Associated Gas	3				
		Colliery Gas	4				
+	From Other Sources		5				
+	Imports [1]		6				
-	Exports [2]		7				
-	International Marine Bunkers		8				
+	Stock Changes [3]		9				
=	Inland Consumption (calc)		10				
-	Statistical Difference		11				
=	Inland Consumption (obs) [4]		12				

Recoverable Gas

Opening Stock Level	13			
Closing Stock Level	14			

Memo:

Gas Vented	15			
Gas Flared	16			

Memo: Cushion Gas

Closing Stock Level	17			

Memo: From Other Sources

of which	Oil	18				
	Coal	19				
	Renewables	20				

The natural gas questionnaire

Definitions

- **Supply – Table 1**
  - ✓ Indigenous Production
    - dry **marketable** production (after purification and extraction of NGL and sulphur)
  - ✓ Imports and Exports
    - are considered imported or exported when having **crossed the physical boundary** of a country
  - ✓ Stock changes and levels
    - stock levels of **recoverable** gas
    - change of stock is opening - closing stock level of recoverable gas

2010

INLAND CONSUMPTION BY SECTOR

Country

Menu

		Unit: TJ (GCV)
		Consumption
		A
Inland Consumption (1)	1	**0**
Transformation Sector - Total	2	**0**
Main Activity Electricity Plants (2)	3	0
Autoproducer Electricity Plants (2, 3)	4	0
Main Activity Combined Heat & Power Plants (2)	5	0
Autoproducer Combined Heat and Power Plants (2, 3)	6	0
Main Activity Heat Plants (2)	7	0
Autoproducer Heat Plants (2, 3)	8	0
Gas Works	9	0
Coke Ovens	10	0
Blast Furnaces	11	0
Gas-to-Liquids (GTL) Plants	12	0
Non-specified (Transformation)	13	0
Energy Sector - Total	14	**0**
Coal Mines	15	0
Oil and Gas Extraction	16	0
Inputs to Oil Refineries	17	0
Coke Ovens	18	0
Blast Furnaces	19	0
Gas Works	20	0
Own Use in Electricity, CHP and Heat Plants	21	0
Liquefaction (LNG) / Regasification Plants	22	0
Gas-to-Liquids (GTL) Plants	23	0
Non-specified (Energy)	24	0
Distribution Losses	25	**0**
Total Final Consumption (4)	26	**0**

(1) Equals the sum of rows 2, 14, 25, 26; should correspond to cell 12B on table 1.
(2) Should correspond to quantities in table 6C in the Annual Electricity and Heat Questionnaire.
(3) Should correspond to quantities in row 1 in table 5.
(4) Should correspond to the sum of cells 1A and 1B in table 2b.

The natural gas questionnaire

Definitions

- **Inland Consumption - Table 2a**

  - ✓ Transformation Sector

    Natural Gas used for producing another type of energy (electricity, heat) which is after used for final consumption
    Example: Gas-to-Liquids

  - ✓ Energy Sector

    Natural Gas consumed by Energy Industry
    Example: Liquefaction plants

  - ✓ Distribution Losses

2010

TOTAL FINAL CONSUMPTION BY SECTOR

Country

Menu

		Unit: TJ (GCV)	
		Energy Use	**Non-Energy Use**
		A	B
of which Biogas	4	0	0
Pipeline Transport	5	0	0
Non-specified (Transport)	6	0	0
Industry Sector - Total	7	**0**	**0**
Iron and Steel	8	0	0
Chemical and Petrochemical (2)	9	0	0
Non-Ferrous Metals	10	0	0
Non-Metallic Minerals	11	0	0
Transport Equipment	12	0	0
Machinery	13	0	0
Mining and Quarrying	14	0	0
Food and Tobacco	15	0	0
Paper, Pulp and Print	16	0	0
Wood and Wood Products	17	0	0
Construction	18	0	0
Textile and Leather	19	0	0
Non-specified (Industry)	20	0	0
Other Sectors - Total	21	**0**	**0**
Commercial and Public Services	22	0	0
Residential	23	0	0
Agriculture/Forestry	24	0	0
Fishing	25	0	0
Non-specified (Other)	26	0	0

(1) Corresponds to the sum of rows 2, 7, 21.
(2) Please report fuel use in column A.
(3) The sum of cells 1A and 1B should correspond to cell A26 in table 2a.

The natural gas questionnaire

- **Final Consumption - Table 2b**

  (= derived from final consumers)

  - ✓ Different Use
    - Non-Energy Use
      - *Report Natural Gas used as a raw material for producing other products (Chemical and Petrochemical Industry)*
    - Energy Use
      - *Report Natural Gas used as fuel*
  - ✓ 3 Sectors
    - Industry Sector
    - Transport Sector
    - Other Sectors

The natural gas questionnaire

Definitions

- **Imports / Exports - Tables 3,4**
  - ✓ Requested Data
    - 2 Units: Million m3 et TJ
    - Natural Gas **by pipeline and LNG**
  - ✓ Geographical Breakdown
    - 62 import origin
    - 48 export destination
  - ✓ Trade
    - Importance of the ultimate origin or destination
    - Transit trade and re-exports are not to be included

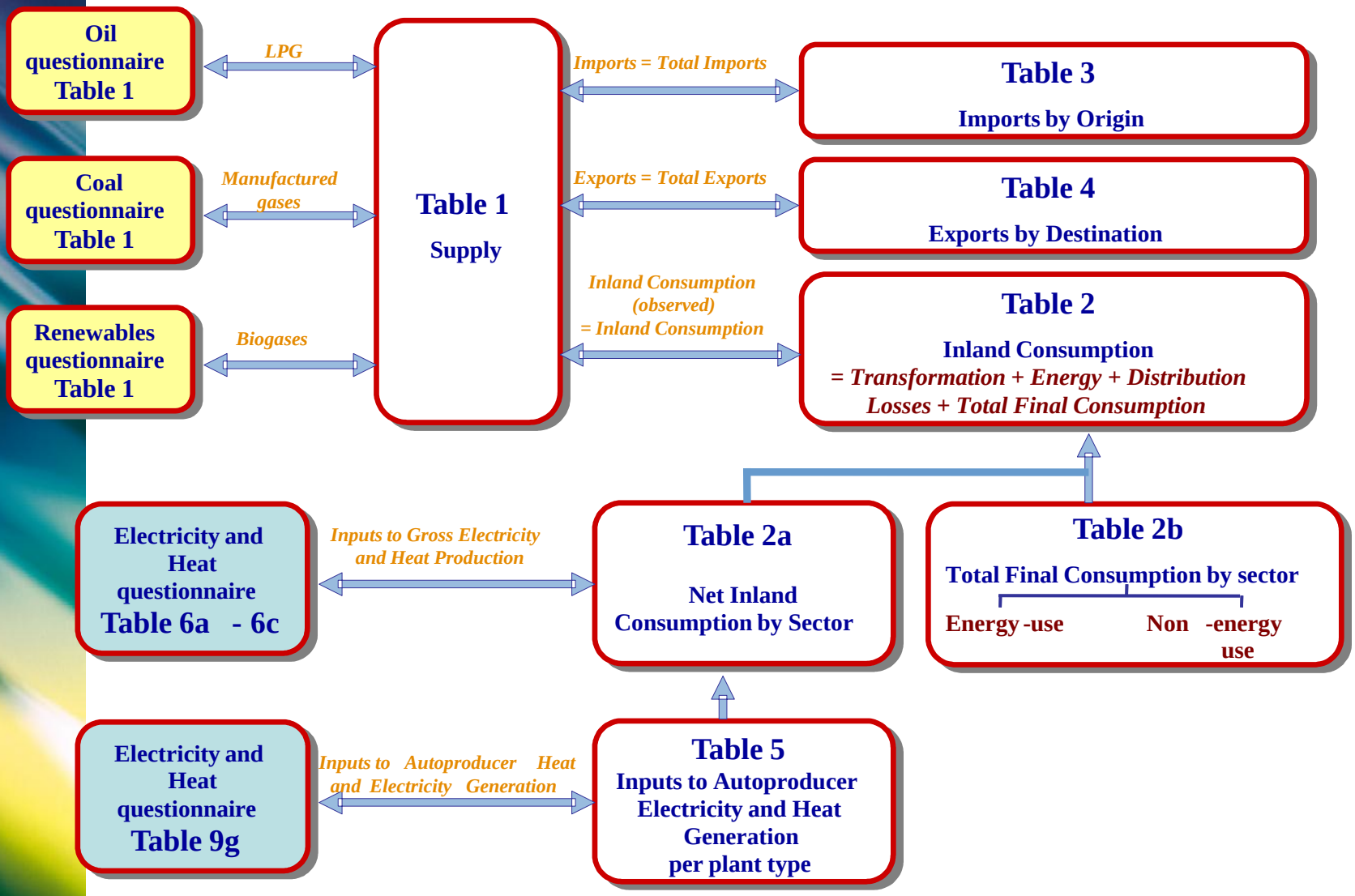
The natural gas questionnaire

Definitions

- **Gas Storage Capacity – Table 5**
  - ✓ Location of the storage
  - ✓ Type of storage
    - Depleted oil and gas fields
    - Aquifers
    - Salt Cavities
  - ✓ Technical Characteristics
    - Working Capacity = total gas storage capacity minus cushion gas
    - Peak Output = maximum rate at which gas can be withdrawn from storage

The natural gas questionnaire

Relations within the questionnaire



The natural gas questionnaire

Some specific problems regarding gas reporting

Common Problems

- **Trade**
  - ✓ transit trade is often reported as import / export
  - ✓ exchange contracts
  - ✓ origin not always known due to spot markets and hubs
  - ✓ increasing difficulties with liberalised market

- **Units**
  - ✓ measurement in million cubic metres under Standard conditions - often reported under Normal conditions
  - ✓ data in TJ often reported as Net rather than Gross

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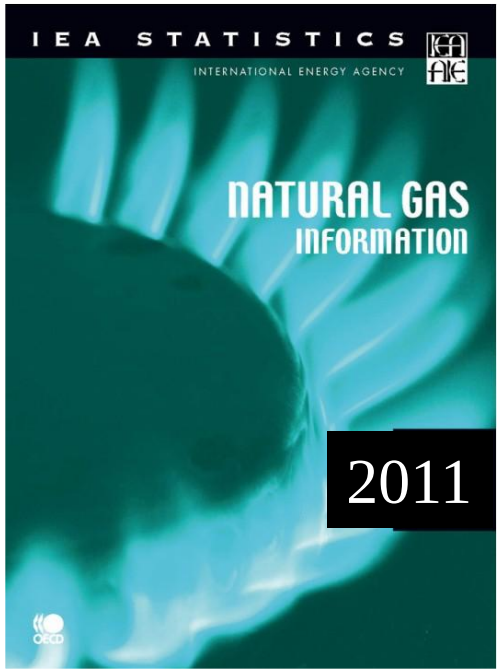
IEA Publications on annual natural gas

Publication and CD-ROM

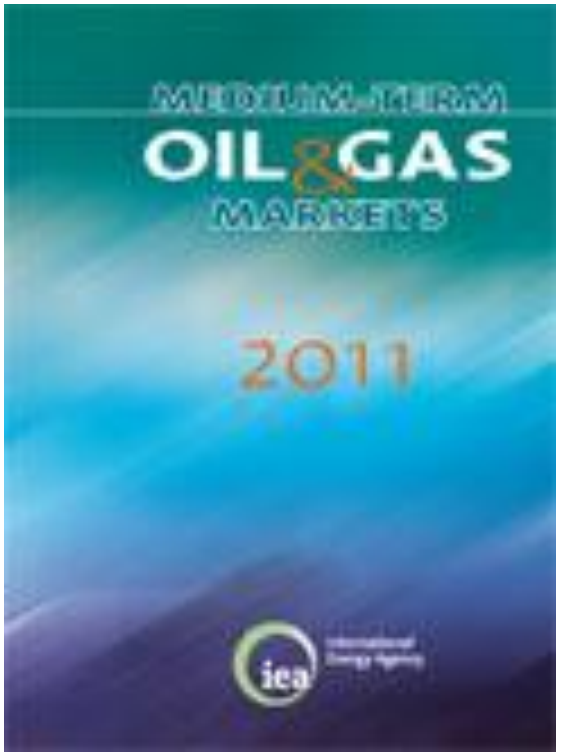
- Natural Gas Information (hard copy, pdf)
- CD-ROM
- On-line Data Service
  - Pay-Per-View
  - Data download
- Derived publications/analysis:
  - Natural Gas Market Review
  - Energy Statistics of OECD Countries
  - Energy Balances of OECD Countries
  - CO2 Emissions from Fuel Combustion



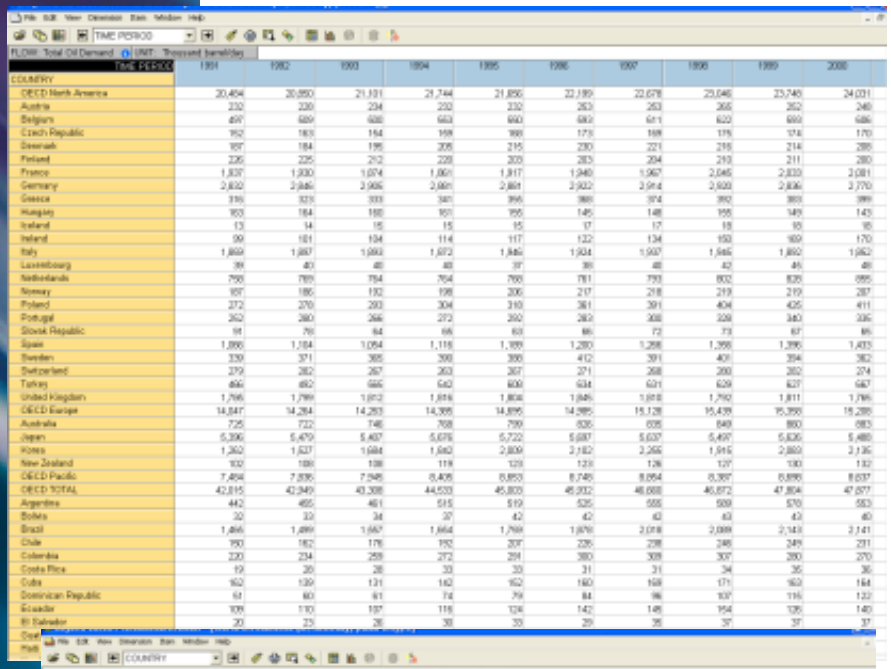
Publications including Natural Gas data

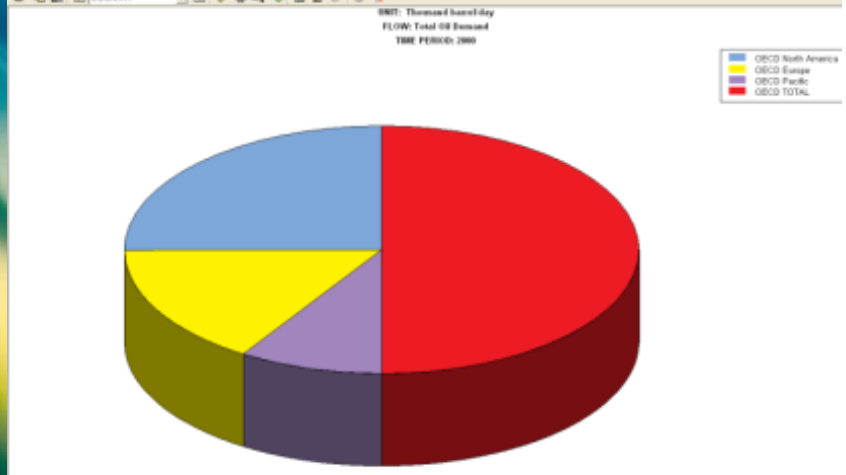
Statistics

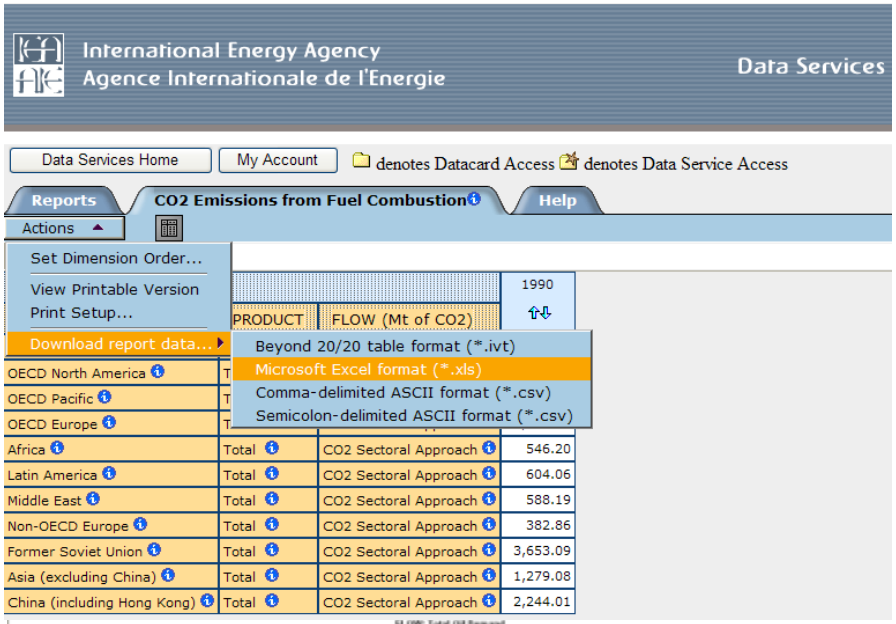
Analysis

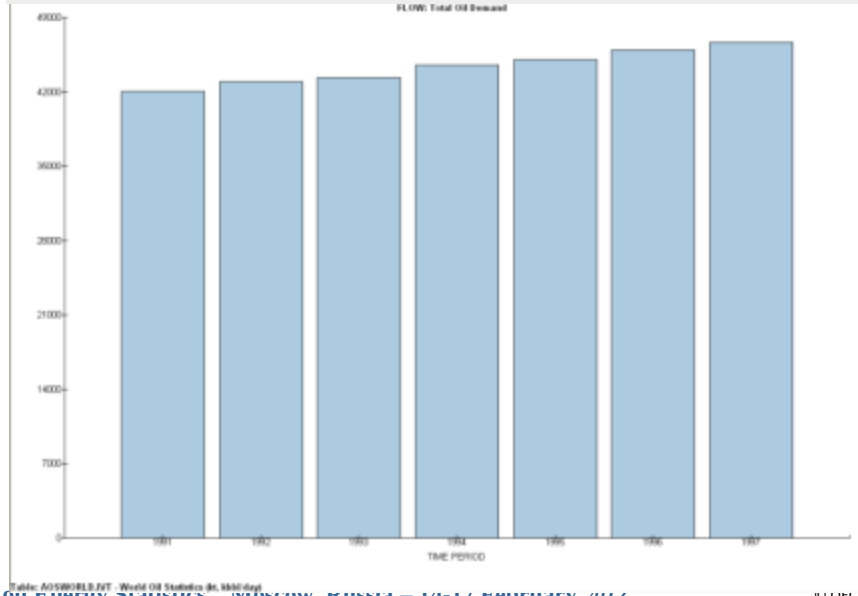


Online Data Service









Thank you !

Questions welcome