



Statistics 1996

euro  gas

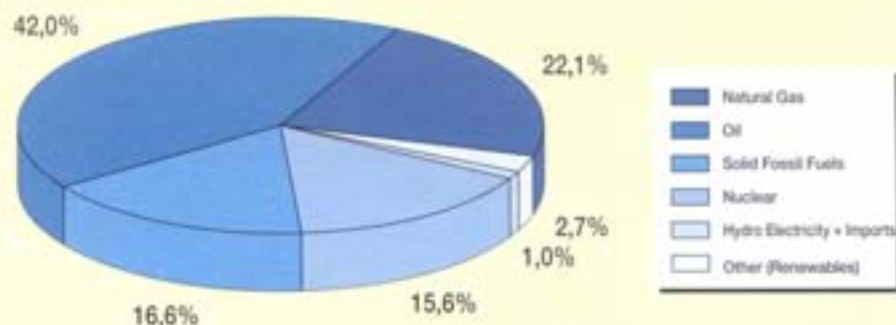
# 1. Primary energy consumption

1996 - Primary Energy Consumption in euogas Member Countries (EU 15)

MTOE	A	B	CH	CZ (3)	D	DK	E	F	FIN	H	I	IRL	NL	S	UK	EU15
Oil	11,3	23,1	12,5	7,7	138,5	9,6	56,2	94,0	8,6	7,1	93,9	5,5	23,7	18,7	78,4	589,3
Solid Fuels	3,3	8,9	0,1	23,2	88,9	9,0	15,4	15,0	6,0	4,3	13,1	3,1	9,3	2,4	45,5	232,7
Natural gas	6,8	11,8	2,4	6,6	75,5	3,7	8,4	32,2	2,9	10,2	46,3	2,1	37,6	0,9	82,1	311,0
Nuclear Electricity 1)	0,0	10,7	6,2	3,2	42,1	0,0	14,7	104,2	4,9	3,7	0,0	0,0	1,1	19,1	22,7	219,5
Hydro Electricity 1)	3,1	0,1	2,6	0,2	1,7	0,0	3,5	5,9	1,0	0,0	4,0	0,1	0,0	4,3	0,3	25,7
Electricity Net Import	0,1	0,9	(0,1)	0,0	(0,6)	(1,3)	0,1	(18,2)	1,0	0,2	3,2	0,0	1,0	0,4	1,5	(11,3)
Renewables 2)	2,8	0,0	0,4	0,0	5,4	1,7	3,1	4,2	5,2	0,3	3,3	0,2	0,0	7,2	1,2	35,4
Other	0,9	0,0	0,8	0,0	0,0	0,0	0,0	0,00	0,0	0,2	0,0	0,0	1,0	0,3	0,0	2,2
<b>Total</b>	<b>28,3</b>	<b>55,5</b>	<b>24,9</b>	<b>40,9</b>	<b>351,5</b>	<b>22,7</b>	<b>101,4</b>	<b>237,3</b>	<b>29,6</b>	<b>26,0</b>	<b>163,8</b>	<b>11,0</b>	<b>73,7</b>	<b>53,3</b>	<b>231,7</b>	<b>1.404,6</b>

Notes : 1) Domestically produced  
 2) Renewables includes biomass, wind, solar and geothermal energy.  
 3) 1995 figures

1996 Primary Energy Consumption by fuel (EU15)



1996 Share of Natural Gas in Primary Energy Consumption



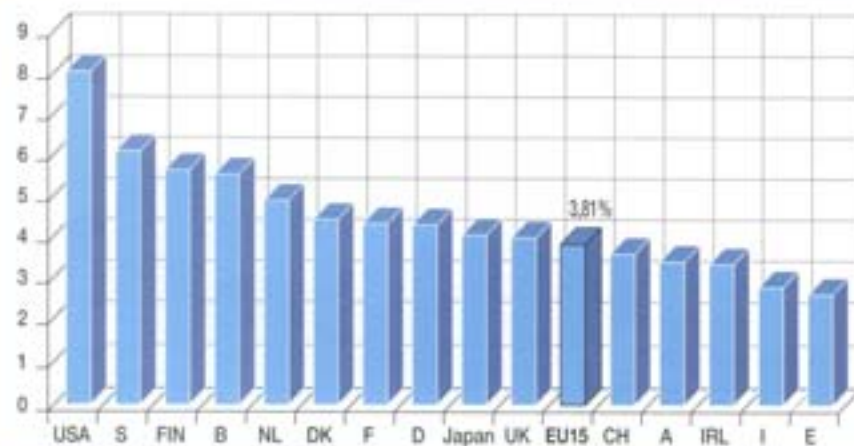
## 1996 Primary Energy Consumption (PEC) per capita / per unit of GDP

	A	B	CH	D	DK	E	F	FIN	I	IRL	NL	S	UK	EU 15
PEC per capita 1)	3,39	5,54	3,58	4,29	4,41	2,60	4,31	5,63	2,77	3,33	4,87	6,08	3,97	3,81
PEC/GDP-ratio 2)	0,15	0,27	0,11	0,19	0,16	0,19	0,20	0,22	0,14	0,19	0,23	0,23	0,22	0,19

Notes : 1) IEA - estimate (for 1996) measured as total primary energy supply in TOE per inhabitant.

2) IEA - estimate (for 1996) measured as total primary energy supply in TOE per \$ 1000 of GDP at 1990 prices and exchange rates

### 1996 Primary Energy Consumption per Capita



## 2. Final energy consumption

### 1996 Final Energy Consumption in eurogas Member Countries (EU15)

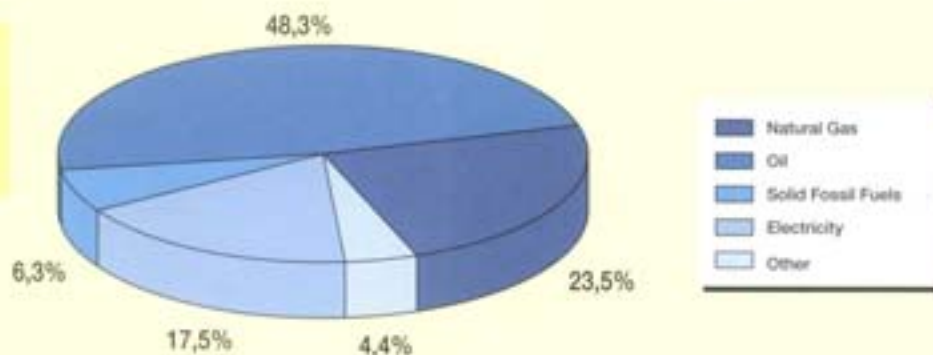
MTOE	A	B	CH	CZ (3)	D	DK (3)	E	F	FIN (3)	H	I	IRL	NL	S	UK	EU15
Oil	9,7	20,9	11,9	6,2	106,6	7,4	48,8	87,4	7,3	5,0	63,2	4,8	18,2	12,6	67,4	474,5
Solid Fossil Fuels	1,5	3,4	0,2	7,7	16,9	1,0	2,4	8,0	0,8	1,9	6,0	1,2	2,1	6,3	10,5	62,2
Natural gas	3,8	10,2	2,2	5,5	55,0	1,7	7,3	31,9	1,7	6,2	36,0	0,8	25,7	0,5	56,2	231,5
Electricity 1)	4,1	6,0	4,2	4,2	38,2	2,7	12,9	30,6	5,7	2,4	20,7	1,4	7,4	11,0	25,9	172,3
Other 2)	4,1	0,0	0,9	4,8	14,3	2,3	2,9	4,1	5,9	2,5	0,0	0,0	4,4	4,1	0,0	43,1
<b>Total</b>	<b>23,2</b>	<b>40,5</b>	<b>19,4</b>	<b>28,4</b>	<b>230,0</b>	<b>15,1</b>	<b>74,3</b>	<b>162,0</b>	<b>21,4</b>	<b>18,0</b>	<b>125,9</b>	<b>8,1</b>	<b>57,8</b>	<b>34,5</b>	<b>160,0</b>	<b>983,5</b>

Notes : 1) Includes electricity produced by CHP-plants. Heat produced by CHP-plants is included in "Other".

2) Includes heat (e.g. district heating) and non-electricity generating renewables (e.g. biomass generated heat).

3) 1995 figures

### 1996 Final Energy Consumption by Source (EU15)



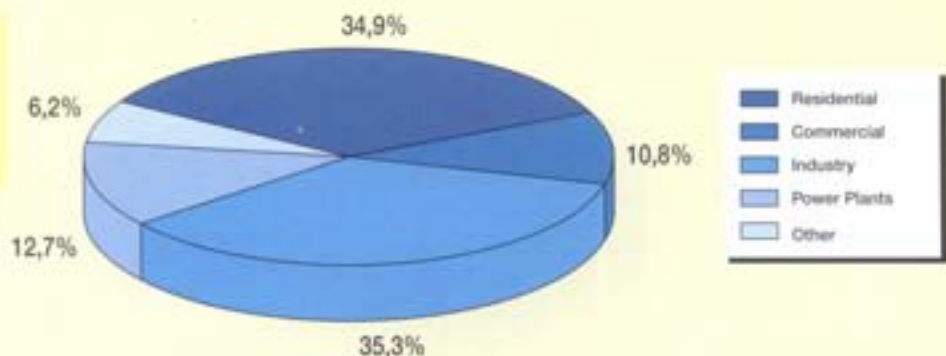
### 3. Natural Gas Sales and Supplies

1996 - Inland Sales of Natural Gas by Sector in eurogas Member Countries / EU 15

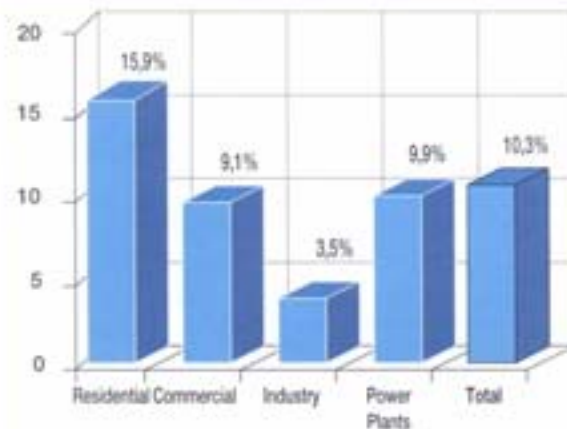
PJ	A	B	CH	CZ (3)	D	DK	E	F	FIN	H	I	IRL	NL	S	UK	EU15
Residential	110,0	169,8	42,1	n.a.	1.151,6	27,7	57,5	589,1	0,8	146,1	729,7	13,9	525,1	2,3	1.407,0	4.794,5
Commercial	n.a.	74,3	19,0	n.a.	139,0	15,8	19,2	249,4	1,2	59,3	184,4	9,6	363,9	3,7	419,0	1.481,4
Industry	123,0	213,8	41,2	n.a.	1.306,2	38,6	302,9	650,1	66,1	111,6	878,0	37,0	573,9	13,4	634,0	4.849,5
Power plants	67,0	90,5	0,0	n.a.	261,5	13,5	8,3	0,4	34,4	88,4	311,4	60,0	215,1	0,0	674,0	1.740,4
Others	18,0	0,0	8,3	n.a.	474,8	59,8	0,0	16,9	35,6	66,6	37,1	0,7	6,9	13,8	191,0	654,6
<b>Total</b>	<b>318,0</b>	<b>548,4</b>	<b>110,6</b>	<b>349,7</b>	<b>3.333,1</b>	<b>155,2</b>	<b>387,8</b>	<b>1.505,8</b>	<b>138,1</b>	<b>472,0</b>	<b>2.140,6</b>	<b>121,2</b>	<b>1.684,9</b>	<b>33,2</b>	<b>3.325,0</b>	<b>13.720,3</b>

With an assumed energy content of 1m<sup>3</sup> of 39 MJ (GCV), Total Inland Sales corresponds to 352 BCM (approx. 285 MTOE (NCV))

1996 Natural Gas Sales by Sector (EU 15)



1996 Gas Demand Growth Rate by Sector (EU15)

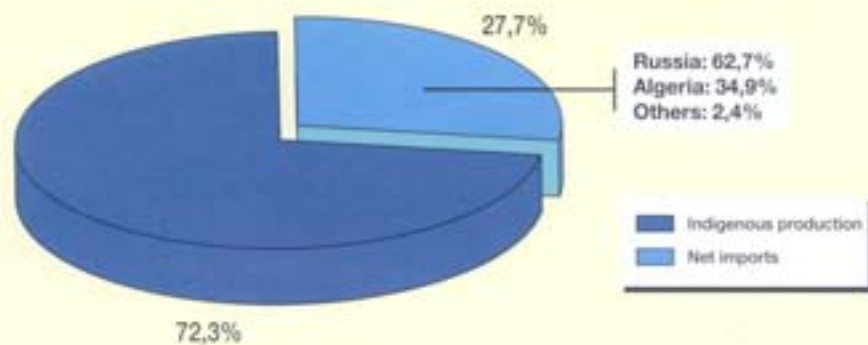


## 1996 - Supplies of Natural Gas in eurogas Member Countries / EU 15

PJ	A	B	CH	CZ	D	DK	E	F	FIN	H	I	IRL	NL	S	UK	EU15	EU15 %
Indigenous Production	59,0	0,0	0,0	3,8	749,8	248,8	18,1	107,0	0	163,3	763,3	100,8	3.158,7	0,0	3.304,0	8.514,8	62,1%
<b>+ Net Imports</b>																	
from EU-members	19,0	220,9	95,2	16,9	1.021,0	(79,3)	15,7	194,9	0	0,0	169,6	22,5	(1.576,9)	33,2	(54,0)	19,0	0,1%
from Non-EU-members	243,0	330,7	15,4	335,0	1.772,9	0,0	371,1	1.182,9	138,3	337,6	1.241,8	0,0	90,1	0,0	71,0	5.442,2	39,7%
<b>± changes in stocks 1)</b>																	
and other balances	(4,0)	(3,2)	0,0	(6,0)	(210,5)	(13,9)	(17,3)	21,1	0	(29,9)	(34,0)	0,0	13,0	0,0	3,0	(251,0)	-1,6%
<b>+ Net Supplies</b>	<b>317,0</b>	<b>546,4</b>	<b>110,6</b>	<b>349,7</b>	<b>3.331,1</b>	<b>155,6</b>	<b>387,7</b>	<b>1.505,9</b>	<b>138,3</b>	<b>472,0</b>	<b>2.140,7</b>	<b>123,3</b>	<b>1.684,9</b>	<b>33,2</b>	<b>3.324,0</b>	<b>13.721,0</b>	<b>100,0%</b>

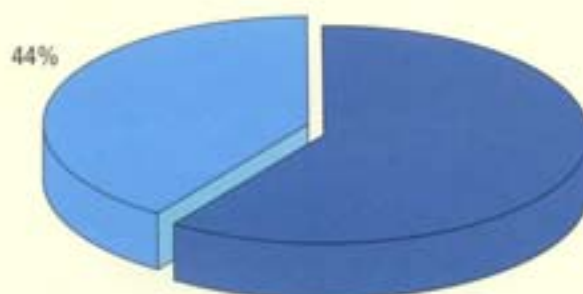
Notes : 1) (-) Increase in stocks. + Decrease in stocks

### 1996 Breakdown of Western Europe's Natural Gas Supplies



Note: Western Europe = EU + Norway + Switzerland

### 1996 EU Share of World Gas Trade



In 1996 world natural gas trade (import/export) totalled to some 384 MTOE of which 44% was imported by EU-countries.

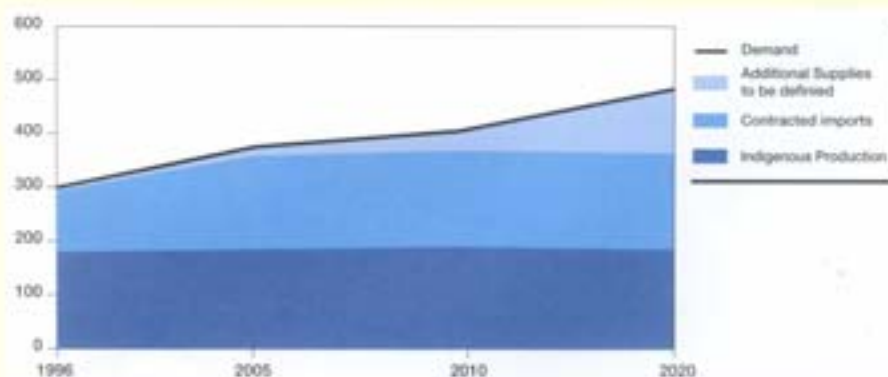
Source : eurogas and Cedigaz

## 5. Natural Gas Demand and Supply Outlook to 2020

### eurogas Long-term Natural Gas Demand & Supply Outlook / EU15

MTOE	1996	2005	2010	2020
Total Demand	295	375	405	435
Indigenous Production	180	185	190	135
Net Contracted Imports	115	175	180	180
Additional Supplies to be Defined	-	15	35	120
Share of Primary Energy Consumption	21%	25%	26%	26,5%

EU  
Natural Gas  
Demand  
& Supply  
Outlook  
1996-2020  
(MTOE)

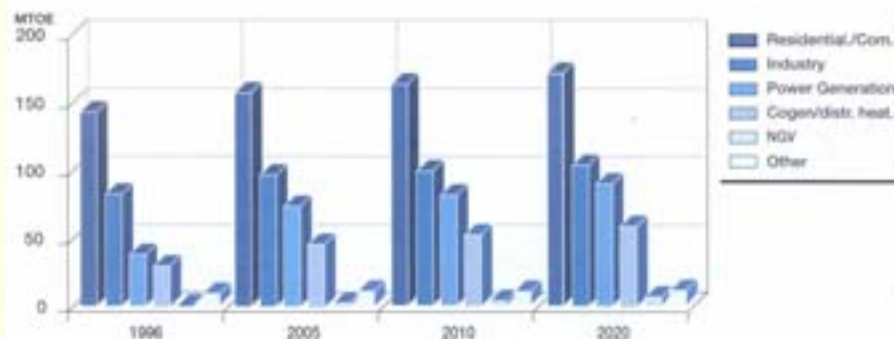


### Expected Import Dependency EU15 / Western Europe

European Union	40%	50%	55%	70%
Western Europe	30%	33%	35%	50%

Western Europe = EU + Norway + Switzerland

### Natural Gas Demand Outlook by Sector, EU15



## 7. Gas Supply Industry Key Figures

### Number of Gas Customers (in thousands, rounded) at of 1 January 1997

	A	B	CH (1)	CZ (2)	D (1)	DK	E	F	FIN	H	I	IRL	NL	S (2)	UK
Domestic	1.180	2.262	406	2.158	15.400	289	2.932	9.470	33	2.473	14.010	257	n.a.	52	18.798
Non-Domestic	2	82	24	n.a.	650	6	59	505	2	115	890	9	n.a.	3	543
<b>Total</b>	<b>1.181</b>	<b>2.344</b>	<b>430</b>	<b>n.a.</b>	<b>16.050</b>	<b>295</b>	<b>2.991</b>	<b>9.975</b>	<b>35</b>	<b>2.588</b>	<b>14.900</b>	<b>266</b>	<b>6.280</b>	<b>55</b>	<b>19.341</b>

### Number of Employees at 1 January 1997

	A	B	CH	CZ	D	DK	E	F	FIN	H	I	IRL	NL	S	UK
Total for Transmission and Distribution	3.330	4.125	1.650	8.572	46.000	1.334	4.154	25.100	300	9.853	34.000	761	10.750	225	17.000

### Investments in 1996 (mio ECU-average July 1996 rates)

	A	B	CH	CZ	D	DK	E	F	FIN	H	I	IRL	NL	S	UK
Total for Transmission and Distribution	168	206	146	n.a.	3.400	111	752	862	50	n.a.	2.190	54	540	3	375

### Pipeline Lengths at 1 January 1997 (km)

	A	B	CH	CZ	D	DK	E	F	FIN	H	I	IRL	NL	S	UK
Transmission	5.068	3.453	2.020	3.354	53.000	1.086	6.637	32.060	820	4.826	28.500	1.015	11.429	527	17.900
Distribution	19.058	41.231	12.160	40.897	282.000	16.168	17.533	140.590	1.170	44.710	170.000	5.075	109.000	3.000	253.200
<b>Total</b>	<b>24.126</b>	<b>44.684</b>	<b>14.180</b>	<b>44.251</b>	<b>335.000</b>	<b>17.254</b>	<b>24.170</b>	<b>172.650</b>	<b>1.990</b>	<b>49.536</b>	<b>198.500</b>	<b>6.090</b>	<b>120.429</b>	<b>3.527</b>	<b>271.100</b>

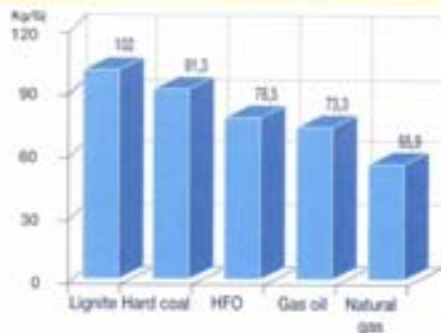
### Natural Gas Storage at 1 January 1997

	A	B	CH (3)	CZ (3)	D (1)	DK	E	F	FIN	H	I	IRL	NL	S	UK
Number of Storage Facilities	5	3	(1)	5 + (2)	37	2	2	15	0	4	8	0	1	0	7
Maximum Working Volume, mill m <sup>3</sup>	2.630	675	±50	1.620+(2)	14.098	±680	1.119	10.400	0	±2.620	±14.700	0	±75	0	3.497
Maximum Withdrawal Capacity, mill m <sup>3</sup> /day	27	±19	±1,4	19,8+(2)	353	±20	5,5	219	0	±34	263	0	±31	0	134

- Notes : 1) preliminary  
2) approximate  
3) ( ) = Storage facilities abroad

# 8. Energy Efficiency and Greenhouse Gas Emissions

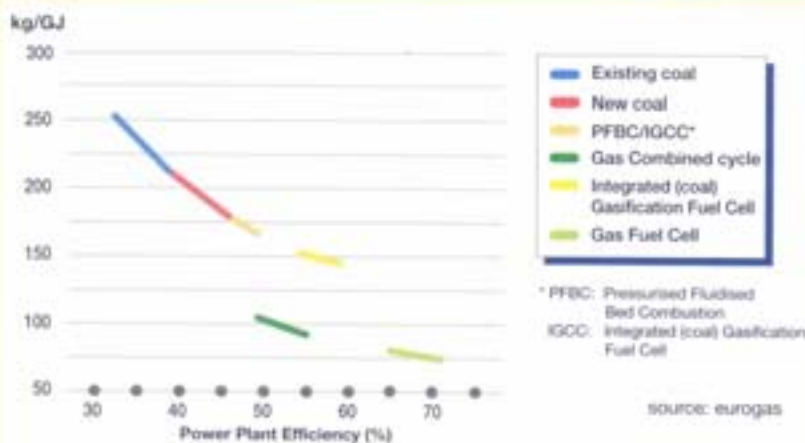
CO<sub>2</sub> Formed by the Combustion of Fossil Fuels



source: IGU

For the same amount of energy supplied, natural gas generates less CO<sub>2</sub> than other fossil fuels.

Efficiencies and CO<sub>2</sub> Emissions from Fossil-Fuelled Power Plants



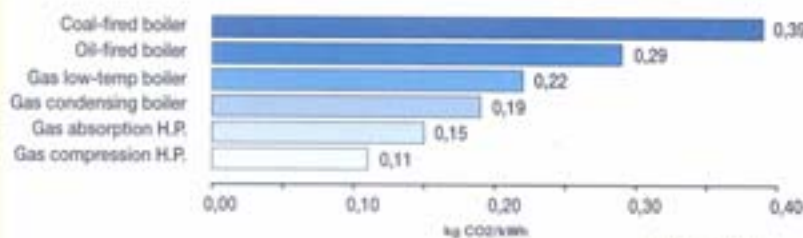
\* PFBC: Pressurized Fluidized Bed Combustion  
IGCC: Integrated (coal) Gasification Fuel Cell

source: eurogas

For a given energy performance, less energy supply is required with natural gas owing to the high energy efficiency of natural gas fired technologies :

- easy processing
- efficient combustion
- clean combustion gas for high heat recovery and protection of process equipment

CO<sub>2</sub> Emissions from Heat Supply Systems



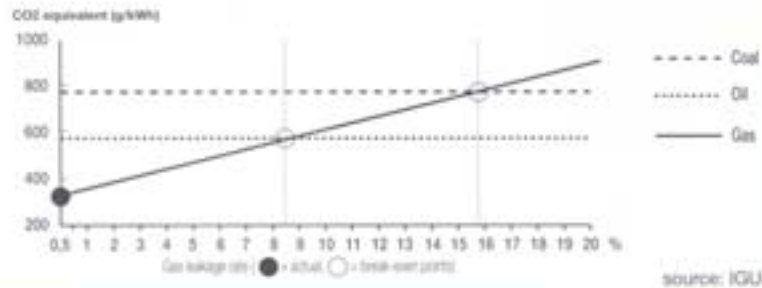
source: Ruhrgas

## Methane Emissions

Though methane is the main component of natural gas, methane leakages from the total natural gas chain operations (from production to final distribution) are so low that natural gas clearly maintains its "greenhouse" advantage over other fossil fuels.

From a comparison among fossil fuels of total greenhouse gas emissions from the overall fuel chain in terms of CO<sub>2</sub> equivalent, it is possible to determine the theoretical leakage rates of methane from gas supply operations at which gas would break even with coal or oil regarding global warming impact:

### Break-Even Leakage Rates - Gas vs Oil and Coal



Methane leakages from natural gas networks in the USA and Western Europe including Scandinavia are estimated at 0.05-0.66% of throughput (source: IGU), far below the break even rates that would negate the climate change advantage of natural gas. With the ongoing replacement of older, low pressure distribution systems, this figure will gradually be reduced further.

## 9. Definitions and Conversion Factors

Internationally agreed statistical methods and definitions have been applied.

**Primary Energy Consumption** is defined as the total gross energy supply (indigenous production plus net imports) before any conversion of the primary energy into final energy forms has taken place.

**Final Energy Consumption** is the Primary Energy Consumption less net energy losses in the production of electricity and synthetic gas, refinery use and other energy sector uses and losses.

**Natural Gas Sales and Supplies** have been stated in PJ because of different national gas qualities. With an assumed energy content of 1 m<sup>3</sup> of natural gas of 39 MJ (Gross Calorific Value), 1 PJ corresponds to approx. 25.6 mill. m<sup>3</sup> of natural gas.

### Conversion Factors

1PJ (GCV)	=	25.6 million m <sup>3</sup> gas	
1 m <sup>3</sup> of natural gas	=	39 megajoules (MJ - GCV)	= 10.8 kWh
1 MTOE	=	1 Million Tonnes of Oil Equivalent	= 41.86 PJ (NCV)
1000 m <sup>3</sup> of natural gas	=	0.9 ton oil equivalent (toe - crude oil)	
1 BCM	=	1 Billion Cubic Meters	
1 cubic meter (m <sup>3</sup> )	=	35.315 cubic feet (cf)	
1 million m <sup>3</sup> of LNG	=	593 million m <sup>3</sup> of gas	
Net Calorific Value (NCV)	=	0.9 Gross Calorific Value (GCV)	
1 Megajoule	=	10 <sup>6</sup> Joules	
1 Gigajoule	=	10 <sup>9</sup> Joules	
1 Terajoule	=	10 <sup>12</sup> Joules	
1 Petajoule	=	10 <sup>15</sup> Joules	

### Heat units

Equivalent to :	GJ	kWh	MBtu	th	therm
1 gigajoule (GJ)	1	277.8	0.948	283.9	9.479
1 kilowatt-hour (kWh)	3.6 10 <sup>-3</sup>	1	3.411 10 <sup>-3</sup>	0.86	3.411 10 <sup>-7</sup>
1 million British Thermal Units (MBtu)	1.055	293.2	1	252	10
1 thermie (th)	4.186 10 <sup>-2</sup>	1.162	3.968 10 <sup>-3</sup>	1	3.968 10 <sup>-7</sup>
1 therm	0.1055	29.32	1 10 <sup>-4</sup>	25.2	1