

Energy Statistics 1990 - 2008

2009 REPORT



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December 2009



*Energy Policy Statistical
Support Unit*

Sustainable Energy Ireland

Sustainable Energy Ireland was established as Ireland's national authority agency under the Sustainable Energy Act 2002. SEI's mission is to promote and assist the development of sustainable energy. This encompasses environmentally and economically sustainable production, supply and use of energy, in support of government policy, across all sectors of the economy including public bodies, the business sector, local communities and individual consumers. Its remit relates mainly to improving energy efficiency, advancing the development and competitive deployment of renewable sources of energy and combined heat and power, and reducing the environmental impact of energy production and use, particularly in respect of greenhouse gas emissions.

SEI is charged with implementing significant aspects of government policy on sustainable energy and the climate change abatement, including:

- Assisting deployment of superior energy technologies in each sector as required;
- Raising awareness and providing information, advice and publicity on best practice;
- Stimulating research, development and demonstration;
- Stimulating preparation of necessary standards and codes;
- Publishing statistics and projections on sustainable energy and achievement of targets.

It is funded by the Government through the National Development Plan; programmes are part financed by the European Union.

Energy Policy Statistical Support Unit (EPSSU)

SEI has a lead role in developing and maintaining comprehensive national and sectoral statistics for energy production, transformation and end use. This data is a vital input to meeting international reporting obligations, for advising policy makers and informing investment decisions. Based in Cork, EPSSU is SEI's specialist statistics team. Its core functions are to:

- Collect, process and publish energy statistics to support policy analysis and development in line with national needs and international obligations;
- Conduct statistical and economic analyses of energy services sectors and sustainable energy options;
- Contribute to the development and promulgation of appropriate sustainability indicators.

Highlights – the year 2008

- Ireland's economy contracted by 3% in 2008. Energy demand grew by 1.5% and energy-related CO₂ emissions increased by 1.3%.
- Energy-related CO₂ emissions fell by 4.6% in industry and transport recorded a 1.9% reduction in emissions in 2008 compared with 2007. These sectors' energy use is more directly coupled with economic growth.
- Energy-related CO₂ emissions increased by 9.7% in the services sector and 8.8% in the residential sector. One significant factor here was the reduction in external temperatures during 2008, i.e. a return to normal weather in 2008 after a mild year in 2007.
- Imported oil and gas accounted for 81% of energy supply and Ireland's overall import dependency was 89% in 2008.
- Renewable energy use grew by 21% during 2008 and by 16% per annum on average in the period 2005 - 2008. Since 1990 renewable energy has grown by 247% (7.1% per annum on average) in absolute terms.
- In 2008, there was a 23% increase in wind generation and a 45% increase in the contribution from hydro.
- The installed capacity of wind generation reached 1,161 MW (246 MW more than in September 2008). There are 434 MW of wind contracted for connection before the end of 2009 and a further 469 MW by the end of 2010.
- The estimated amount of CO₂ avoided through the use of renewable energy increased by 197% (6.2% per annum on average) over the period 1990 to 2008, reaching 2,242 kt CO₂ in 2008.
- Final consumption of electricity in 2008 grew by 3.1%, the same rate it had been growing at between 2005 and 2008. In 2008, electricity accounted for 17% of final energy use.
- Natural gas remains the dominant fuel in electricity generation with its share increasing to 55% in 2008. Natural gas use in electricity generation was 2,811 ktoe in 2008, 2.7% higher than in 2007.
- The carbon intensity of electricity increased by 3.2% in 2008 to 582 CO₂ g/kWh due to fuel mix changes.
- Overall final energy use in industry decreased by 5.4% in 2008 relative to the previous year, with all fuels experiencing reductions.
- Energy-related CO₂ emissions fell in industry in 2008 by 4.6%. If upstream electricity emissions are omitted industry experienced a decrease in CO₂ emissions of 5.9% in 2008.
- Energy use in transport fell for the first time in 2008 – by 1.3% to 5.6 Mtoe (42% of final energy use) due to the economic downturn. Transport energy-related CO₂ emissions also fell for the first time in 2008, by 1.9%.
- There was a significant increase in the share of transport energy from biofuels since 2006, albeit from a low base. In absolute terms, biofuels in transport increased from 1 ktoe in 2005 (0.03% of petrol and diesel use) to 56 ktoe in 2008 (1.2%).
- The share of diesel in transport energy increased from 34% to 48% over the period 1990 – 2008 while the share of petrol has declined from 47% to 34%.
- Between 2000 and 2005 the share of private car label bands A, B & C was on average 35% while in 2006/07 it rose to 41%. In the period after the introduction of the new Vehicle Registration Tax (VRT) and Annual Road Tax (AMT), July to December, the share of these bands rose to 73%. In the first six months of 2009 it increased again to 78%.
- Residential energy use increased by 8.8% in 2008. When corrections for climate effects are taken into account the increase was 3.3%.
- Climate corrected, the unit energy consumption per household was just 0.7% higher in 2008 than in 2007 compared with an uncorrected increase of 6.1%.
- In 2008 the "average" dwelling was responsible for emitting approximately 8 tonnes of CO₂.
- Oil has become the dominant fuel in the residential sector, more than doubling its share from 17% in 1990 to almost 39% in 2008, followed by electricity at 23%.
- Final energy use in the commercial and public services sector grew by 80% (3.3% per annum) over the period 1990 – 2008. During this period the value added generated by the sector grew by 157% while the numbers employed more than doubled (128% increase).
- Electricity consumption in services increased by 242% (7% per annum) between 1990 and 2008, representing 45% of energy use in the sector, up from 24% in 1990.
- The commercial and public services sector experienced an increase of 6.9% in final energy use in 2008.
- The services sector experienced an increase of 9.7% in primary energy related emissions during 2008.

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1. Introduction

This publication, *Energy Statistics 1990 – 2008*, is intended as a companion publication to *Energy in Ireland* which contains commentary and analysis based on the data presented here. It is also intended to serve as a resource for policy makers, analysts and researchers with an interest in energy use in Ireland and is prepared by SEI's Energy Policy Statistical Support Unit (EPSSU), based in Cork. This Unit was established to deliver on the remit of Sustainable Energy Ireland in respect of the development, collation, analysis, publication and maintenance of national energy statistics, indicators and trends.

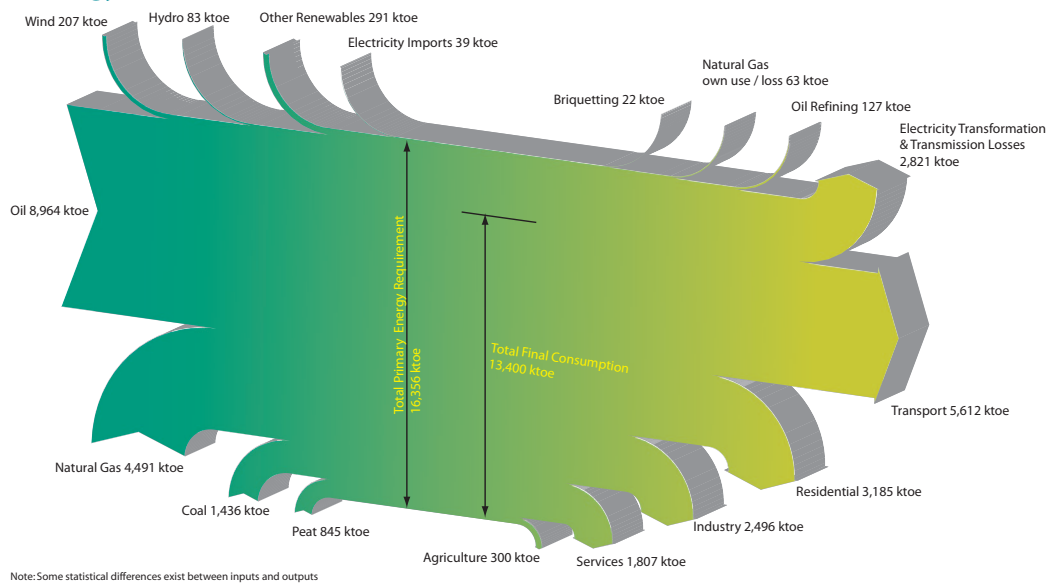
This document details historic energy data from 1990 to 2008. The data are presented in tables showing 1990, 1995 and the last nine years 2000 to 2008.

Energy balance data analysed in this report was frozen on 20th November 2009. Balance data are updated whenever more accurate information is known. To obtain the most up-to-date balance figures visit the statistics publications section on Sustainable Energy Ireland's website.

An energy data service is available at <http://www.sei.ie/statistics>, follow the links for Energy Statistics Databank. This service is hosted by the Central Statistics Office with data provided by SEI.

Feedback and comment on the report are welcome and should be addressed by post to the address on the rear cover or by email to EPSSU@SEI.ie.

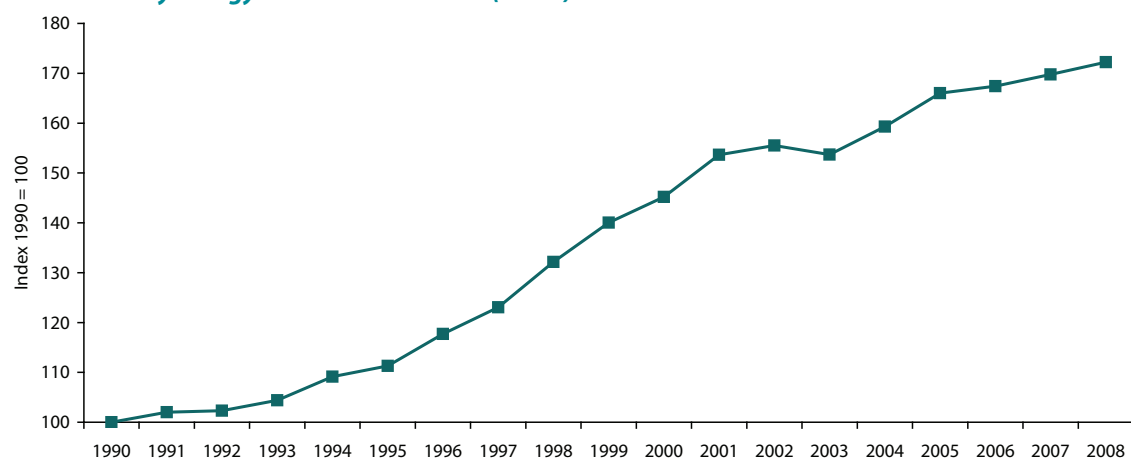
Figure 1 Energy Flow 2008



2. Energy Balance 2008

kilo tonnes of oil equivalent (ktoe)	COAL	PEAT	OIL	NATURAL GAS	RENEWABLES	ELECTRICITY	TOTAL
Indigenous Production	-	645	-	355	538	-	1,538
Imports	1,600	-	10,386	4,135	44	65	16,229
Exports	4	10	1,216	-	2	26	1,258
Mar. Bunkers	-	-	70	-	-	-	70
Stock Change	-160	210	144	1	2	-	197
Primary Energy Supply (incl. non-energy)	1,436	845	9,243	4,491	581	39	16,635
Primary Energy Requirement (excl. non-energy)	1,436	845	8,964	4,491	581	39	16,356
Transformation Input	1,046	674	3,615	2,811	38	58	8,242
Public Thermal Power Plants	1,046	558	345	2,577	29	-	4,557
Combined Heat and Power Plants	-	7	6	233	9	-	255
Pumped Storage Consumption	-	-	-	-	-	45	45
Briquetting Plants	-	108	-	-	-	-	108
Oil Refineries & other energy sector	-	-	3,264	-	-	13	3,277
Transformation Output	-	92	3,411	-	14	2,250	5,767
Public Thermal Power Plants	-	-	-	-	11	2,061	2,072
Combined Heat and Power Plants - Electricity	-	-	-	-	3	160	163
Combined Heat and Power Plants - Heat	-	-	-	-	-	-	-
Pumped Storage Generation	-	-	-	-	-	28	28
Briquetting Plants	-	92	-	-	-	-	92
Oil Refineries	-	-	3,411	-	-	-	3,411
Exchanges and transfers	12	-	-12	-	-304	304	1
Electricity	-	-	-	-	-304	304	-
Heat	-	-	-	-	-	-	-
Other	12	-	-12	-	-	-	1
Own Use and Distribution Losses	-	22	127	63	-	371	583
Available Final Energy Consumption	401	241	8,900	1,617	253	2,165	13,577
Non-Energy Consumption	-	-	279	-	-	-	279
Final non-Energy Consumption (Feedstocks)	-	-	279	-	-	-	279
Total Final Energy Consumption	380	280	8,534	1,659	253	2,294	13,400
Industry	125	-	950	596	139	686	2,496
Non-Energy Mining	-	-	94	20	-	49	163
Food, beverages and tobacco	18	-	148	169	41	137	513
Textiles and textile products	-	-	7	0	-	7	14
Wood and wood products	-	-	3	4	88	28	122
Pulp, paper, publishing and printing	-	-	5	7	-	22	33
Chemicals & man-made fibres	-	-	37	101	-	104	243
Rubber and plastic products	1	-	11	5	-	34	51
Other non-metallic mineral products	106	-	250	54	10	73	493
Basic metals and fabricated metal products	-	-	300	184	-	47	531
Machinery and equipment n.e.c.	-	-	7	9	-	16	33
Electrical and optical equipment	-	-	75	34	-	130	239
Transport equipment manufacture	-	-	3	8	-	10	21
Other manufacturing	-	-	9	2	-	29	40
Transport	-	-	5,552	-	56	5	5,612
Road Freight	-	-	1,160	-	-	-	1,160
Road Private Car	-	-	2,126	-	56	-	2,181
Public Passenger Services	-	-	226	-	-	-	226
Rail	-	-	46	-	-	5	50
Domestic Aviation	-	-	43	-	-	-	43
International Aviation	-	-	929	-	-	-	929
Fuel Tourism	-	-	640	-	-	-	640
Unspecified	-	-	384	-	-	-	384
Residential	228	280	1,231	669	44	733	3,185
Commercial/Public Services	26	-	550	394	15	822	1,807
Commercial Services	26	-	359	173	12	589	1,159
Public Services	-	-	191	221	3	233	648
Agricultural	-	-	251	-	0	48	300
Statistical Difference	22	-39	86	-42	-1	-129	-103

Figure 2 Primary Energy Growth 1990 – 2008(Index)

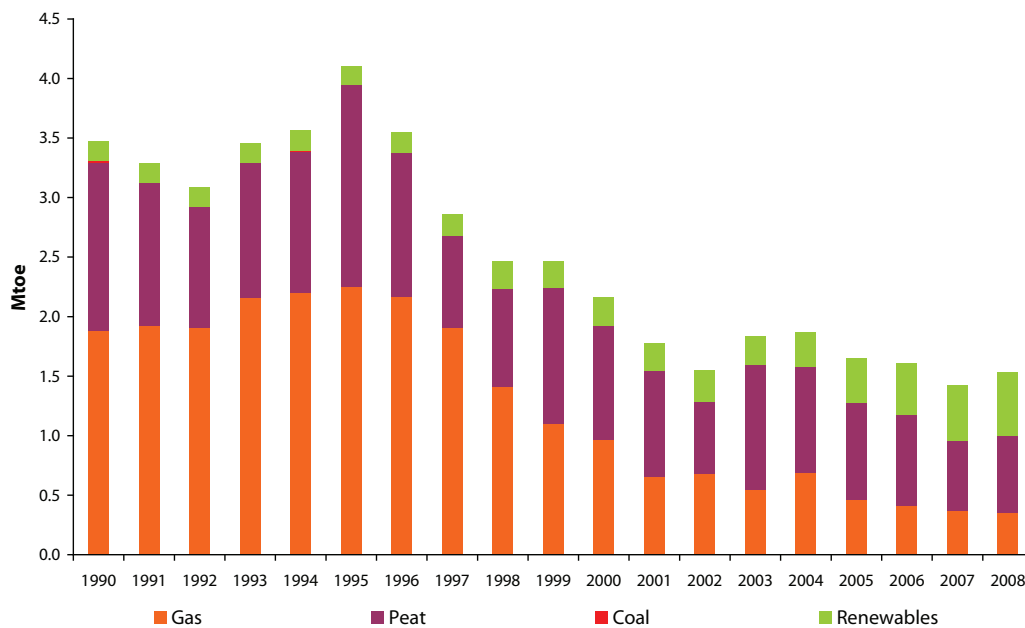


3. Energy Production

3.1 Primary Energy Production

Primary Production											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Indigenous Production	3,471	4,105	2,161	1,776	1,546	1,836	1,867	1,648	1,606	1,424	1,538
Coal	16	1	0	0	0	0	0	0	0	0	0
Peat	1,411	1,697	965	883	606	1,056	889	810	766	591	645
Natural Gas	1,877	2,253	960	660	679	545	690	462	410	370	355
Renewables	168	155	235	234	261	235	287	376	430	462	538
Hydro	60	61	73	51	78	51	54	54	62	57	83
Wind	0	1	21	29	33	39	56	96	139	168	207
Biomass	105	89	113	125	125	119	141	180	181	171	165
Landfill Gas	0	0	24	24	19	16	20	25	25	24	26
Biogas	2	3	4	4	4	9	10	9	7	10	9
Liquid Biofuel	0	0	0	0	0	0	0	1	3	15	24
Solar	0	0	0	0	0	0	0	0	1	1	3
Geothermal	0	0	0	0	0	0	6	10	11	15	20

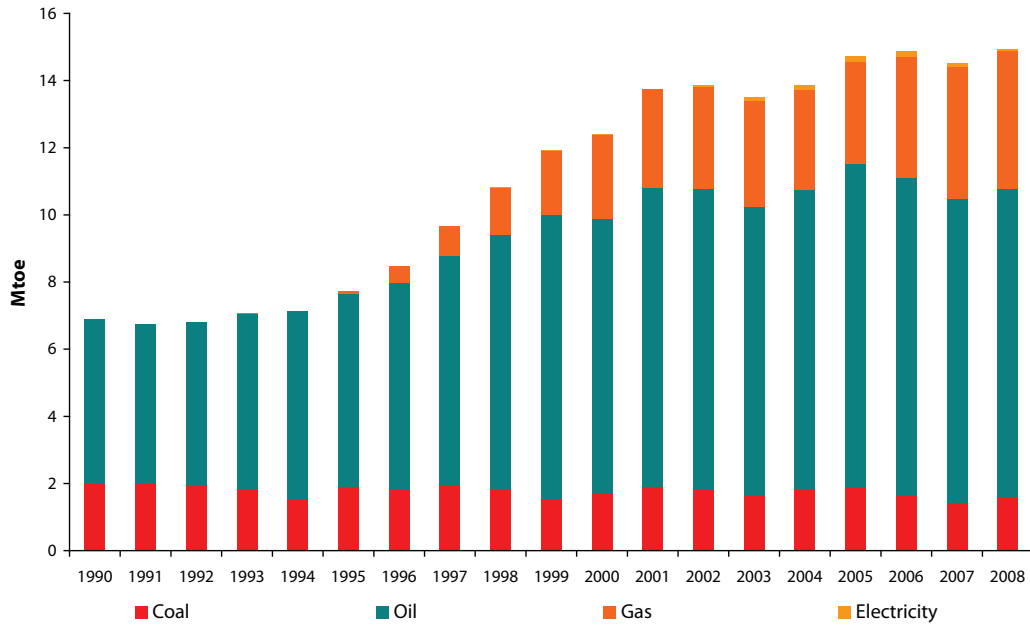
Figure 3 Indigenous Production by Fuel 1990 – 2008



3.2 Net Energy Imports

Net Energy Imports											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Net Imports	6,974	7,695	12,202	13,609	13,631	13,285	13,639	14,259	14,506	14,407	14,676
Coal	1,992	1,886	1,692	1,887	1,801	1,627	1,831	1,879	1,631	1,417	1,596
Bituminous Coal	1,974	1,817	1,643	1,831	1,748	1,570	1,775	1,822	1,590	1,382	1,552
Anthracite + Manufactured Ovoids	0	47	32	35	28	33	37	33	35	30	31
Lignite	18	21	18	20	25	24	19	25	6	5	12
Peat Briquettes	-4	-6	-8	-8	-8	-12	-10	-10	-10	-8	-10
Oil	4,986	5,732	8,027	8,820	8,788	8,431	8,718	9,198	9,122	8,960	8,916
Crude	2,035	2,283	3,010	3,429	3,402	3,324	2,959	3,342	3,254	3,489	3,267
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	586	686	1,059	934	929	982	1,137	1,085	1,168	1,246	1,196
Kerosene	96	224	357	334	264	326	391	390	442	483	460
Jet Kerosene	370	350	724	910	1,046	1,031	1,016	1,177	1,214	1,111	1,261
Fuel Oil	504	677	426	724	453	95	370	116	-28	-543	-389
LPG	118	112	121	99	90	91	104	111	114	116	134
Gasoil / Diesel/ DERV	1,212	1,291	2,111	2,092	2,348	2,311	2,468	2,686	2,705	2,750	2,720
Petroleum Coke	65	110	220	299	256	270	272	291	254	309	267
Natural Gas	0	85	2,483	2,931	3,007	3,140	2,965	3,016	3,610	3,924	4,135
Electricity	0	-1	8	-22	43	100	135	176	153	114	39
Renewables	0	0	0	0	0	0	0	0	2	25	42
Biomass	0	0	0	0	0	0	0	0	2	12	11

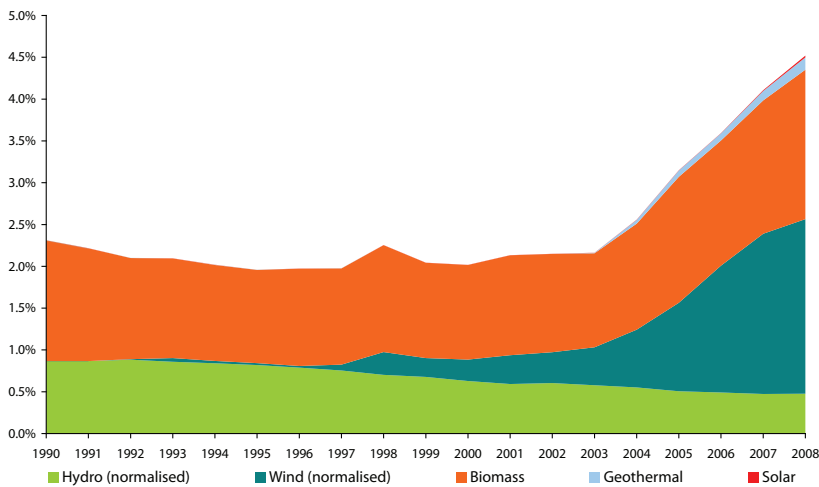
Figure 4 Net Imported Energy by Fuel 1990 – 2008



3.3 Renewable Production

Renewable Production											
kilo tonnes of oil equivalent	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Renewable Production	168	155	235	234	261	235	287	376	430	462	538
Hydro	60	61	73	51	78	51	54	54	62	57	83
Wind	0	1	21	29	33	39	56	96	139	168	207
Biomass	105	89	113	125	125	119	141	180	181	171	165
Landfill Gas	0	0	24	24	19	16	20	25	25	24	26
Biogas	2	3	4	4	4	9	10	9	7	10	9
Liquid Biofuel	0	0	0	0	0	0	0	1	3	15	24
Solar	0	0	0	0	0	0	0	0	1	1	3
Geothermal	0	0	0	0	0	0	6	10	11	15	20

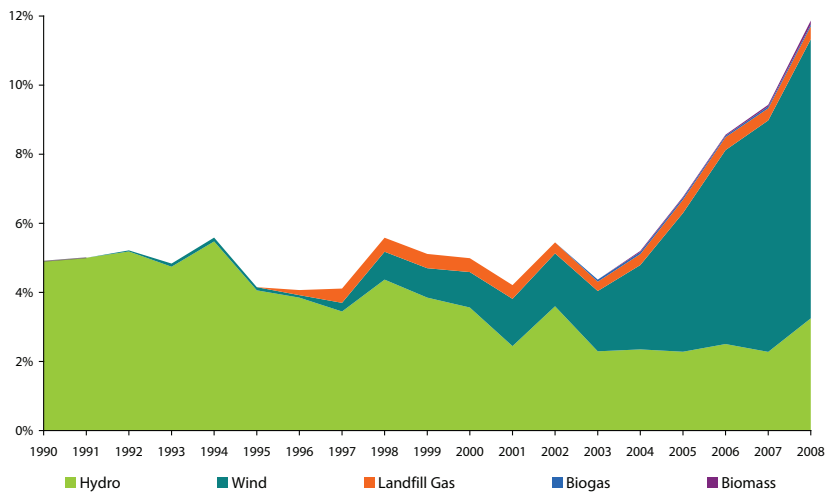
Figure 5 Renewable Energy Contribution to Final Consumption (Directive 2009/28/EC)



3.4 Renewable Electricity as percentage of Gross Electricity Consumption

	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Renewables % of Gross Electricity	4.90%	4.15%	4.99%	4.21%	5.45%	4.37%	5.20%	6.77%	8.56%	9.43%	11.87%
Hydro	4.90%	4.06%	3.56%	2.44%	3.60%	2.30%	2.35%	2.28%	2.51%	2.28%	3.25%
Wind	0.00%	0.09%	1.03%	1.37%	1.53%	1.74%	2.44%	4.02%	5.61%	6.70%	8.08%
Biomass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.03%	0.05%	0.11%
Landfill Gas	0.00%	0.00%	0.40%	0.40%	0.32%	0.27%	0.32%	0.38%	0.38%	0.35%	0.37%
Biogas	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.06%	0.04%	0.06%	0.06%

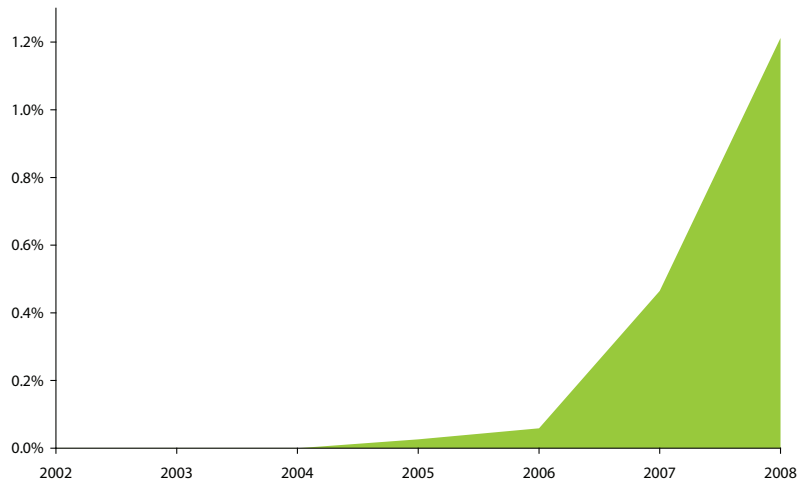
Figure 6 Renewable Energy Contribution to Gross Electricity Consumption 1990 – 2008



3.5 Renewable Energy as percentage of (Petrol & Diesel) Transport

	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Liquid Biofuels (ktoe)	0	0	0	0	0	0	0	1	3	21	56
Liquid Biofuels	0	0	0	0	0	0	0	1	3	21	56
Liquid Biofuels (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	1.2%

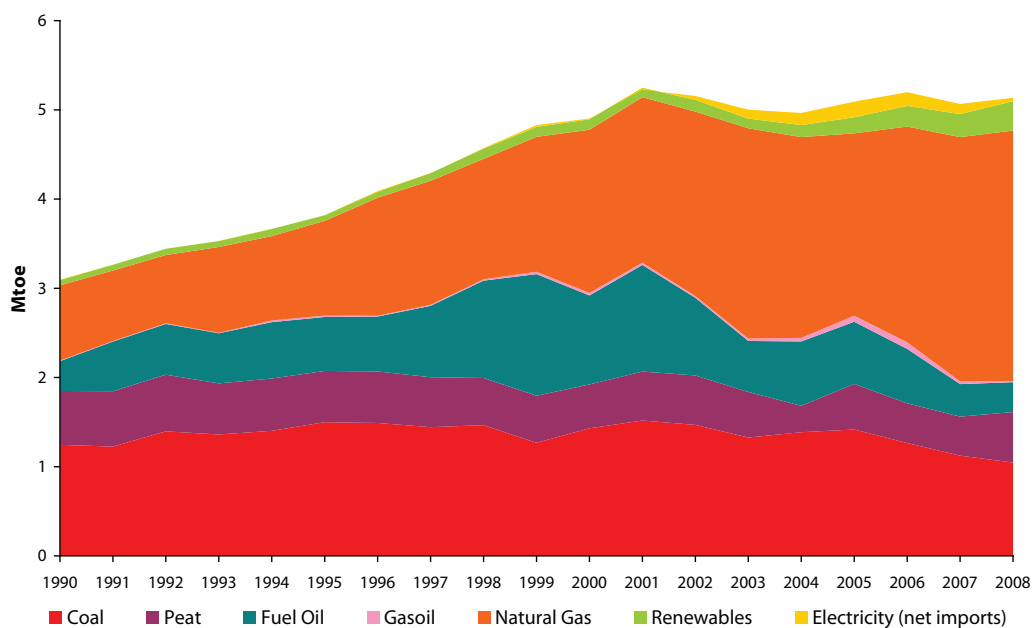
Figure 7 Renewable Energy as percentage of (Petrol & Diesel) Transport



3.6 Fuels used in Electricity Production

Electricity Inputs											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	1,245	1,499	1,430	1,517	1,468	1,327	1,387	1,416	1,265	1,124	1,046
Bituminous Coal	1,245	1,499	1,430	1,517	1,468	1,327	1,387	1,416	1,265	1,124	1,046
Peat	604	574	491	549	554	511	296	511	444	438	566
Milled Peat	572	567	491	549	554	511	296	511	444	438	566
Sod Peat	32	8	0	0	0	0	0	0	0	0	0
Oil	341	625	1,039	1,232	898	607	769	774	693	404	351
Refinery Gas	0	5	12	12	8	8	8	8	7	8	5
Fuel Oil	334	605	998	1,195	870	571	721	697	611	364	335
Gasoil	7	16	29	26	20	28	39	68	75	32	10
Natural Gas	843	1,063	1,828	1,855	2,069	2,356	2,251	2,044	2,417	2,737	2,811
Renewables	60	63	117	104	131	109	135	180	232	258	329
Hydro	60	61	73	51	78	51	54	54	62	57	83
Wind	0	1	21	29	33	39	56	96	139	168	207
Biomass	0	0	0	0	0	0	2	2	3	3	7
Landfill Gas	0	0	24	24	19	16	20	25	25	24	26
Biogas	0	0	0	0	0	2	2	2	2	5	5
Electricity (net imports)	0	-1	8	-22	43	100	135	176	153	114	39
Total	3,093	3,822	4,914	5,237	5,163	5,010	4,973	5,101	5,205	5,075	5,141

Figure 8 Primary Fuel Mix for Electricity Generation 1990 – 2008

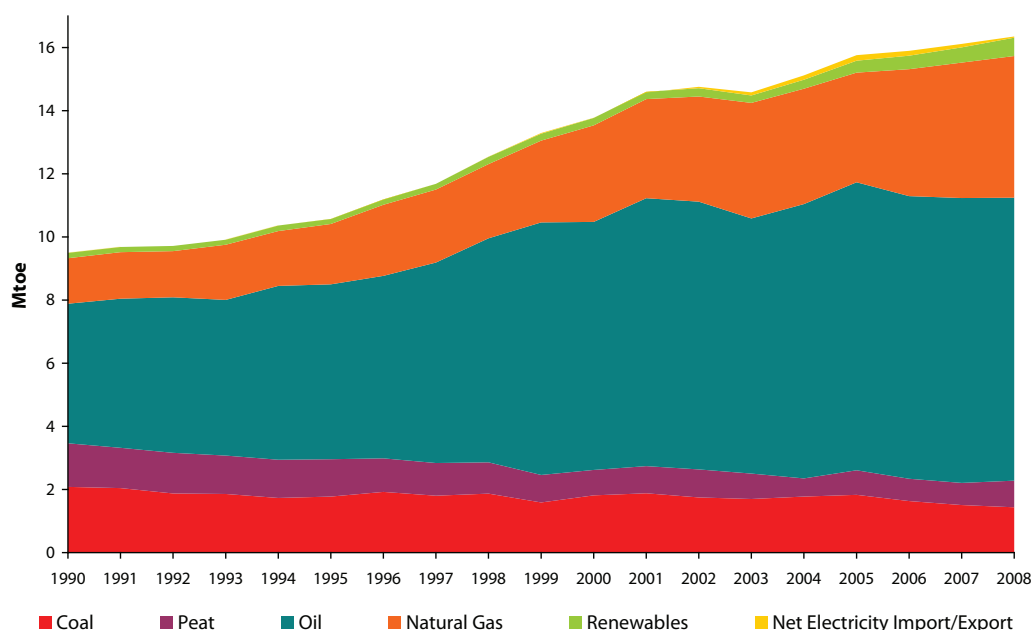


4. Consumption

4.1 Primary Energy Consumption

Primary Energy Consumption											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Primary Energy Supply (incl. non-energy)	9,928	11,097	14,451	15,152	15,347	14,804	15,359	16,223	16,248	16,237	16,635
Primary Energy Requirement (excl. non-energy)	9,497	10,568	13,780	14,579	14,756	14,583	15,120	15,762	15,900	16,120	16,356
Coal	2,085	1,777	1,815	1,879	1,751	1,700	1,778	1,832	1,631	1,508	1,436
Peat	1,377	1,184	803	863	887	805	574	776	707	701	845
Oil	4,422	5,643	8,147	8,607	8,719	8,304	8,931	9,586	9,305	9,139	9,243
Natural Gas	1,877	2,339	3,443	3,591	3,686	3,659	3,653	3,477	4,019	4,293	4,491
Renewables	168	155	235	234	261	235	287	376	432	481	581
Electricity Imports	0	-1	8	-22	43	100	135	176	153	114	39
Transformation Input	5,105	6,234	8,339	8,796	8,446	8,304	7,874	8,317	8,227	8,353	8,242
Coal	1,245	1,499	1,430	1,517	1,468	1,327	1,387	1,416	1,265	1,124	1,046
Peat	788	730	618	679	679	645	387	610	552	532	674
Oil	2,186	2,905	4,391	4,669	4,150	3,894	3,761	4,158	3,900	3,866	3,615
Natural Gas	843	1,063	1,828	1,855	2,069	2,356	2,251	2,044	2,417	2,737	2,811
Renewables	0	0	24	24	19	19	25	30	31	32	38
Electricity Pumped Storage	44	39	48	51	61	64	64	60	62	63	58
Exchanges & Transfers	0	0	-1	-1	-0	-0	-4	1	-11	9	1
Own Use & Transmission Loss	289	346	410	443	463	471	474	498	510	494	583
Non Energy Use	430	528	671	573	591	221	238	461	348	117	279
Total Final Consumption (Observed)	7,260	7,998	10,814	11,258	11,310	11,583	11,951	12,636	13,003	13,244	13,400
Coal	843	317	398	393	374	394	405	435	378	374	380
Peat	757	612	303	292	293	271	267	274	284	272	280
Oil	3,962	4,903	7,047	7,399	7,442	7,531	7,689	8,176	8,349	8,581	8,534
Natural Gas	570	797	1,203	1,237	1,199	1,280	1,461	1,464	1,567	1,571	1,659
Renewables	108	92	117	130	130	126	146	194	199	221	253
Electricity	1,021	1,277	1,745	1,808	1,872	1,981	1,983	2,094	2,225	2,224	2,294

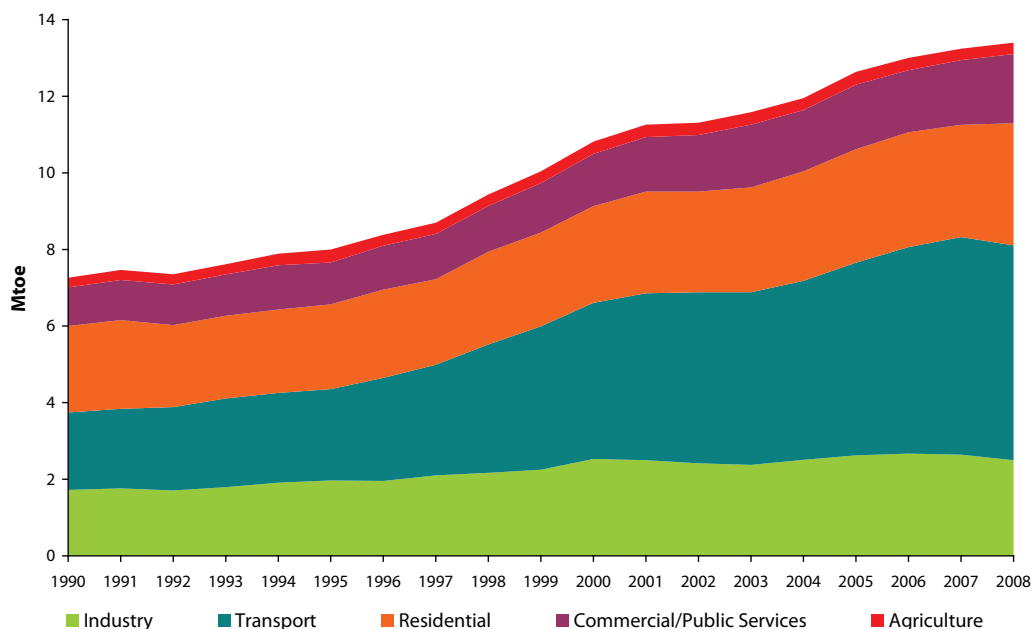
Figure 9 Primary Energy Consumption by Fuel 1990 – 2008



4.2 Total Final Consumption

Total Final Consumption											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	7,260	7,998	10,814	11,258	11,310	11,583	11,951	12,636	13,003	13,244	13,400
Industry	1,720	1,971	2,529	2,499	2,416	2,374	2,506	2,625	2,671	2,640	2,496
Non-Energy Mining	37	143	178	191	167	149	134	171	185	173	163
Food, beverages and tobacco	426	493	636	626	557	542	532	596	618	559	513
Textiles and textile products	51	52	64	63	49	37	26	29	16	15	14
Wood and wood products	74	89	134	146	148	104	127	146	146	130	122
Pulp, paper, publishing and printing	18	54	67	66	63	59	61	43	39	35	33
Chemicals & man-made fibres	184	225	285	293	277	260	277	295	282	258	243
Rubber and plastic products	34	42	51	45	45	44	45	52	57	52	51
Other non-metallic mineral prods	301	187	261	243	310	397	509	519	504	547	493
Basic metals & fab. metal prods	316	410	502	451	451	465	496	433	449	526	531
Machinery and equipment n.e.c.	25	57	86	117	85	61	38	38	37	34	33
Electrical and optical equipment	63	169	203	196	199	195	198	247	267	245	239
Transport equipment manufacture	14	19	24	25	23	21	20	20	24	22	21
Other manufacturing	178	30	39	38	40	42	43	33	47	43	40
Transport	2,022	2,384	4,080	4,355	4,468	4,509	4,673	5,031	5,390	5,685	5,612
Road Freight	334	371	813	825	963	1,075	1,128	1,218	1,186	1,296	1,160
Road Private Car	926	1,176	1,559	1,698	1,708	1,792	1,863	1,910	2,024	2,182	2,181
Public Passenger Services	52	65	86	97	105	121	120	160	162	188	226
Rail	45	38	42	46	40	44	49	45	45	47	50
Domestic Aviation	21	22	34	38	36	36	37	38	40	42	43
International Aviation	354	379	597	719	767	749	707	821	950	1,002	929
Fuel Tourism	0	12	757	766	697	665	709	822	806	633	640
Unspecified	290	320	194	166	151	26	60	18	177	293	384
Residential	2,259	2,214	2,520	2,659	2,629	2,735	2,860	2,961	2,997	2,928	3,185
Commercial/Public Services	1,007	1,090	1,368	1,423	1,473	1,640	1,597	1,684	1,623	1,690	1,807
Commercial Services	554	657	854	888	932	1,059	1,031	1,086	1,047	1,084	1,159
Public Services	452	433	514	535	541	581	566	598	577	606	648
Agricultural	252	340	317	323	324	325	314	336	322	301	300

Figure 10 Total Final Consumption by Sector 1990 – 2008

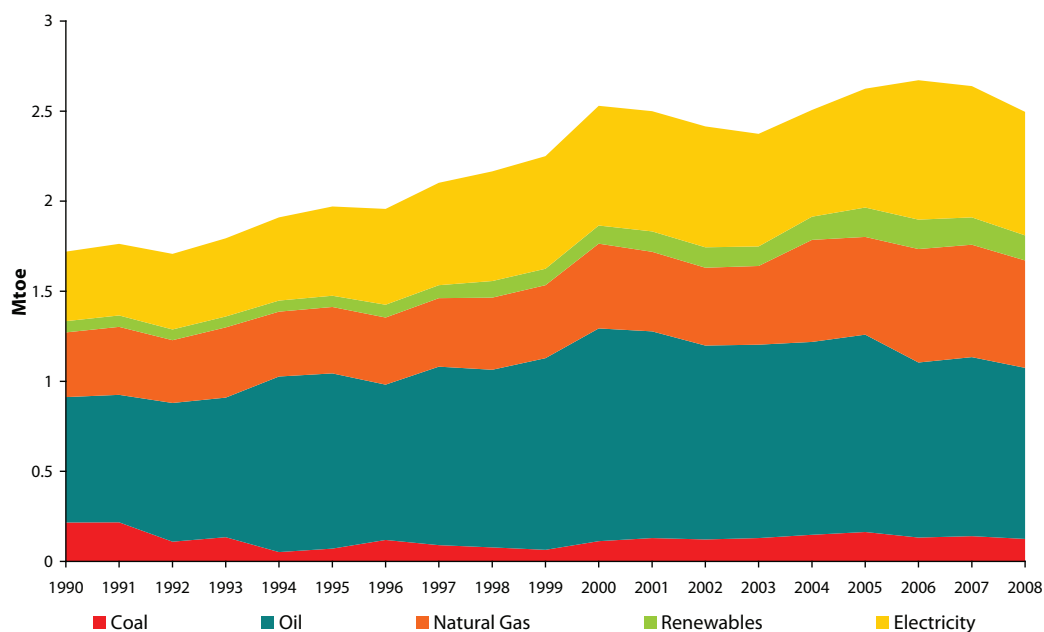


5. Sectoral Consumption of Fuels

5.1 Industry

Industry											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	216	71	113	129	122	129	148	163	133	140	125
Bituminous Coal	216	71	113	129	122	129	148	163	133	140	125
Anthracite + Manufactured Ovoids	0	0	0	0	0	0	0	0	0	0	0
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	0	0	0	0	0	0	0	0	0	0	0
Peat	0	0	0	0	0	0	0	0	0	0	0
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	0	0	0	0	0	0	0	0	0	0	0
Briquettes	0	0	0	0	0	0	0	0	0	0	0
Oil	696	973	1,181	1,148	1,076	1,074	1,071	1,096	972	994	950
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Kerosene	17	42	90	101	105	121	120	124	124	124	139
Jet Kerosene	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil	422	582	673	571	516	480	483	472	372	359	331
LPG	62	61	66	68	64	64	63	73	71	70	82
Gasoil / Diesel/ DERV	148	210	190	191	193	197	186	199	190	178	178
Petroleum Coke	47	76	161	216	197	211	217	227	214	261	219
Naphta	1	1	1	1	1	1	1	1	1	1	1
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	358	369	471	441	432	437	566	543	629	624	596
Renewables	63	62	100	113	113	108	129	163	164	152	139
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	61	59	96	109	109	104	124	159	162	151	137
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	2	3	4	4	4	4	5	4	2	1	1
Wastes	0	0	0	0	0	0	0	0	0	0	0
Solar	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Electricity	386	496	665	667	672	626	592	660	773	729	686
Total	1,720	1,971	2,529	2,499	2,416	2,374	2,506	2,625	2,671	2,640	2,496

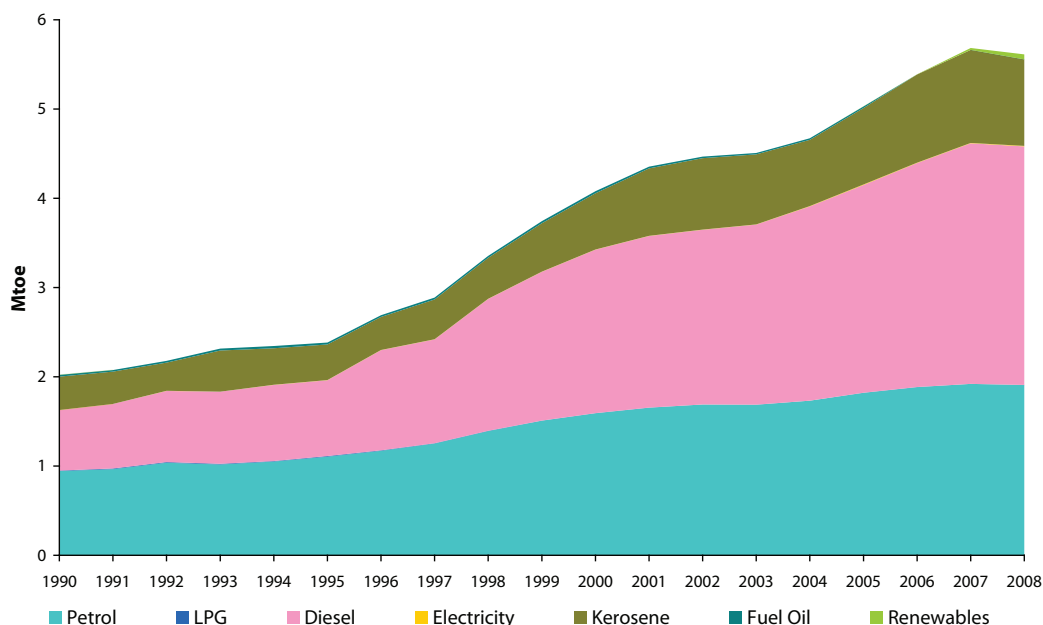
Figure 11 Industry Final Energy Use by Fuel



5.2 Transport

Transport											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	0	0	0	0	0	0	0	0	0	0	0
Bituminous Coal	0	0	0	0	0	0	0	0	0	0	0
Anthracite + Manufactured Ovoids	0	0	0	0	0	0	0	0	0	0	0
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	0	0	0	0	0	0	0	0	0	0	0
Peat	0	0	0	0	0	0	0	0	0	0	0
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	0	0	0	0	0	0	0	0	0	0	0
Briquettes	0	0	0	0	0	0	0	0	0	0	0
Oil	2,021	2,383	4,078	4,352	4,466	4,507	4,669	5,025	5,383	5,659	5,552
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	944	1,105	1,591	1,653	1,689	1,687	1,732	1,820	1,884	1,920	1,907
Kerosene	0	0	0	0	0	0	0	0	0	0	0
Jet Kerosene	374	400	629	755	802	784	743	857	988	1,043	970
Fuel Oil	20	22	25	20	18	17	18	18	0	0	0
LPG	7	6	2	2	1	1	1	1	1	1	1
Gasoil / Diesel/ DERV	677	849	1,831	1,923	1,956	2,018	2,176	2,329	2,509	2,695	2,673
Petroleum Coke	0	0	0	0	0	0	0	0	0	0	0
Naphta	0	0	0	0	0	0	0	0	0	0	0
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Renewables	0	0	0	0	0	0	0	1	3	21	56
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	0	0	0
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	0	0	0	0	0	0	0	0	0	0	0
Liquid Biofuels	0	0	0	0	0	0	0	1	3	21	56
Solar	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Electricity	1	2	2	2	2	2	4	5	5	4	5
Total	2,022	2,384	4,080	4,355	4,468	4,509	4,673	5,031	5,390	5,685	5,612

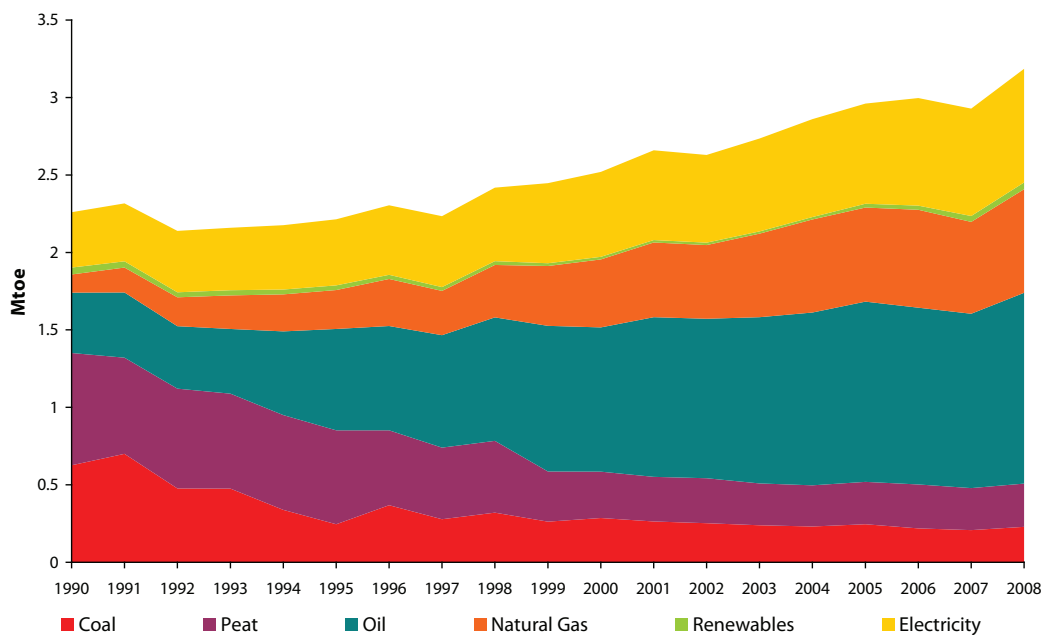
Figure 12 Transport Final Energy Use by Fuel



5.3 Residential

Residential											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	626	246	286	264	252	239	231	246	219	208	228
Bituminous Coal	608	178	210	181	170	167	158	163	159	142	164
Anthracite + Manufactured Ovoids	0	47	59	62	56	53	59	59	57	60	55
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	18	21	17	21	26	18	15	24	4	6	10
Peat	725	606	299	288	290	270	266	273	284	271	280
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	570	486	179	179	178	177	177	183	196	186	174
Briquettes	155	120	120	109	113	93	89	90	88	85	106
Oil	390	654	931	1,031	1,030	1,073	1,115	1,164	1,141	1,125	1,231
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Kerosene	105	283	570	645	663	710	775	795	792	789	887
Jet Kerosene	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	70	68	73	77	72	71	73	80	78	77	91
Gasoil / Diesel/ DERV	197	270	244	247	248	248	239	256	245	230	229
Petroleum Coke	19	33	44	62	46	43	28	33	25	29	23
Naphta	0	0	0	0	0	0	0	0	0	0	0
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	117	252	439	482	476	539	601	607	632	593	669
Renewables	45	30	17	16	16	15	15	25	27	37	44
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	45	30	17	16	16	15	15	16	17	23	23
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	0	0	0	0	0	0	0	0	0	0	0
Wastes	0	0	0	0	0	0	0	0	0	0	0
Solar	0	0	0	0	0	0	0	0	1	1	3
Geothermal	0	0	0	0	0	0	5	9	10	14	18
Electricity	356	427	548	579	566	599	632	646	695	693	733
Total	2,259	2,214	2,520	2,659	2,629	2,735	2,860	2,961	2,997	2,928	3,185

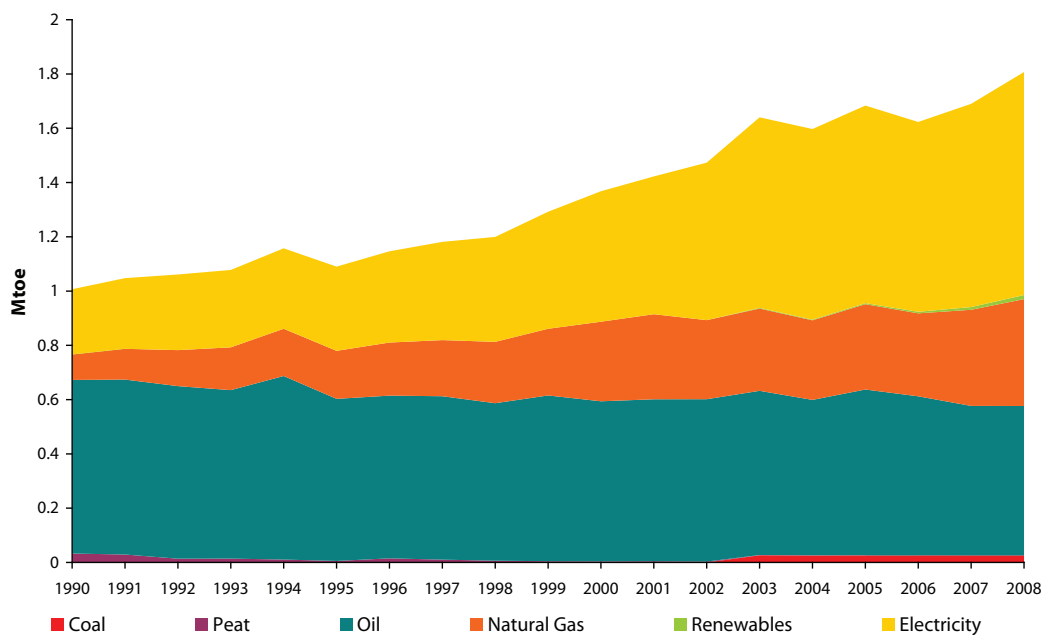
Figure 13 Residential Final Energy Use by Fuel



5.4 Commercial & Public Services

Commercial/Public Services											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	1	0	0	0	0	26	26	26	26	26	26
Bituminous Coal	1	0	0	0	0	25	25	24	24	24	24
Anthracite + Manufactured Ovoids	0	0	0	0	0	1	1	1	1	1	1
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	0	0	0	0	0	1	0	1	1	1	1
Peat	32	6	4	4	3	1	0	0	0	0	0
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	16	0	0	0	0	0	0	0	0	0	0
Briquettes	16	6	4	4	3	1	0	0	0	0	0
Oil	640	597	590	597	598	605	573	611	586	551	550
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Kerosene	0	0	0	0	0	0	0	0	0	0	0
Jet Kerosene	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil	148	68	17	15	14	13	11	10	10	10	10
LPG	9	11	11	11	11	10	11	12	12	11	13
Gasoil / Diesel/ DERV	483	518	562	570	573	573	550	589	564	530	527
Petroleum Coke	0	0	0	0	0	9	0	0	0	0	0
Naphta	0	0	0	0	0	0	0	0	0	0	0
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	94	177	293	314	291	303	293	314	306	354	394
Renewables	0	0	0	0	0	2	2	4	6	10	15
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	1	5	10
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	0	0	0	0	0	2	2	3	3	3	3
Wastes	0	0	0	0	0	0	0	0	0	0	0
Solar	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	1	2	2	2
Electricity	240	310	481	508	580	702	702	728	699	749	822
Total	1,007	1,090	1,368	1,423	1,473	1,640	1,597	1,684	1,623	1,690	1,807

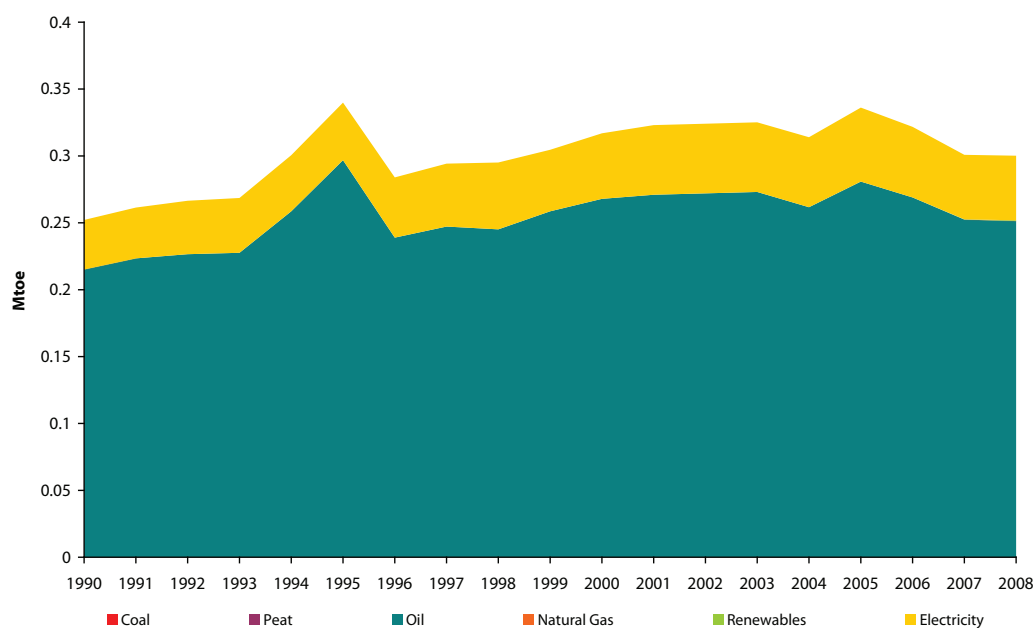
Figure 14 Commercial/Public Services Final Energy Use by Fuel



5.5 Agriculture

Agriculture											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	0	0	0	0	0	0	0	0	0	0	0
Bituminous Coal	0	0	0	0	0	0	0	0	0	0	0
Anthracite + Manufactured Ovoids	0	0	0	0	0	0	0	0	0	0	0
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	0	0	0	0	0	0	0	0	0	0	0
Peat	0	0	0	0	0	0	0	0	0	0	0
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	0	0	0	0	0	0	0	0	0	0	0
Briquettes	0	0	0	0	0	0	0	0	0	0	0
Oil	215	297	268	271	272	273	262	281	269	252	251
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Kerosene	0	0	0	0	0	0	0	0	0	0	0
Jet Kerosene	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Gasoil / Diesel/ DERV	215	297	268	271	272	273	262	281	269	252	251
Petroleum Coke	0	0	0	0	0	0	0	0	0	0	0
Naphta	0	0	0	0	0	0	0	0	0	0	0
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Renewables	0	0	0	0	0	0	0	0	0	0	1
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	0	0	1
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	0	0	0	0	0	0	0	0	0	0	0
Wastes	0	0	0	0	0	0	0	0	0	0	0
Solar	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Electricity	37	43	49	52	52	52	52	55	53	48	48
Total	252	340	317	323	324	325	314	336	322	301	300

Figure 15 Agriculture Final Energy Use by Fuel

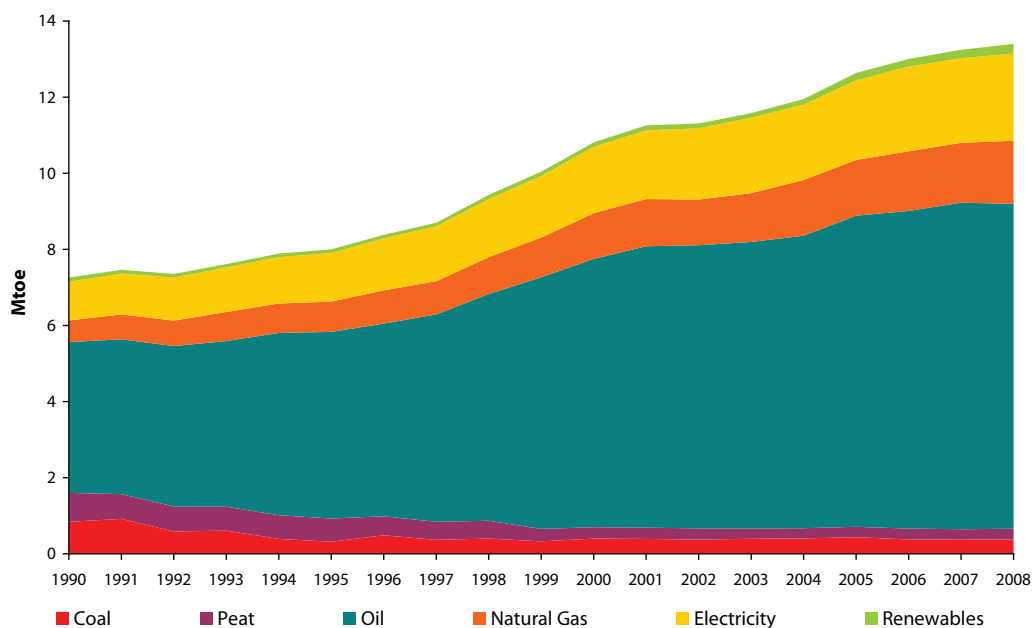


6. Fuels

6.1 Final Consumption of Fuels

Total Final Consumption											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coal	843	317	398	393	374	394	405	435	378	374	380
Bituminous Coal	825	249	323	311	292	321	330	351	316	307	313
Anthracite + Manufactured Ovoids	0	47	59	62	56	54	59	60	57	61	56
Coke	0	0	0	0	0	0	0	0	0	0	0
Lignite	18	21	17	21	26	19	15	24	4	7	10
Peat	757	612	303	292	293	271	267	274	284	272	280
Milled Peat	0	0	0	0	0	0	0	0	0	0	0
Sod Peat	586	486	179	179	178	177	177	183	196	186	174
Briquettes	171	126	124	113	116	94	90	91	88	85	106
Oil	3,962	4,903	7,047	7,399	7,442	7,531	7,689	8,176	8,349	8,581	8,534
Crude	0	0	0	0	0	0	0	0	0	0	0
Refinery Gas	0	0	0	0	0	0	0	0	0	0	0
Gasoline	944	1,105	1,591	1,653	1,689	1,687	1,732	1,820	1,884	1,920	1,907
Kerosene	121	325	660	746	767	832	895	919	916	913	1,026
Jet Kerosene	374	400	629	755	802	784	743	857	988	1,043	970
Fuel Oil	589	672	714	606	548	509	512	500	381	369	341
LPG	148	146	153	157	149	146	149	166	162	159	188
Gasoil / Diesel/ DERV	1,719	2,144	3,095	3,203	3,243	3,309	3,413	3,653	3,778	3,885	3,859
Petroleum Coke	66	110	205	278	243	263	245	259	239	290	242
Naphta	1	1	1	1	1	1	1	1	1	1	1
Bitumen	0	0	0	0	0	0	0	0	0	0	0
White Spirit	0	0	0	0	0	0	0	0	0	0	0
Lubricants	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	570	797	1,203	1,237	1,199	1,280	1,461	1,464	1,567	1,571	1,659
Renewables	108	92	118	130	130	126	152	194	199	221	254
Hydro	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0
Biomass	105	89	113	125	125	119	139	176	181	179	171
Landfill Gas	0	0	0	0	0	0	0	0	0	0	0
Biogas	2	3	4	4	4	7	7	7	4	5	4
Liquid Biofuels	0	0	0	0	0	0	0	1	3	21	56
Solar	0	0	0	0	0	0	0	0	1	1	3
Geothermal	0	0	0	0	0	0	5	10	11	15	20
Electricity	1,021	1,277	1,745	1,808	1,872	1,981	1,983	2,094	2,225	2,224	2,294
Total	7,260	7,999	10,814	11,258	11,311	11,583	11,956	12,636	13,003	13,244	13,401

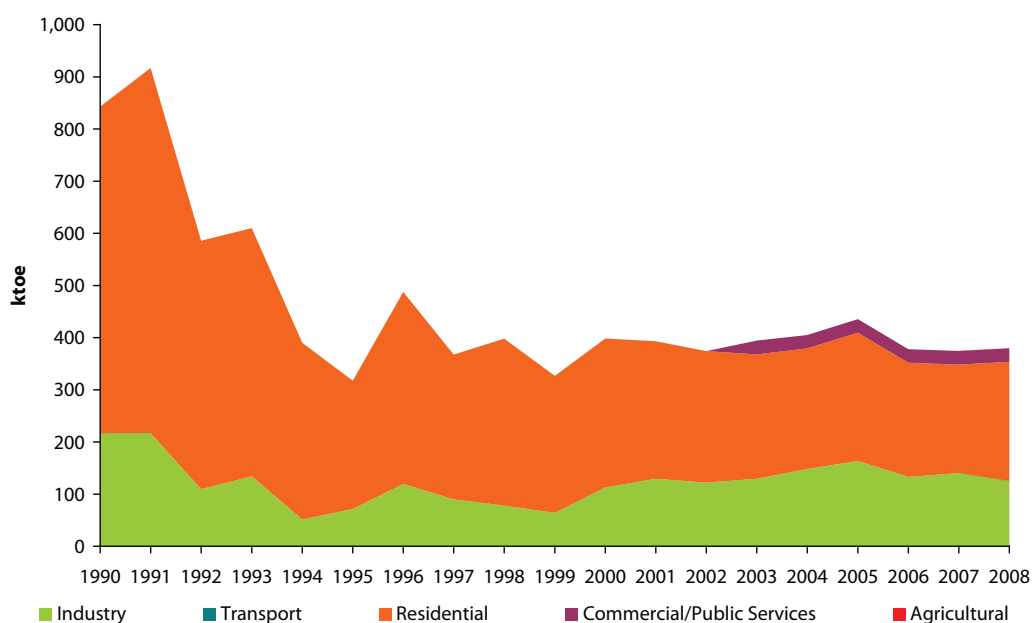
Figure 16 Total Final Energy Use by Fuel



6.2 Coal

Coal											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	843	317	398	393	374	394	405	435	378	374	380
Industry	216	71	113	129	122	129	148	163	133	140	125
Non-Energy Mining	0	0	0	0	0	0	0	0	0	0	0
Food, beverages and tobacco	70	18	29	19	16	15	15	50	27	18	18
Textiles and textile products	3	6	10	8	7	7	7	8	0	0	0
Wood and wood products	0	0	0	0	0	0	0	0	0	0	0
Pulp, paper, publishing and printing	0	0	0	0	0	0	0	0	0	0	0
Chemicals & man-made fibres	18	0	0	0	0	0	0	0	0	0	0
Rubber and plastic products	0	0	0	0	0	0	0	2	1	1	1
Other non-metallic mineral products	124	44	70	95	94	105	127	103	105	121	106
Basic metals and fabricated metal prods	1	0	0	0	0	0	0	0	0	0	0
Machinery and equipment n.e.c.	0	0	0	0	0	0	0	1	0	0	0
Electrical and optical equipment	0	3	4	7	5	2	0	0	0	0	0
Transport equipment manufacture	0	0	0	0	0	0	0	0	0	0	0
Other manufacturing	0	0	0	0	0	0	0	0	0	0	0
Transport	0	0	0	0	0	0	0	0	0	0	0
Road Freight	0	0	0	0	0	0	0	0	0	0	0
Road Private Car	0	0	0	0	0	0	0	0	0	0	0
Public Passenger Services	0	0	0	0	0	0	0	0	0	0	0
Rail	0	0	0	0	0	0	0	0	0	0	0
Domestic Aviation	0	0	0	0	0	0	0	0	0	0	0
International Aviation	0	0	0	0	0	0	0	0	0	0	0
Fuel Tourism	0	0	0	0	0	0	0	0	0	0	0
Unspecified	0	0	0	0	0	0	0	0	0	0	0
Residential	626	246	286	264	252	239	231	246	219	208	228
Commercial/Public Services	1	0	0	0	0	26	26	26	26	26	26
Commercial Services	1	0	0	0	0	26	26	26	26	26	26
Public Services	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0

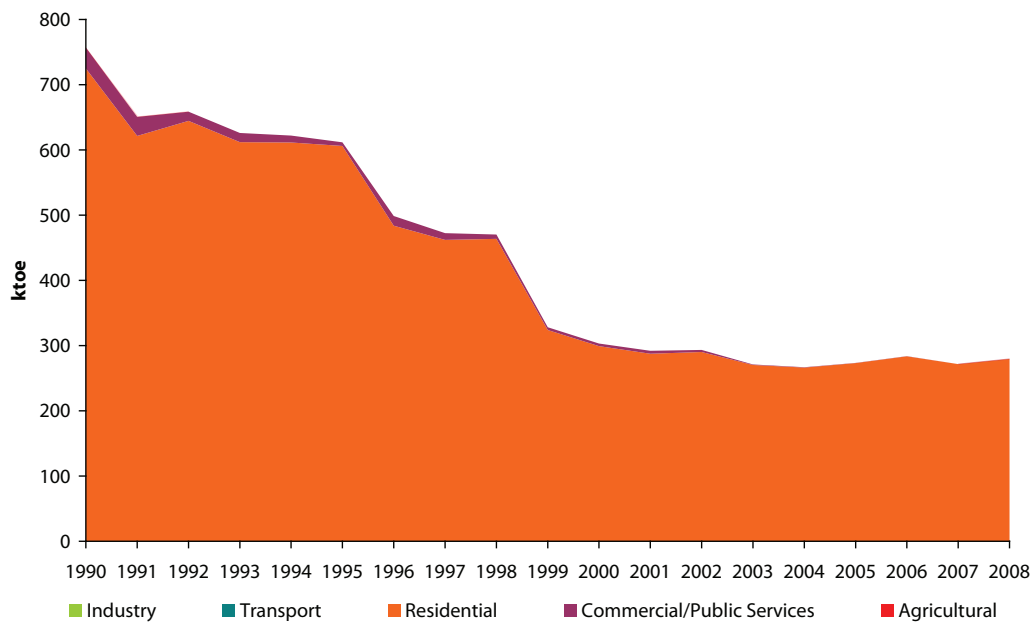
Figure 17 Coal Use by Sector 1990 – 2008



6.3 Peat

Peat											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	757	612	303	292	293	271	267	274	284	272	280
Industry	0	0	0	0	0	0	0	0	0	0	0
Non-Energy Mining	0	0	0	0	0	0	0	0	0	0	0
Food, beverages and tobacco	0	0	0	0	0	0	0	0	0	0	0
Textiles and textile products	0	0	0	0	0	0	0	0	0	0	0
Wood and wood products	0	0	0	0	0	0	0	0	0	0	0
Pulp, paper, publishing and printing	0	0	0	0	0	0	0	0	0	0	0
Chemicals & man-made fibres	0	0	0	0	0	0	0	0	0	0	0
Rubber and plastic products	0	0	0	0	0	0	0	0	0	0	0
Other non-metallic mineral products	0	0	0	0	0	0	0	0	0	0	0
Basic metals and fab. metal prods	0	0	0	0	0	0	0	0	0	0	0
Machinery and equipment n.e.c.	0	0	0	0	0	0	0	0	0	0	0
Electrical and optical equipment	0	0	0	0	0	0	0	0	0	0	0
Transport equipment manufacture	0	0	0	0	0	0	0	0	0	0	0
Other manufacturing	0	0	0	0	0	0	0	0	0	0	0
Transport	0	0	0	0	0	0	0	0	0	0	0
Road Freight	0	0	0	0	0	0	0	0	0	0	0
Road Private Car	0	0	0	0	0	0	0	0	0	0	0
Public Passenger Services	0	0	0	0	0	0	0	0	0	0	0
Rail	0	0	0	0	0	0	0	0	0	0	0
Domestic Aviation	0	0	0	0	0	0	0	0	0	0	0
International Aviation	0	0	0	0	0	0	0	0	0	0	0
Fuel Tourism	0	0	0	0	0	0	0	0	0	0	0
Unspecified	0	0	0	0	0	0	0	0	0	0	0
Residential	725	606	299	288	290	270	266	273	284	271	280
Commercial/Public Services	32	6	4	4	3	1	0	0	0	0	0
Commercial Services	0	0	0	0	0	0	0	0	0	0	0
Public Services	32	6	4	4	3	1	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0

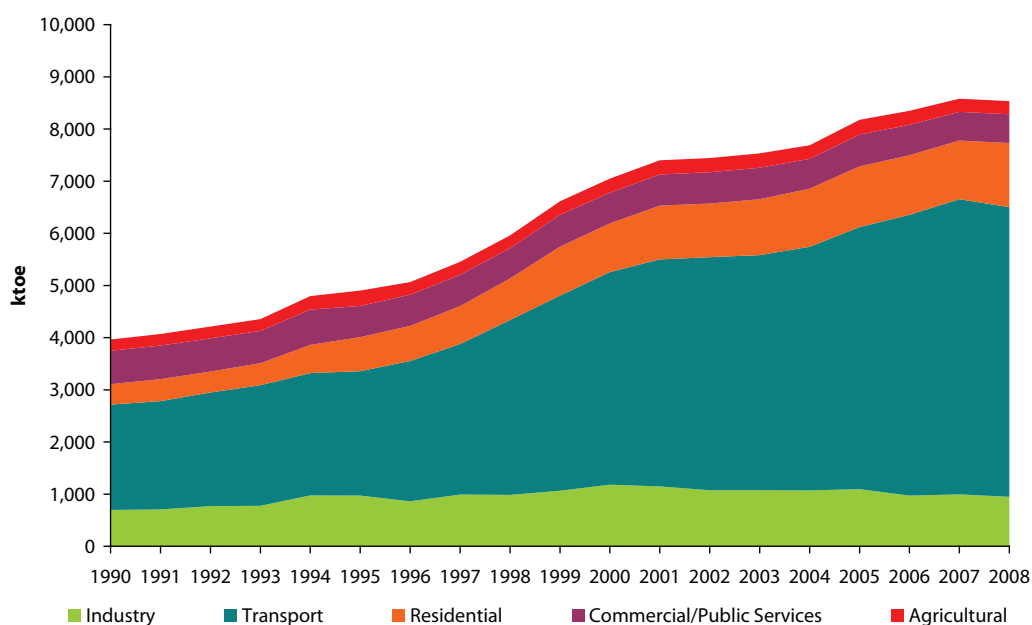
Figure 18 Peat Use by Sector 1990 – 2008



6.4 Oil

Oil											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	3,962	4,903	7,047	7,399	7,442	7,531	7,689	8,176	8,349	8,581	8,534
Industry	696	973	1,181	1,148	1,076	1,074	1,071	1,096	972	994	950
Non-Energy Mining	25	78	92	118	90	69	44	93	103	99	94
Food, beverages and tobacco	138	232	289	296	227	178	126	141	176	153	148
Textiles and textile products	28	31	34	37	27	19	10	12	7	7	7
Wood and wood products	4	7	8	7	9	11	13	5	4	3	3
Pulp, paper, publishing and printing	9	10	10	9	8	8	8	9	6	5	5
Chemicals & man-made fibres	42	62	71	67	59	54	49	47	41	37	37
Rubber and plastic products	16	14	14	10	9	8	6	8	11	10	11
Other non-metallic mineral products	89	67	93	52	118	196	273	282	250	290	250
Basic metals and fab. metal prods	242	367	444	407	403	417	444	383	279	301	300
Machinery and equipment n.e.c.	15	33	55	86	56	33	8	8	7	7	7
Electrical and optical equipment	32	61	59	50	57	63	68	92	74	70	75
Transport equipment manufacture	10	5	5	4	3	3	3	4	3	3	3
Other manufacturing	46	6	7	5	10	14	18	12	11	9	9
Transport	2,021	2,383	4,078	4,352	4,466	4,507	4,669	5,025	5,383	5,659	5,552
Road Freight	334	371	813	825	963	1,075	1,128	1,218	1,186	1,296	1,160
Road Private Car	926	1,176	1,559	1,698	1,708	1,792	1,863	1,909	2,022	2,160	2,126
Public Passenger Services	52	65	86	97	105	121	120	160	162	188	226
Rail	43	36	40	44	38	42	45	40	40	43	46
Domestic Aviation	21	22	34	38	36	36	37	38	40	42	43
International Aviation	354	379	597	719	767	749	707	821	950	1,002	929
Fuel Tourism	0	12	757	766	697	665	709	822	806	633	640
Unspecified	290	320	194	166	151	26	60	18	177	293	384
Residential	390	654	931	1,031	1,030	1,073	1,115	1,164	1,141	1,125	1,231
Commercial/Public Services	640	597	590	597	598	604	573	611	586	551	550
Commercial Services	340	357	381	386	388	396	373	399	382	359	359
Public Services	300	240	209	210	210	208	200	212	203	191	191
Agricultural	215	297	268	271	272	273	262	281	269	252	251

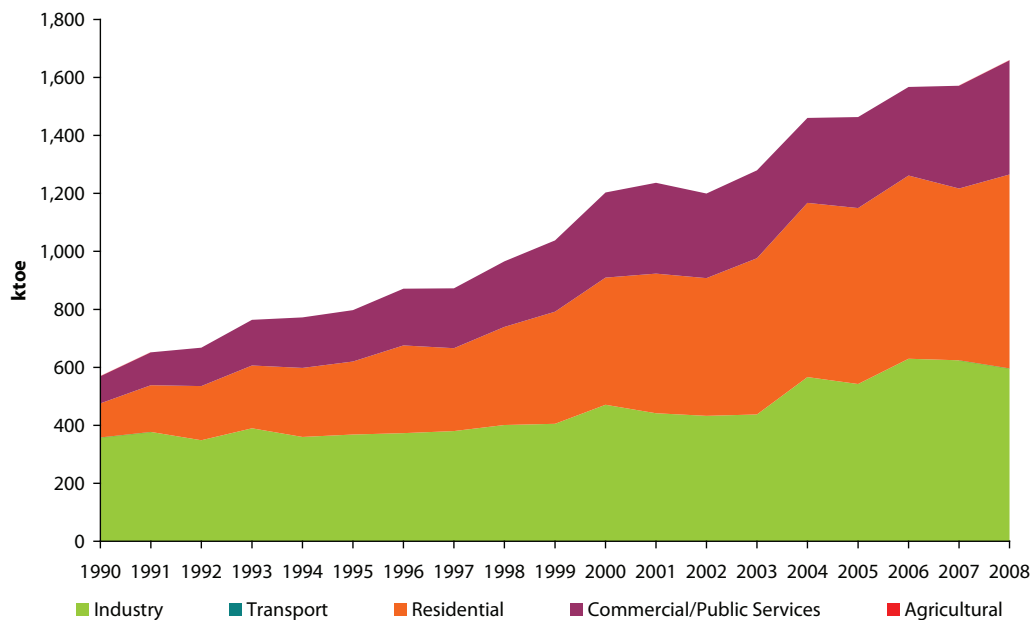
Figure 19 Oil Use by Sector 1990 – 2008



6.5 Natural Gas

Natural Gas											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	570	797	1,203	1,237	1,199	1,280	1,461	1,464	1,567	1,571	1,659
Industry	358	369	471	441	432	437	566	543	629	624	596
Non-Energy Mining	4	36	46	33	32	32	42	28	23	22	20
Food, beverages and tobacco	110	124	158	146	146	152	201	209	195	183	169
Textiles and textile products	0	2	2	2	2	2	2	2	0	0	0
Wood and wood products	0	0	0	0	1	2	5	4	4	4	4
Pulp, paper, publishing and printing	0	24	30	29	26	23	26	11	8	7	7
Chemicals & man-made fibres	88	77	99	107	106	108	142	140	117	110	101
Rubber and plastic products	4	4	5	5	6	7	11	10	5	5	5
Other non-metallic mineral products	57	38	48	47	47	48	63	69	63	59	54
Basic metals and fabricated metal prods	17	9	11	5	7	9	15	8	152	177	184
Machinery and equipment n.e.c.	0	10	13	14	13	12	15	14	11	10	9
Electrical and optical equipment	0	31	39	33	30	27	32	39	39	37	34
Transport equipment manufacture	0	7	9	11	10	9	10	7	9	8	8
Other manufacturing	79	8	10	9	7	5	3	3	3	3	2
Transport	0	0	0	0	0	0	0	0	0	0	0
Road Freight	0	0	0	0	0	0	0	0	0	0	0
Road Private Car	0	0	0	0	0	0	0	0	0	0	0
Public Passenger Services	0	0	0	0	0	0	0	0	0	0	0
Rail	0	0	0	0	0	0	0	0	0	0	0
Domestic Aviation	0	0	0	0	0	0	0	0	0	0	0
International Aviation	0	0	0	0	0	0	0	0	0	0	0
Fuel Tourism	0	0	0	0	0	0	0	0	0	0	0
Unspecified	0	0	0	0	0	0	0	0	0	0	0
Residential	117	252	439	482	476	539	601	607	632	593	669
Commercial/Public Services	94	177	293	314	291	303	293	314	306	354	394
Commercial Services	41	78	129	137	128	133	129	138	134	155	173
Public Services	53	99	165	176	164	170	165	177	172	199	221
Agricultural	0	0	0	0	0	0	0	0	0	0	0

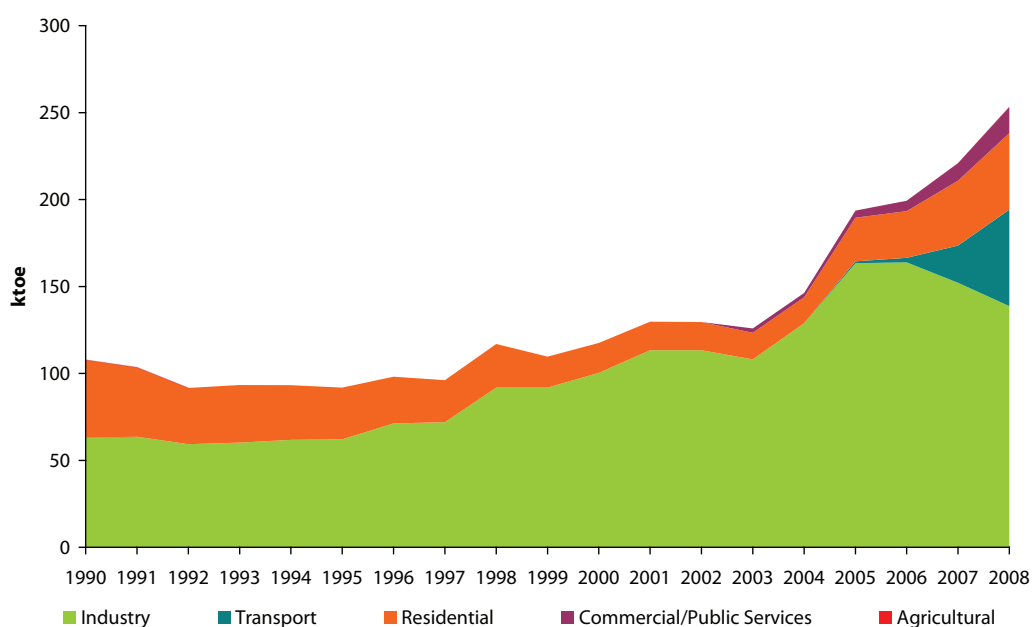
Figure 20 Natural Gas Use by Sector 1990 – 2008



6.6 Renewables

Renewables											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	108	92	117	130	130	126	146	194	199	221	253
Industry	63	62	100	113	113	108	129	163	164	152	139
Non-Energy Mining	0	0	0	0	0	0	0	0	0	0	0
Food, beverages and tobacco	2	3	4	4	4	44	45	54	58	59	41
Textiles and textile products	0	0	0	0	0	0	0	0	0	0	0
Wood and wood products	61	59	96	109	109	64	84	109	106	93	88
Pulp, paper, publishing and printing	0	0	0	0	0	0	0	0	0	0	0
Chemicals & man-made fibres	0	0	0	0	0	0	0	0	0	0	0
Rubber and plastic products	0	0	0	0	0	0	0	0	0	0	0
Other non-metallic mineral products	0	0	0	0	0	0	0	0	0	0	10
Basic metals and fab. metal products	0	0	0	0	0	0	0	0	0	0	0
Machinery and equipment n.e.c.	0	0	0	0	0	0	0	0	0	0	0
Electrical and optical equipment	0	0	0	0	0	0	0	0	0	0	0
Transport equipment manufacture	0	0	0	0	0	0	0	0	0	0	0
Other manufacturing	0	0	0	0	0	0	0	0	0	0	0
Transport	0	0	0	0	0	0	0	1	3	21	56
Road Freight	0	0	0	0	0	0	0	0	0	0	0
Road Private Car	0	0	0	0	0	0	0	1	3	21	56
Public Passenger Services	0	0	0	0	0	0	0	0	0	0	0
Rail	0	0	0	0	0	0	0	0	0	0	0
Domestic Aviation	0	0	0	0	0	0	0	0	0	0	0
International Aviation	0	0	0	0	0	0	0	0	0	0	0
Fuel Tourism	0	0	0	0	0	0	0	0	0	0	0
Unspecified	0	0	0	0	0	0	0	0	0	0	0
Residential	45	30	17	16	16	15	15	25	27	37	44
Commercial/Public Services	0	0	0	0	0	2	2	4	6	10	15
Commercial Services	0	0	0	0	0	0	0	1	3	7	12
Public Services	0	0	0	0	0	2	2	3	3	3	3
Agricultural	0	0	0	0	0	0	0	0	0	0	0

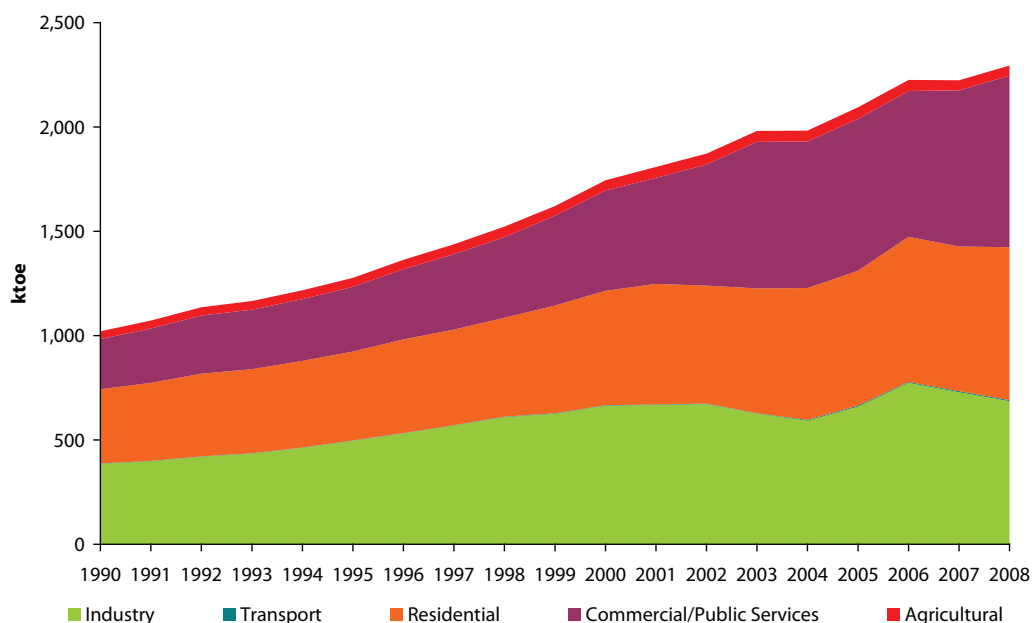
Figure 21 Renewables Use by Sector 1990 – 2008



6.7 Electricity

Electricity											
kilo tonnes of oil equivalent (ktoe)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Energy Consumption	1,021	1,277	1,745	1,808	1,872	1,981	1,983	2,094	2,225	2,224	2,294
Industry	386	496	665	667	672	626	592	660	773	729	686
Non-Energy Mining	8	30	40	40	45	47	49	50	58	53	49
Food, beverages and tobacco	105	117	156	161	163	153	145	142	162	146	137
Textiles and textile products	19	13	18	16	13	10	7	8	9	8	7
Wood and wood products	10	22	29	29	29	27	25	28	33	30	28
Pulp, paper, publishing and printing	9	20	27	27	29	28	27	24	26	23	22
Chemicals & man-made fibres	36	86	115	119	112	98	87	108	123	111	104
Rubber and plastic products	13	25	33	30	31	29	27	33	40	36	34
Other non-metallic mineral products	31	38	50	50	51	48	46	64	86	77	73
Basic metals and fab. metal prods	56	34	46	39	40	38	37	42	18	48	47
Machinery and equipment n.e.c.	10	13	18	17	17	16	15	16	19	17	16
Electrical and optical equipment	31	75	101	106	108	101	97	117	153	138	130
Transport equipment manufacture	4	8	10	10	10	9	8	9	12	11	10
Other manufacturing	53	17	22	23	24	23	22	18	34	30	29
Transport	1	2	2	2	2	2	4	5	5	4	5
Road Freight	0	0	0	0	0	0	0	0	0	0	0
Road Private Car	0	0	0	0	0	0	0	0	0	0	0
Public Passenger Services	0	0	0	0	0	0	0	0	0	0	0
Rail	1	2	2	2	2	2	4	5	5	4	5
Domestic Aviation	0	0	0	0	0	0	0	0	0	0	0
International Aviation	0	0	0	0	0	0	0	0	0	0	0
Fuel Tourism	0	0	0	0	0	0	0	0	0	0	0
Unspecified	0	0	0	0	0	0	0	0	0	0	0
Residential	356	427	548	579	566	599	632	646	695	693	733
Commercial/Public Services	240	310	481	508	580	702	702	728	699	749	822
Commercial Services	172	222	345	364	416	503	504	522	501	537	589
Public Services	68	88	136	144	164	199	199	206	198	212	233
Agricultural	37	43	49	52	52	52	52	55	53	48	48

Figure 22 Electricity Use by Sector 1990 – 2008



Glossary of Terms

Product Definitions

Bituminous Coal and Anthracite:

Other bituminous coal is used for steam raising and space heating purposes and includes all anthracite coals and bituminous coals not included under coking coal. Its gross calorific value is greater than 23 865 kJ/kg, but usually lower than that of coking coal.

Manufactured Ovoids:

A composition fuel manufactured from hard coal fines by shaping with the addition of a binding agent. Note that the amount of patent fuel produced can be slightly higher than the amount of coal consumed in the transformation process because of the addition of a binding agent.

Coke:

The solid product obtained from carbonization of coal, principally coking coal, at high temperature, it is low in moisture and volatile matter. Coke oven coke is used mainly in the iron and steel industry acting as energy source and chemical agent.

Lignite:

Lignite/brown coal is a non-agglomerating coal with a gross calorific value of less than 17 435 kJ/kg, and greater than 31% volatile matter on a dry mineral matter free basis.

Peat:

Combustible soft, porous or compressed, fossil sedimentary deposit of plant origin with high water content (up to 90% in the raw state), easily cut, of light to dark brown colour. Peat used for non-energy purposes is not included.

Milled Peat:

Milled peat is the term used to describe air dried peat in powder or crumb form. This description is derived from the cutting operation which results in the loose crumb-like structure.

Sod Peat:

Traditional use of peat as a fuel in Ireland. It is a rectangular shaped hand cut sod dried in the open air. Can be machine cut also.

Peat Briquettes:

Small blocks of highly compressed dry peat.

Crude Oil:

Crude oil is a mineral oil of natural origin comprising a mixture of hydrocarbons and associated impurities, such as sulphur. It exists in the liquid phase under normal surface temperature and pressure and its physical characteristics (density, viscosity, etc.) are highly variable. This category includes field or lease condensate recovered from associated and non-associated gas where it is commingled with the commercial crude oil stream.

Refinery Gas:

Refinery gas includes a mixture of non-condensable gases mainly consisting of hydrogen, methane, ethane and olefins obtained during distillation of crude oil or treatment of oil products (e.g. cracking) in refineries. This also includes gases which are returned from the petrochemical industry.

Motor Gasoline:

Motor gasoline consists of a mixture of light hydrocarbons distilling between 35°C and 215°C. It is used as a fuel for land based spark ignition engines. Motor gasoline may include additives, oxygenates and octane enhancers, including lead compounds such as TEL (Tetraethyl lead) and TML (tetramethyl lead). Unleaded Motor Gasoline: motor gasoline where lead compounds have not been added to enhance octane rating. It may contain traces of organic lead. Leaded Motor Gasoline: motor gasoline with TEL (tetraethyl lead) and/or TML (tetramethyl lead) added to enhance octane rating. This category includes motor gasoline blending components (excluding additives/oxygenates), e.g. alkylates, isomerate, reformate, cracked gasoline destined for use as finished motor gasoline.

Aviation Gasoline:

This is motor spirit prepared especially for aviation piston engines, with an octane number suited to the engine, a freezing point of -60°C and a distillation range usually within the limits of 30°C and 180°C.

Kerosene:

Kerosene comprises refined petroleum distillate and is used in sectors other than aircraft transport. It distils between 150°C and 300°C.

Kerosene Type Jet Fuel:

This is a distillate used for aviation turbine power units. It has the same distillation characteristics between 150°C and 300°C (generally not above 250°C) and flash point as kerosene. In addition, it has particular specifications (such as freezing point) which are established by the International Air Transport Association (IATA). This category includes kerosene blending components.

Fuel Oil:

This covers all residual (heavy) fuel oils (including those obtained by blending). Kinematic viscosity is above 10 cSt at 80°C. The flash point is always above 50°C and density is always more than 0.90 kg/l. **Low sulphur content:** heavy fuel oil with sulphur content lower than 1%. **High sulphur content:** heavy fuel oil with sulphur content of 1% or higher.

Liquefied Petroleum Gases (LPG):

LPG is light paraffinic hydrocarbons derived from the refinery processes, crude oil stabilisation and natural gas processing plants. They consist mainly of propane (C₃H₈) and butane (C₄H₁₀) or a combination of the two. They could also include propylene, butylene, isobutene and isobutylene. LPG is normally liquefied under pressure for transportation and storage.

Gas/Diesel Oil/ DERV (Distillate Fuel Oil):

Gas/diesel oil is primarily a medium distillate distilling between 180°C and 380°C. Several grades are available depending on uses: **Transport Diesel (DERV):** • on road diesel oil for diesel compression ignition (cars, trucks etc.), usually of low sulphur content; **Heating and other Gasoil:** • light heating oil for industrial and commercial uses; • marine diesel and diesel used in rail traffic; • other gas oil including heavy gas oils which distil between 380°C and 540°C and which are used as petrochemical feedstocks. This category includes blending components.

Petroleum Coke:

Petroleum coke is a black solid by-product, obtained mainly by cracking and carbonising petroleum derived feedstock, vacuum bottoms, tar and pitches in processes such as delayed coking or fluid coking. It consists mainly of carbon (90 to 95%) and has a low ash content. It is used as a feedstock in coke ovens for the steel industry, for heating purposes, for electrode manufacture and for production of chemicals. The two most important qualities are "green coke" and "calcinated coke". This category also includes "catalyst coke" deposited on the catalyst during refining processes; this coke is not recoverable and is usually burned as refinery fuel.

Naphtha:

Naphtha is a feedstock destined for either the petrochemical industry (e.g. ethylene manufacture or aromatics production). Naphtha comprises material in the 30°C and 210°C distillation range or part of this range.

Bitumen:

Bitumen is a solid, semi-solid or viscous hydrocarbon with a colloidal structure, being brown to black in colour, obtained as a residue in the distillation of crude oil, by vacuum distillation of oil residues from atmospheric distillation. Bitumen is often referred to as asphalt and is primarily used for construction of roads and for roofing material. This category includes fluidized and cut back bitumen.

White Spirit and SBP:

White Spirit and SBP are defined as refined distillate intermediates with a distillation in the naphtha/kerosene range.

Lubricants:

Lubricants are hydrocarbons produced from distillate by product; they are mainly used to reduce friction between bearing surfaces. This category includes all finished grades of lubricating oil, from spindle oil to cylinder oil, and those used in greases, including motor oils and all grades of lubricating oil base stocks.

Natural Gas:

Natural gas comprises gases, occurring in underground deposits, whether liquefied or gaseous, consisting mainly of methane. It includes both "non-associated" gas originating from fields producing only hydrocarbons in gaseous form, and "associated" gas produced in association with crude oil as well as methane recovered from coal mines (colliery gas).

Hydro-power:

Potential and kinetic energy of water converted into electricity in hydroelectric plants. Pumped storage is treated separately in the balance.

Wind Energy:

Kinetic energy of wind exploited for electricity generation in wind turbines.

Solid Biomass:

Covers organic, non-fossil material of biological origin which may be used as fuel for heat production or electricity generation. It comprises: **Charcoal:** covers the solid residue of the destructive distillation and pyrolysis of wood and other vegetal material and **Wood, wood wastes, other solid wastes:** Covers purpose-grown energy crops (poplar, willow etc.), a multitude of woody materials generated by an industrial process (wood/paper industry in particular) or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, black liquor etc.) as well as wastes such as tallow, straw, rice husks, nut shells, poultry litter, crushed grape dregs etc. Combustion is the preferred technology for these solid wastes. The quantity of fuel used is reported on a net calorific value basis.

Landfill Gas:

A gas composed principally of methane and carbon dioxide produced by anaerobic digestion landfill wastes.

Biogas:

A gas composed principally of methane and carbon dioxide produced by anaerobic digestion of biomass, comprising: **Sewage sludge gas,** produced from the anaerobic fermentation of sewage sludge and **Other biogas,** such as biogas produced from the anaerobic fermentation of animal slurries and of wastes in abattoirs, breweries and other agro-food industries.

Liquid Biofuel:

cover the fuels listed below: **Bioethanol:** ethanol produced from biomass and/or biodegradable fraction of waste; **Biodiesel:** a diesel quality liquid fuel produced from biomass or used fried oils; **Biomethanol:** methanol produced from biomass and/or the biodegradable fraction of waste; **Biodimethylether:** a diesel quality fuel produced from biomass and/or the biodegradable fraction of waste; **Other Liquid Biofuel:** liquid biofuels, used directly as a fuel, not included in biogasoline or biodiesels.

Geothermal energy:

Energy available as heat emitted from within the earth's crust, usually in the form of hot water or steam. It is exploited at suitable sites: for electricity generation using dry steam or high enthalpy brine after flashing or directly as heat for district heating, agriculture etc. Ground source geothermal energy is also included in the category.

Solar Energy:

Solar radiation exploited for hot water production and electricity generation, by: flat plate collectors, for domestic hot water or for the seasonal heating of swimming pools; photovoltaic cells; solar thermal-electric plants. Passive solar energy for the direct heating, cooling and lighting of dwellings or other buildings is not included.

Electricity:

Gross electricity production is measured at the terminals of all alternator sets in a station; it therefore includes the energy taken by station auxiliaries and losses in transformers that are considered integral parts of the station. The difference between gross and net production is amount of own use of electricity in the generation plants.

Heat:

In recent years, the production of heat for sale has been increasing in importance. To reflect this, heat production represents all heat production from public CHP and heat plants as well as heat sold by autoproducer CHP and heat plants to third parties. Corresponding fuels to produce quantities of heat for sale are being recorded in the transformation sector under the rows CHP plants and Heat plants. The use of fuels for heat which is not sold is recorded under the sectors in which the fuel use occurs.

Flow Definitions**Production:**

Production refers to the quantities of fuels extracted or produced, calculated after any operation for removal

of inert matter or impurities (e.g. sulphur from natural gas). It refers only to indigenous production of fuels in Ireland.

Imports and Exports:

Imports and exports comprise amounts having crossed the national territorial boundaries of the country whether or not customs clearance has taken place. **a) Coal** Imports and exports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit should not be included. **b) Oil and Gas** Quantities of crude oil and oil products imported or exported under processing agreements (i.e. refining on account) are included. Quantities of oil in transit are excluded. Crude oil, NGL and natural gas are reported as coming from the country of origin; refinery feedstocks and oil products are reported as coming from the country of last consignment. Re-exports of oil imported for processing within bonded areas are shown as an export of product from the processing country to the final destination. **c) Electricity** Amounts are considered as imported or exported when they have crossed the national territorial boundaries

International Marine Bunkers:

International marine bunkers cover those quantities delivered to sea-going ships of all flags, including warships. Consumption by ships engaged in transport in inland and coastal waters and by fishing vessels in all waters is not included.

Stock Changes:

Stock changes (opening stock minus closing stock) reflect the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. Oil and gas stock changes in pipelines are not taken into account. With the exception of large users mentioned above, changes in final users' stocks are not taken into account. A stock build is shown as a negative number, and a stock draw as a positive number.

Primary Energy Supply (including non-energy):

Primary energy supply is defined as production + inputs from other sources + imports - exports - international marine bunkers ± stock changes. This includes any energy source that may be used for non-energy purposes such as natural gas as a feedstock for fertilizer production.

Primary Energy Supply (excluding non-energy):

Total primary energy supply (TPES) is made up of production + imports - exports - international marine bunkers ± stock changes but excluding non-energy uses.

Statistical Differences:

Statistical difference is defined as deliveries to final consumption + use for transformation and consumption within the energy sector + distribution losses – domestic supply – transfers. Statistical differences arise because the data for the individual components of supply are often derived from different data sources by the national administration. Furthermore, the inclusion of changes in some large consumers' stocks in the supply part of the balance introduces distortions which also contribute to the statistical differences.

Transformation Input:

This section details the energy inputs into the conversion of primary forms of energy to secondary and further transformation (e.g. coking coal to coke, crude oil to petroleum products, heavy fuel oil to electricity).

Public Thermal Power Plants:

Public thermal power plants refer to plants which are designed to produce electricity only from the combustion of fuels. Public supply undertakings generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid.

Combined Heat & Power plants:

Combined heat and power (CHP) plants (refers to plants which are designed to produce both heat and electricity). CHP plants may be autoproducer (generating for own use only) or third party ownership selling electricity and heat on-site as well as exporting electricity to the grid. Public supply undertakings generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid.

Gross Electricity Consumption:

Defined as total electricity generated plus net imports.

Pumped Storage:

Electricity consumed in, and generated from hydro-electric storage plants.

Briquetting plants:

This category covers the use of fuels for the manufacture of patent fuels & briquettes.

Oil Refineries:

Petroleum refineries (covers the use of hydrocarbons for the manufacture of finished petroleum products).

Transformation Output:

This section details the outputs from the conversion of primary forms of energy into secondary and further transformation (e.g. coking coal to coke, crude oil to petroleum products, heavy fuel oil to electricity).

Exchanges & Transfers:

Transfers comprise inter-product transfers, products transferred and recycled products. Inter-product transfers result from reclassification of products either because their specification has changed or because they are blended into another product, e.g. kerosene may be reclassified as gasoil after blending with the latter in order to meet its winter diesel specification. The net balance of inter-product transfers should be zero. Products transferred reference is intended for petroleum products imported for further processing in refineries. For example, fuel oil imported for upgrading in a refinery is transferred to the feedstock category. Recycled products are finished products which pass a second time through the marketing network, after having been once delivered to final consumers (e.g. used lubricants which are reprocessed). Exchanges are used to exchange say electricity produced from hydro to the electricity column.

Own Use & Distribution Losses:

Own use covers use of energy in refineries, power generation stations etc. Distribution losses include losses in gas distribution and electricity transmission. It may also include unaccounted for use of crude oil and petroleum products.

Non-Specified Energy:

Includes non-specified energy sector's use.

Total Final Energy Consumption:

The term final consumption (equal to the sum of end-use sectors' consumption) implies that energy used for transformation and for own use of the energy producing industries is excluded. Final consumption reflects for the most part deliveries to consumers (see note on stock changes).

Industry sector:

Consumption of the industry sector is specified in the sub-sectors (energy used for transport by industry is not included here but is reported under transport). Covers NACE categories 13 – 37 excluding energy mining and oil refining.

Transport Sector:

Consumption in the Transport sector covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing.

Commercial and Public Services:

Services sector including government and public services.

Residential:

All consumption by households, excluding fuels used for transport. Includes households with employed persons (ISIC Division 95) which is a small part of total residential consumption.

Agriculture:

Includes energy consumed by such users whether for traction (excluding agricultural highway use), power or heating (agricultural and domestic).

Energy Conversion Factors

	To:	toe	MWh	GJ
From:	Multiply by			
toe		1	11.63	41.868
MWh		0.086	1	3.6
GJ		0.02388	0.2778	1

Energy Units:

joule (J): Joule is the international (S.I.) unit of energy.

kilowatt hour (kWh): The conventional unit of energy that electricity is measured and charged for commercially.

tonne of Oil Equivalent (toe): This is a conventional standardized unit of energy and is defined on the basis of a tonne of oil having a net calorific value of 41686 kJ/kg. A related unit is the *kilogram of oil equivalent (kgoe)*, where 1 kgoe = 10⁻³ toe.

Decimal Prefixes

deca (da)	10 ¹	deci (d)	10 ⁻¹
hecto (h)	10 ²	centi (c)	10 ⁻²
kilo (k)	10 ³	milli (m)	10 ⁻³
mega (M)	10 ⁶	micro (μ)	10 ⁻⁶
giga (G)	10 ⁹	nano (n)	10 ⁻⁹
tera (T)	10 ¹²	pico (p)	10 ⁻¹²
peta (P)	10 ¹⁵	femto (f)	10 ⁻¹⁵
exa (E)	10 ¹⁸	atto (a)	10 ⁻¹⁸

Calorific Values

Fuel	Net Calorific Value toe/t	Net Calorific Value MJ/t
Crude Oil	1.0226	42,814
Gasoline (petrol)	1.0650	44,589
Kerosene	1.0556	44,196
Jet Kerosene	1.0533	44,100
Gasoil / Diesel	1.0344	43,308
Residual Fuel Oil (heavy oil)	0.9849	41,236
Milled Peat	0.1860	7,787
Sod Peat	0.3130	13,105
Peat Briquettes	0.4430	18,548
Coal	0.6650	27,842
Liquefied Petroleum Gas (LPG)	1.1263	47,156
Petroleum Coke	0.7663	32,084
	Conversion Factor	Conversion Factor
Electricity	86 toe/GWh	3.6 TJ/GWh

Emission Factors

	t CO ₂ /TJ (NCV)	g CO ₂ /kWh (NCV)
Liquid Fuels		
Motor Spirit (Gasoline)	70.0	251.9
Jet Kerosene	71.4	257.0
Other Kerosene	71.4	257.0
Gas/Diesel Oil	73.3	263.9
Residual Oil	76.0	273.6
LPG	63.7	229.3
Naphta	73.3	264.0
Petroleum Coke	92.93	334.5
Solid Fuels and Derivatives		
Coal	94.6	340.6
Milled Peat	116.7	420.0
Sod Peat	104.0	374.4
Peat Briquettes	98.9	355.9
Gas		
Natural Gas	56.9	204.7
Electricity		
(2008)	161.5	581.4

Sources

Central Statistics Office

Department of Communications, Energy and Natural Resources

Department of Environment, Heritage and Local Government

Department of Transport

Eirgrid

Environmental Protection Agency

Eurostat

International Energy Agency

SGS (National Car Test)

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*Sustainable Energy Ireland is funded by the Irish Government
under the National Development Plan 2007-2013 with
programmes part financed by the European Union*