

Natural gas statistics

Joint Rosstat - IEA workshop on Energy Statistics

Moscow, Russia, 14-17 February 2012

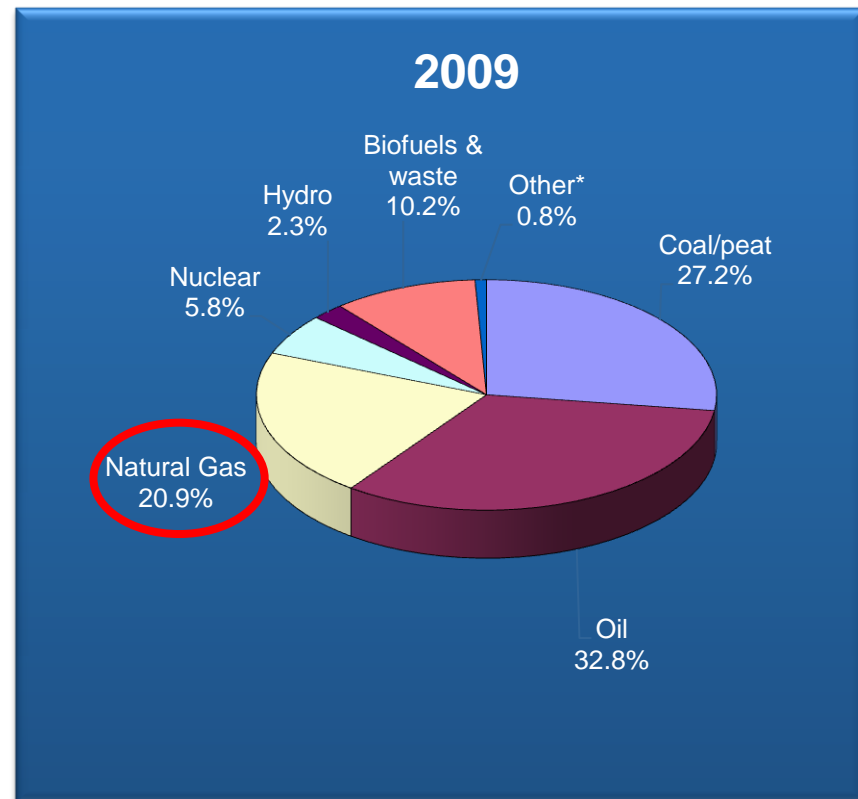
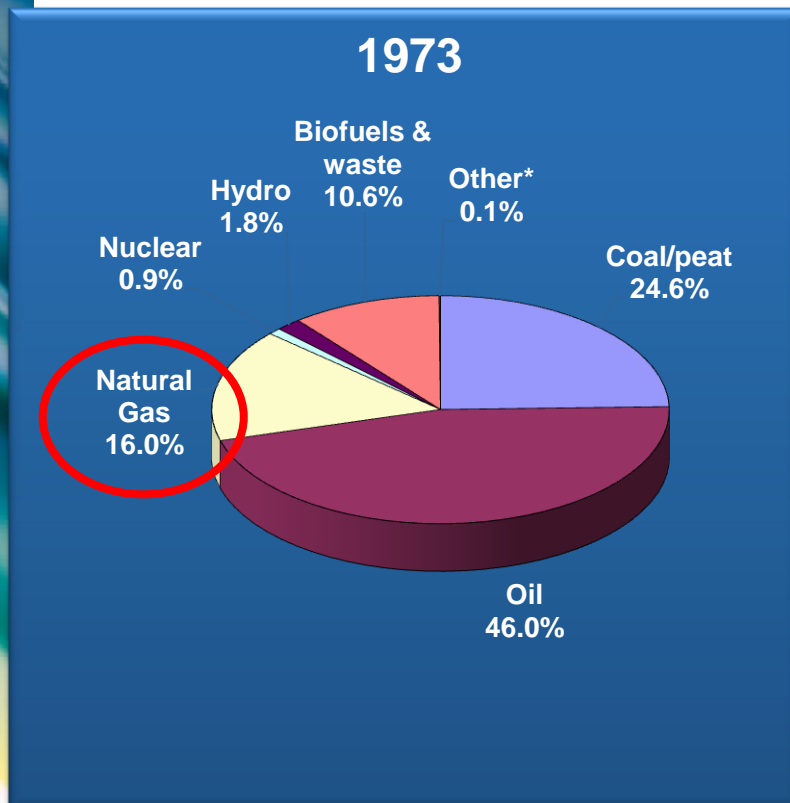
Mieke Reece
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IEA Energy Data Centre*



International
Energy Agency

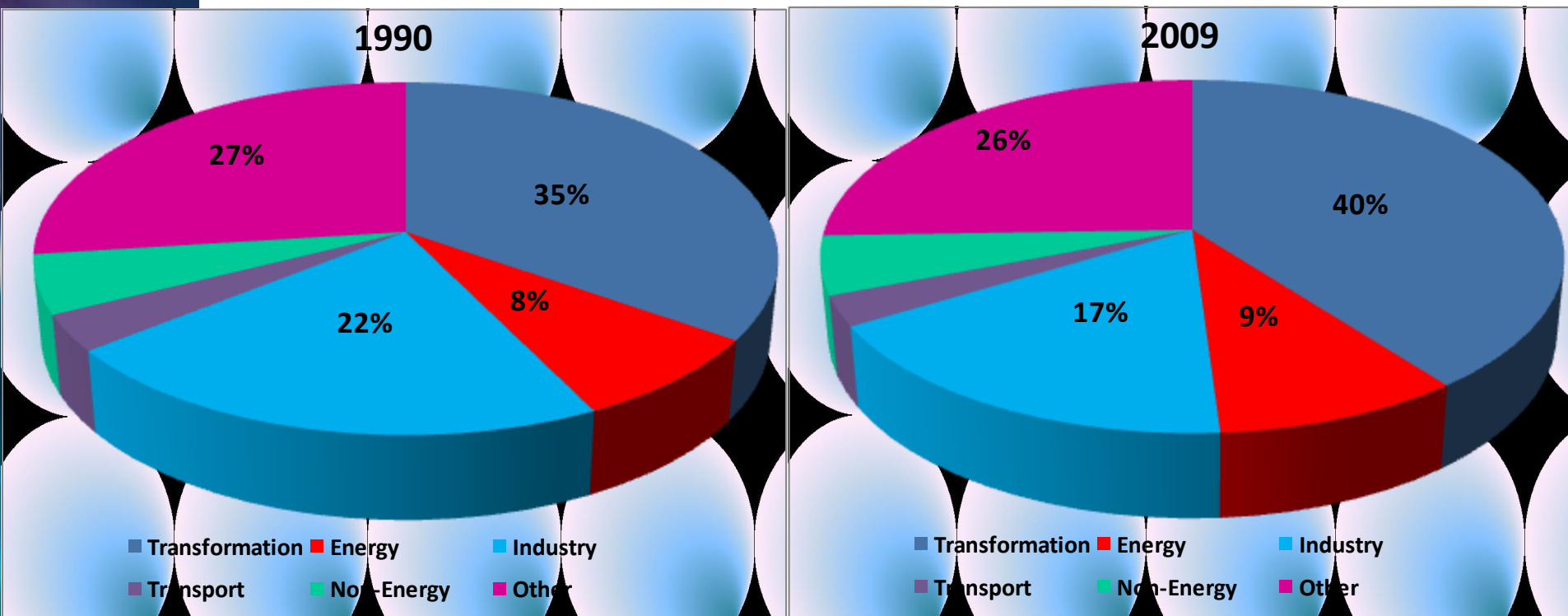
- **The importance of gas in the world**
- **The Natural Gas Chain**
 - ✓ **Basic Concepts**
 - ✓ **Natural Gas Production**
 - ✓ **Supply and Consumption**
- **Structure of the Questionnaire**
 - ✓ **Table description and definitions**
 - ✓ **Relations within the questionnaire**
 - ✓ **Specific problems**

World - Share of natural gas in the energy mix



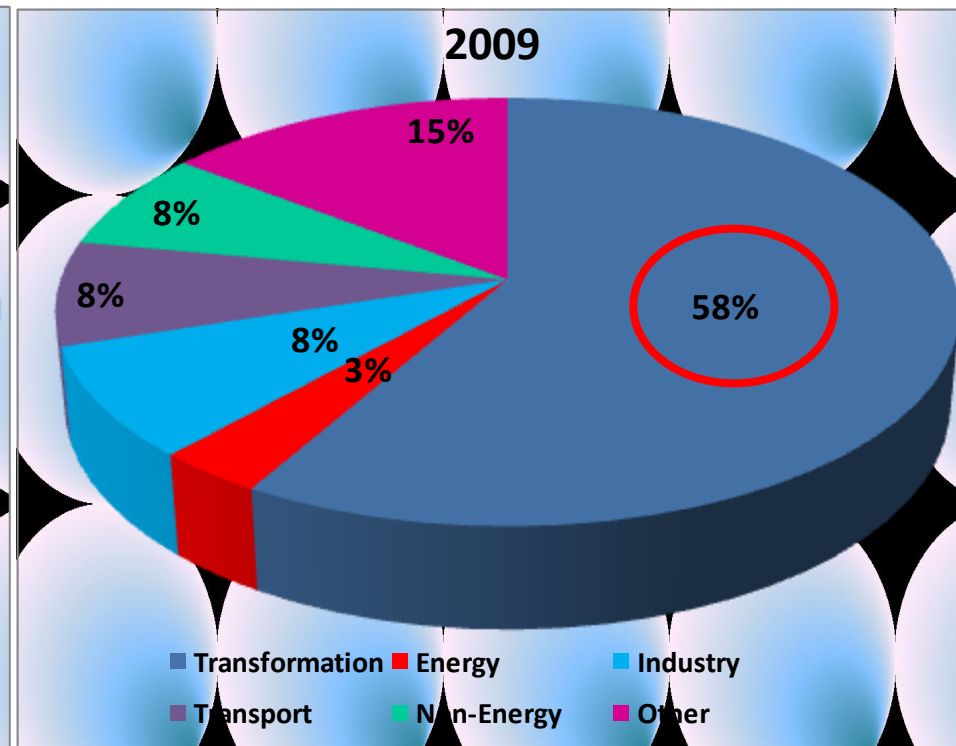
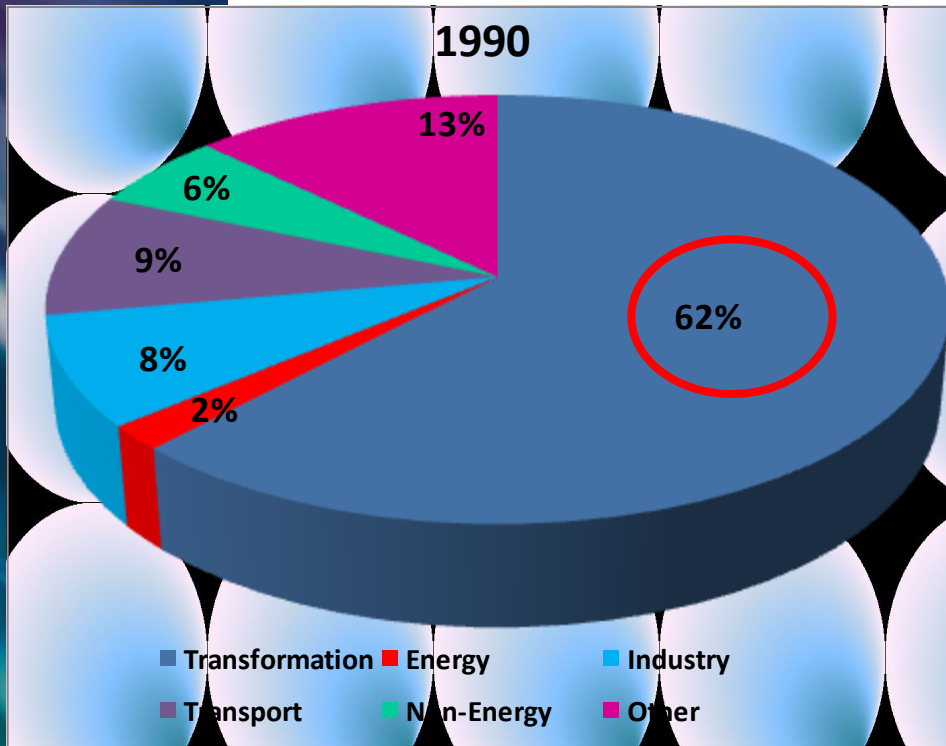
Increase in the share of natural gas in the world

World – Use of natural gas



**Natural gas use mainly for power generation
(transformation)**

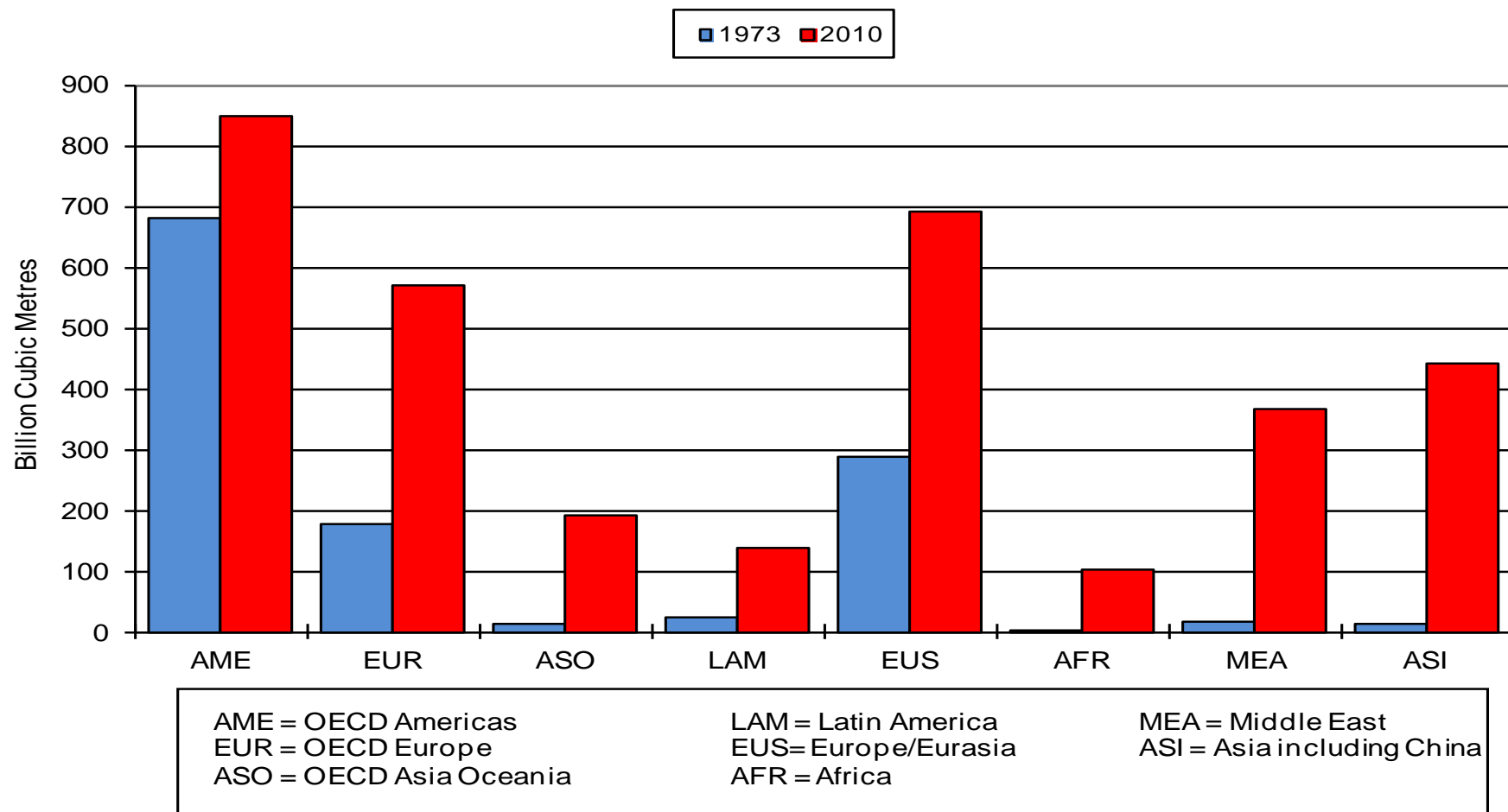
Russia – Use of natural gas



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 m³
- ◆ 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)

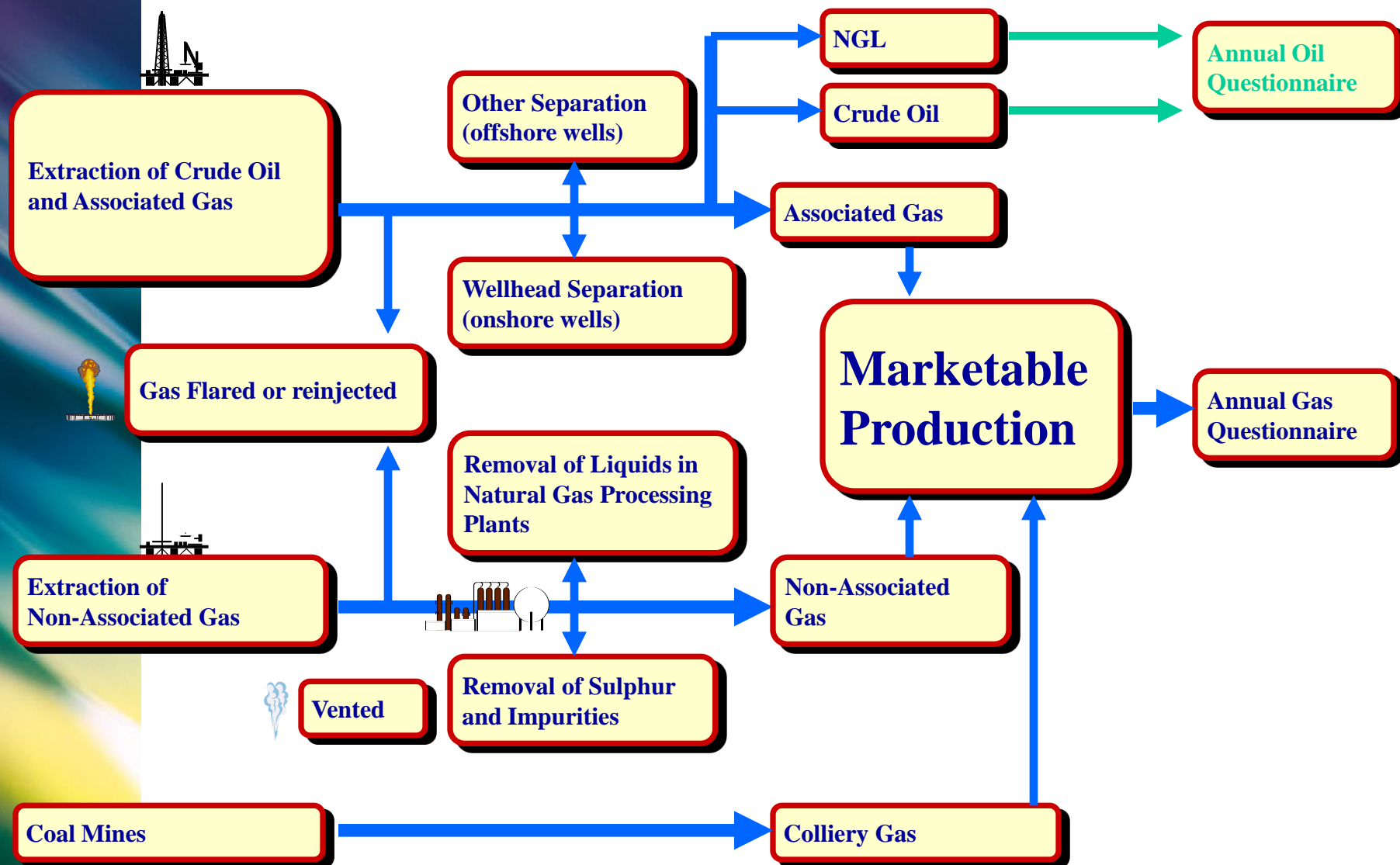
Basic concepts (3)

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

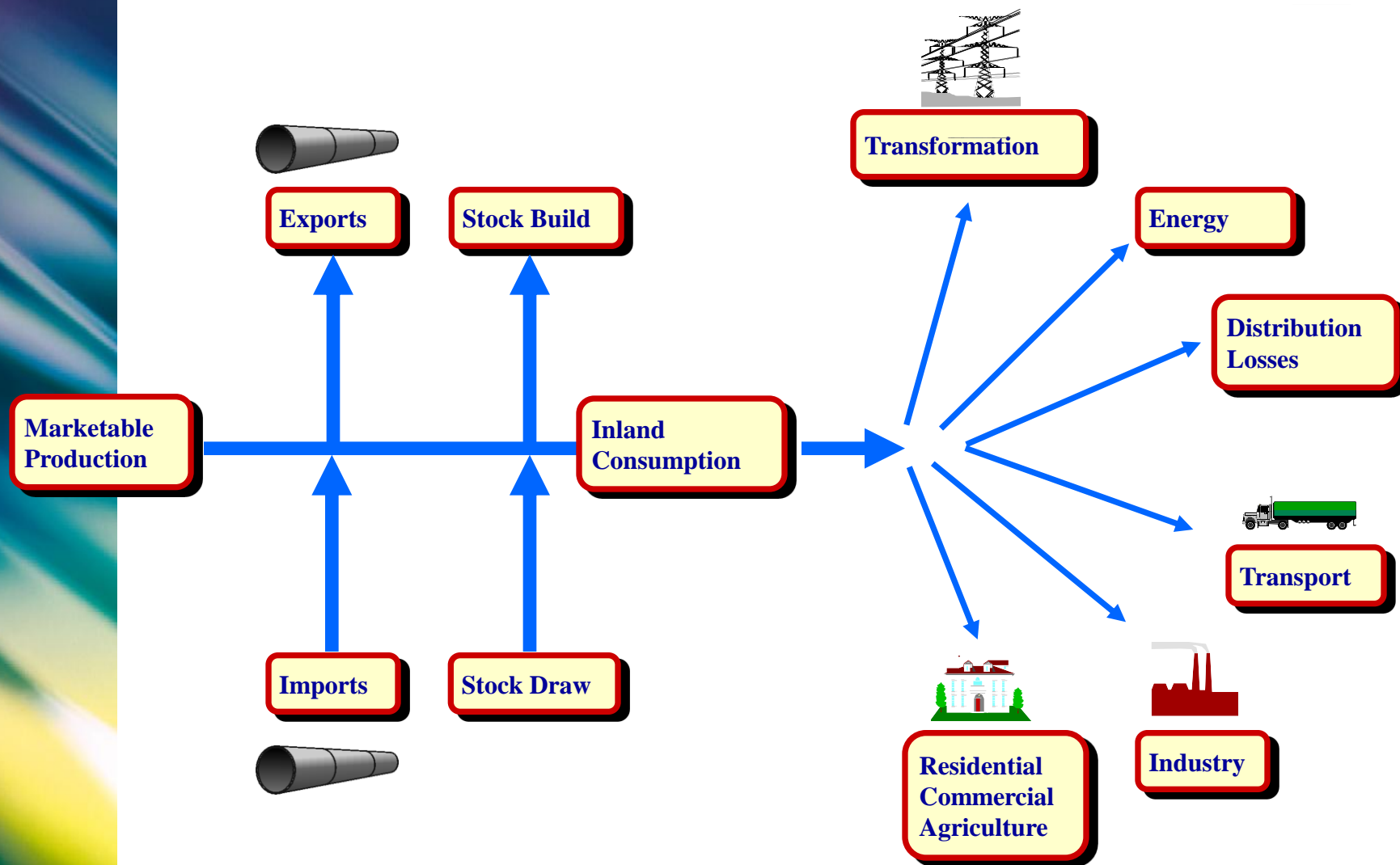
Net Calorific value =

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 - supply and consumption



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The natural gas questionnaire

- ◆ 2 units (million m³, 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				
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Memo: From Other Sources

of which	Oil	18				
	Coal	19				
	Renewables	20				

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

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.

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

Country

Menu		Unit: TJ (GCV)	
		Energy Use	Non-Energy Use
		A	B
<i>of which Biogas</i>	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.

◆ **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

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

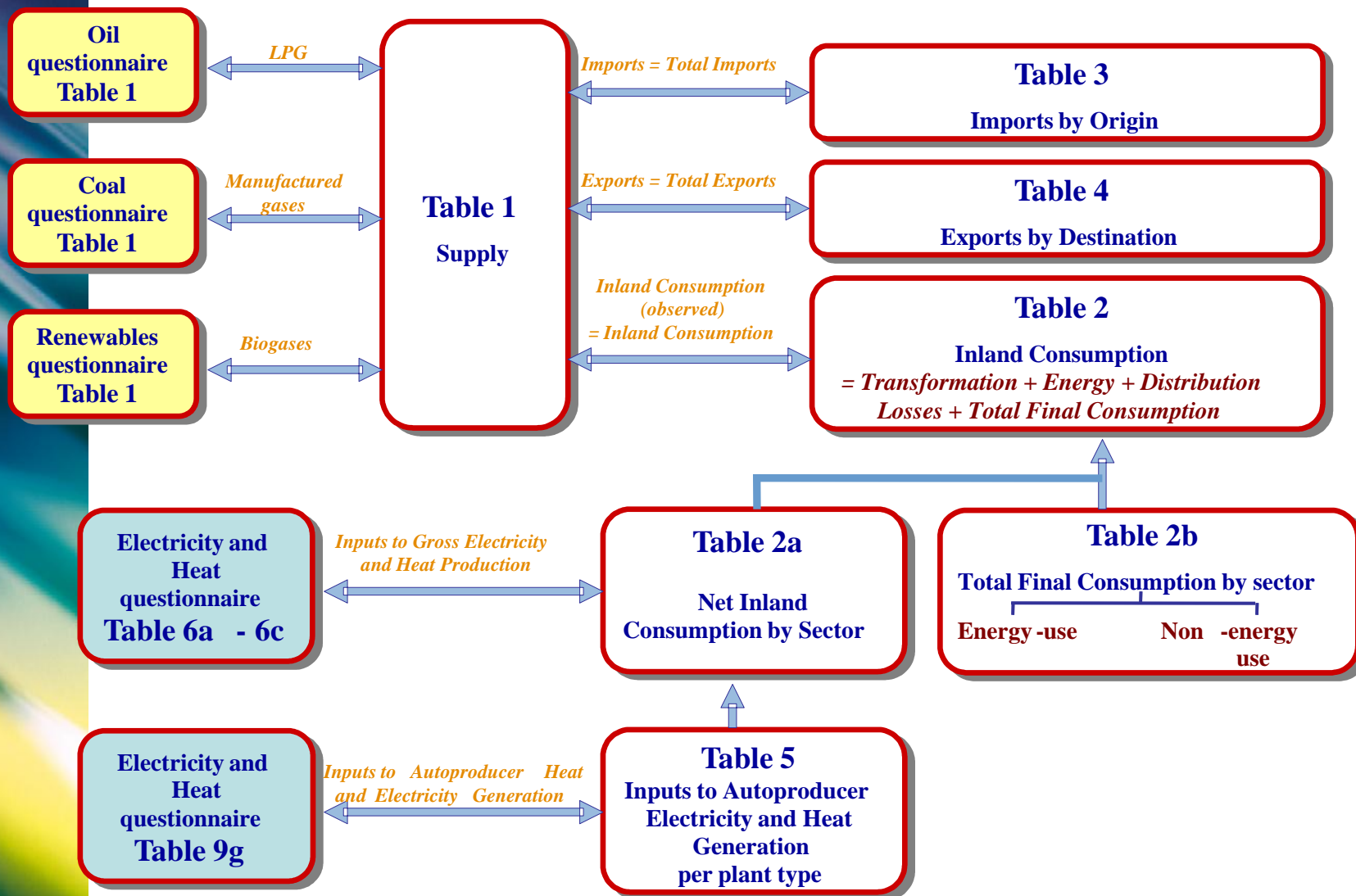
Definitions

♦ **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



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

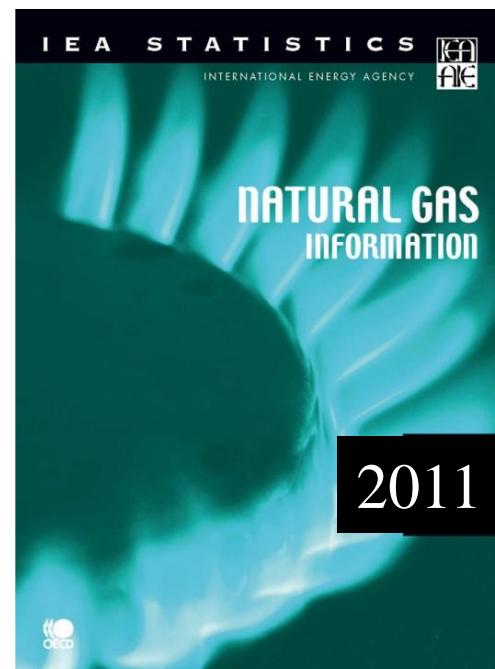
- ✓ measurement in million cubic metres under Standard conditions - often reported under Normal conditions
- ✓ data in TJ often reported as Net rather than Gross

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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

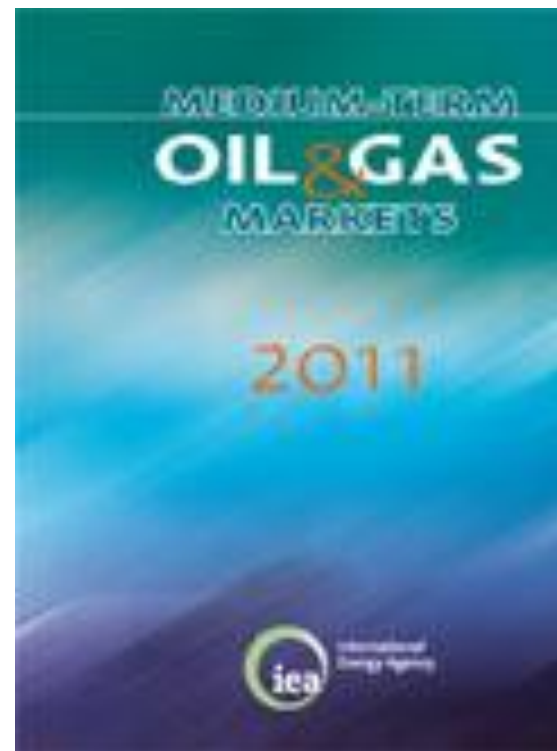


Publications including Natural Gas data

Statistics



Analysis



Online Data Service

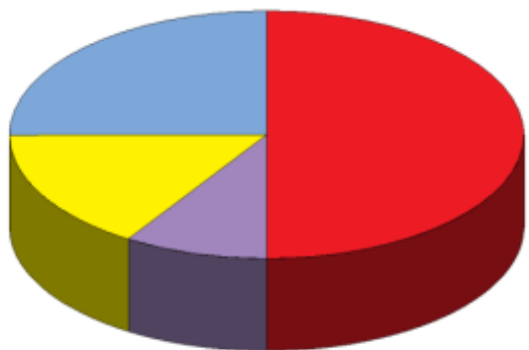
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TIME PERIOD: 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

UNIT: Thousand barrels/day

COUNTRY	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
OECD North America	20,404	20,950	21,131	21,144	21,896	22,195	22,678	23,046	23,740	24,031
Australia	230	239	234	230	232	262	263	265	262	245
Belgium	697	689	686	663	682	682	671	622	600	586
Czech Republic	162	163	164	168	168	173	168	176	174	170
Denmark	107	184	196	205	215	200	221	216	214	206
Finland	226	225	212	229	203	203	204	210	211	200
France	1,837	1,830	1,874	1,861	1,817	1,940	1,967	2,046	2,030	2,081
Germany	2,632	2,646	2,665	2,681	2,681	2,622	2,614	2,600	2,606	2,770
Greece	116	123	133	147	161	166	174	182	183	186
Hungary	103	184	188	107	195	145	148	155	149	143
Ireland	13	14	15	15	15	17	17	18	10	10
Israel	99	101	104	114	117	122	134	150	160	170
Italy	1,869	1,887	1,883	1,872	1,846	1,834	1,927	1,846	1,862	1,862
Luxembourg	39	43	40	40	37	36	40	42	46	49
Netherlands	790	769	764	764	760	781	793	802	835	895
Norway	107	186	192	198	206	217	218	219	219	207
Poland	272	270	293	304	310	361	391	404	425	411
Portugal	262	260	266	272	262	263	308	326	343	326
Slovak Republic	81	76	84	86	83	86	72	73	87	86
Spain	1,896	1,914	1,914	1,116	1,399	1,280	1,258	1,299	1,396	1,433
Sweden	330	371	385	390	390	412	391	401	394	362
Switzerland	279	282	267	263	267	271	268	260	262	274
Taiwan	846	852	846	842	830	834	831	829	827	867
United Kingdom	1,766	1,789	1,812	1,816	1,836	1,846	1,810	1,792	1,811	1,796
OECD Europe	14,847	14,744	14,753	14,705	14,895	14,995	15,128	15,439	15,290	15,295
Australia	725	722	746	768	799	930	930	949	982	983
Japan	5,306	5,479	5,487	5,676	5,722	5,687	5,637	5,497	5,636	5,480
Korea	1,362	1,627	1,684	1,640	2,809	2,182	2,266	1,814	2,869	2,136
New Zealand	102	188	138	118	123	123	126	127	130	132
OECD Pacific	7,494	7,896	7,945	8,436	8,850	8,748	8,654	8,307	8,890	8,637
OECD TOTAL	42,815	43,349	43,338	44,533	45,823	46,212	46,668	48,072	47,854	47,577
Argentina	442	465	461	515	519	635	655	659	670	653
Bolivia	30	33	34	37	42	42	43	43	43	40
Brazil	1,466	1,499	1,667	1,664	1,769	1,876	2,018	2,089	2,143	2,141
Chile	190	182	176	192	207	226	238	246	249	231
Colombia	233	234	259	272	291	300	309	307	293	270
Ecuador	19	26	26	30	30	31	31	34	35	36
Cuba	162	139	131	142	162	160	168	171	162	164
Dominican Republic	61	63	61	74	79	84	86	107	116	122
Ecuador	109	110	117	116	124	142	146	154	136	140
El Salvador	33	23	26	30	33	33	35	37	37	37

UNIT: Thousand barrel/day
FLOW: Total Oil Demand
TIME PERIOD: 2000



International Energy Agency
Agence Internationale de l'Energie

Data Services

Data Services Home My Account denotes Databcard Access denotes Data Service Access

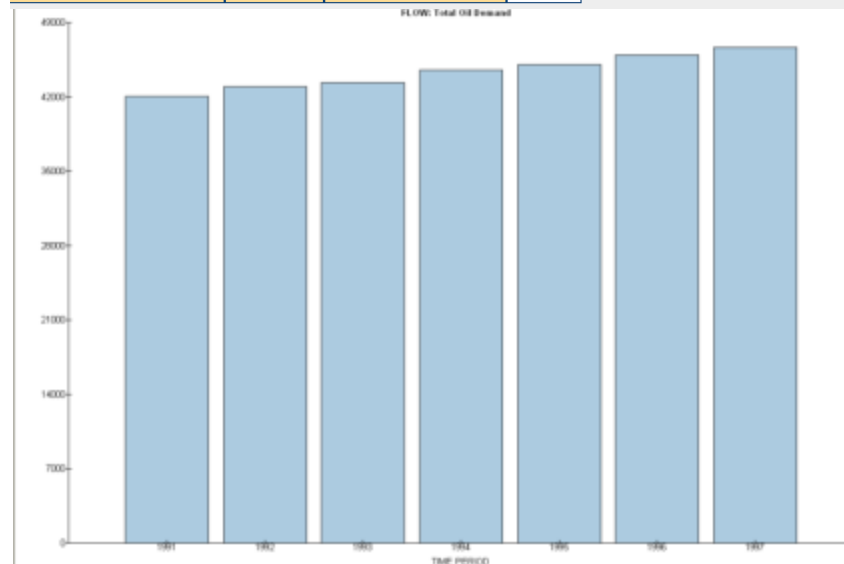
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Actions

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Download report data... Beyond 20/20 table format (*.ivt)
Microsoft Excel format (*.xls)
Comma-delimited ASCII format (*.csv)
Semicolon-delimited ASCII format (*.csv)

PRODUCT	FLOW (Mt of CO2)	1990
OECD North America	Total	546.20
OECD Pacific	Total	604.06
OECD Europe	Total	588.19
Africa	Total	382.86
Latin America	Total	3,653.09
Middle East	Total	1,279.08
Non-OECD Europe	Total	2,244.01
Former Soviet Union	Total	
Asia (excluding China)	Total	
China (including Hong Kong)	Total	



Thank you !

Questions welcome