

## EN32 Energy taxes

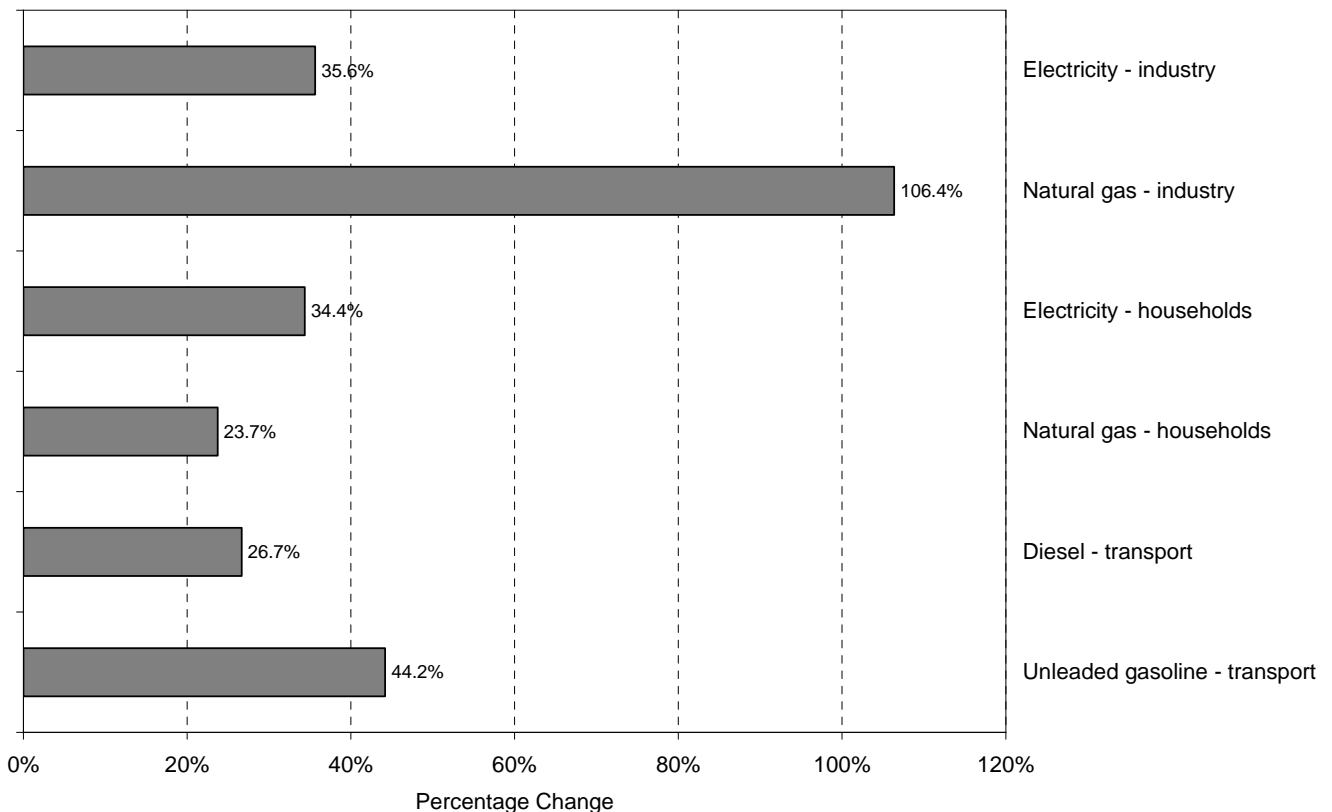
### Key message

During the period 1991 to 2005, the absolute level of taxes on final energy products in the EU-15 increased significantly. Increasing tax rates may indicate that the external costs of energy consumption are being internalised to a greater extent than in previous years. However, despite increases in taxation, the real price of most fuels, except transport fuels, in the EU-15 fell or increased only slightly and the overall demand for energy increased. Taxes in the new Member States are significantly lower than in the EU-15.

### Rationale

Although energy taxes are a traditional source of government income, they are also one of the ways in which external costs can be internalised into final energy prices and hence the level of energy taxes can be seen as a response indicator. An increase in the level of tax that raises the final energy price for a fuel may encourage lower use of that fuel. Changes in relative tax levels between substitutable products may also change relative prices and be used to encourage environmentally preferable fuel switching.

**Fig. 1: Percentage change in end user energy taxes between 1991 and 2004 or 2005**

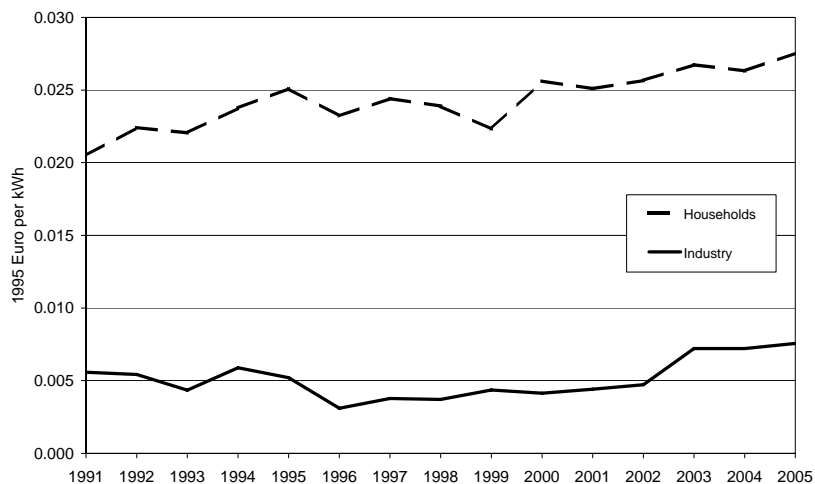


Source: Eurostat

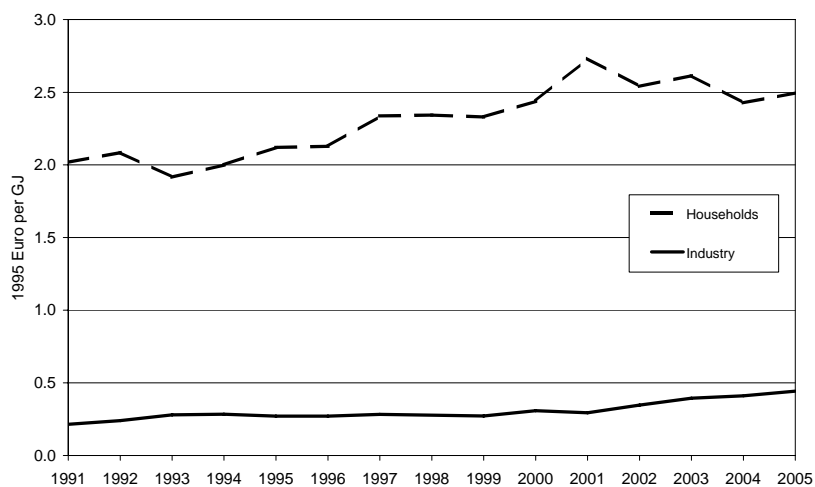
**Notes:** Tax changes are between 1991 and 2004 for gasoline and diesel and between 1991 and 2005 for electricity and gas. Eurostat collects price data on gas and electricity for different consumer categories (see metadata) and presents these in three forms: 1) prices without taxes, 2) prices without VAT and 3) prices with all taxes included. The tax component of energy prices for households is calculated by subtracting prices without taxes from prices including all taxes. For industry, it is calculated by subtracting prices without taxes from prices without VAT. For the transport fuels data is provided by DG Tren (European Commission) in a similar form and the same calculations as for households are applied. All taxes have been deflated to constant prices using the 1995 GDP deflator.

**Fig. 2: Trend in the average tax component, in real terms, in final energy prices in EU-15**

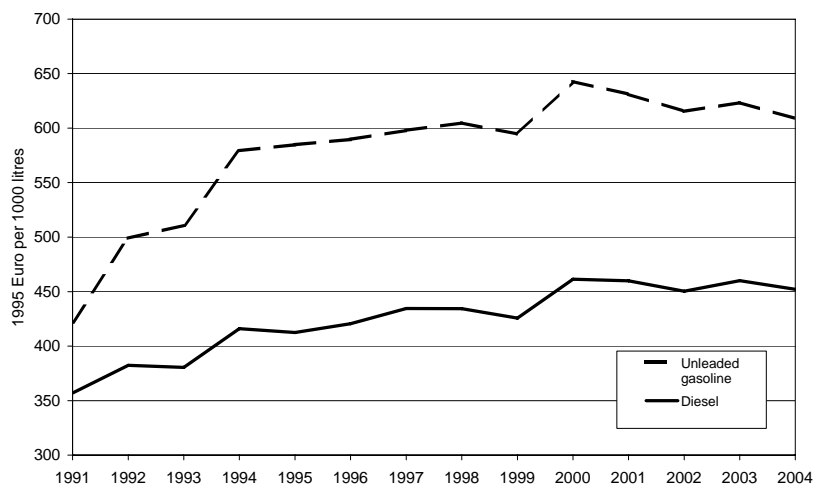
a) electricity



b) natural gas



c) transport fuels



**Source:** Eurostat for electricity and gas taxes; DG TREN (Oil bulletin), European Commission, for gasoline and diesel fuel taxes.

**Note:** Taxes are those applicable in January of each year in each Member State and have been weighted by national energy consumption to calculate average values for the EU-15 and converted to constant prices in 1995 Euros to remove the effect of inflation. Eurostat collect price data for different consumer categories (see meta-data section) and presents these in three forms: 1) prices without taxes, 2) prices without VAT and 3) prices with all taxes included. The tax component of energy prices for households is calculated by subtracting prices without taxes from prices including all taxes. For industry, it is calculated by subtracting prices without taxes from prices without VAT. The tax component for industry prices therefore excludes VAT (as industry can reclaim VAT paid on energy prices).

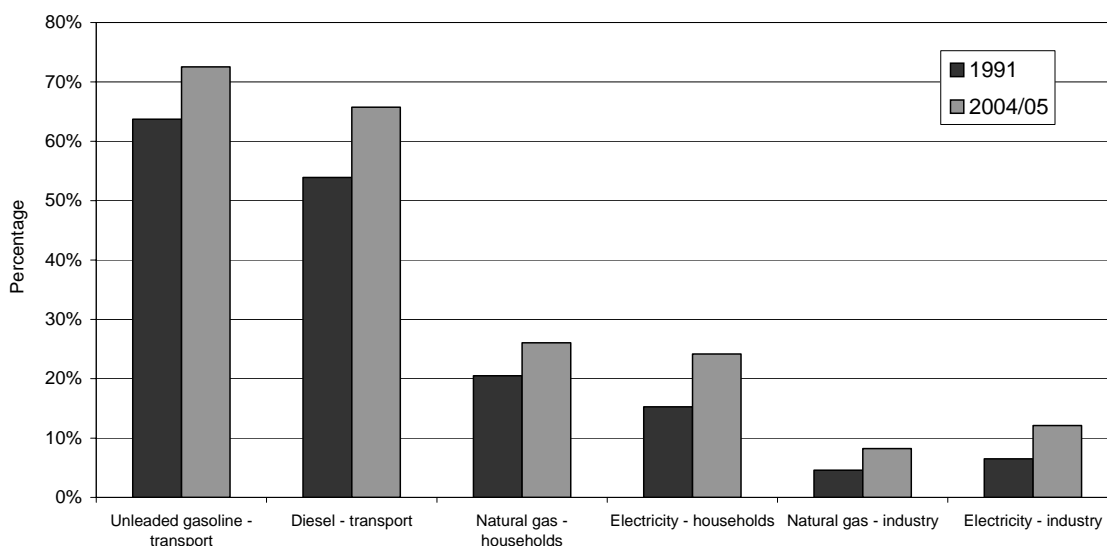
### 1. Indicator assessment

Between 1991 and 2005, **absolute tax levels** for electricity, natural gas and transport fuels in the EU-15 increased when expressed in constant prices, i.e. excluding the effect of inflation. Particularly large percentage increases were seen in the tax levels applied to natural gas in industry (although from a low starting point), and the tax on unleaded gasoline for road transport also rose significantly, partly as it was taxed at a lower rate than leaded gasoline when originally introduced to encourage uptake. Whereas much of the tax increases for gas and electricity purchased by industry have been seen after 2000, for road transport fuels tax levels increased substantially in the 1990s but since 2000 have either levelled off or fallen slightly. In the case of households, taxes have followed a mostly rising trend over the entire period from 1991 to 2005. Overall, although energy taxation levels increased substantially in absolute terms, the increase was not sufficiently high to increase the end-user prices significantly for fuels other than road transport fuels (see EN31).

There is much less time series data available from Eurostat on tax rates in the new Member States. However, the available information indicates that tax rates on energy are lower (at market exchange rates) than in the EU-15 across all sectors. While this situation is expected to change over time, an amendment to the Directive on restructuring the Community framework for the taxation of energy products and electricity allows most new Member States temporarily to apply excise duty exemptions or lower rates of duty than set in the Directive.

The **proportion of tax in final energy prices** increased significantly for all fuels in the EU-15. Member States are increasingly looking towards environmental taxes to raise prices and to encourage consumers to reduce demand and thus reduce the environmental impacts of energy use. However, it is difficult to define the optimal levels of tax required to meet multiple energy policy objectives: ensuring security of supply; affordable energy; and reducing environmental impacts (White Paper for a European Union Policy (COM(95) 682)). Member States have therefore tended to set taxes and adjust levels based on their own experience of fiscal needs and environmental effectiveness. Evidence of effective energy taxation policies is limited at present, but positive environmental results have been produced from the Danish, Finnish and Swedish CO<sub>2</sub> taxes and the United Kingdom fuel duty escalator (EEA, 2000). In Finland, differentiated excise tax on motor fuels accounted for a 10-15 % reduction in CO and hydrocarbon emissions from car traffic (European Commission, 2000) and in Denmark, industry reduced its CO<sub>2</sub> intensity by 25 % in seven years from 1993-2000; analysis have shown that at least 10 percentage points resulted from the CO<sub>2</sub> tax (EEA, 2005). The sale of petrol (and to a lesser extent diesel) decreased in Germany between 1998 and 2001, while the energy tax levied for petrol and diesel increased by 31 % and 48 % over that period, respectively (EEA, 2006).

**Fig. 3: Proportion of tax in energy prices, EU-15**



**Notes:** Latest data are for 2004 for gasoline and diesel and for 2005 for electricity and gas. Value Added Tax (VAT) is excluded from industry fuel taxes.

**Source:** Eurostat

The European Commission believes that energy taxation is a flexible and effective instrument for encouraging consumers to change their behaviour. In its Green Paper, 'Towards a European Strategy for the Security of Energy Supply' (COM(2000) 769 final) the Commission urged the Council to reconsider the energy products 1997 taxation proposal, and states that it will continue to consider other specific taxation measures. A revised version of the energy products Directive entered into force on 1

January 2004. More recently, the Green Paper on energy efficiency (COM(2005)265 final) highlights the need to improve taxation, to ensure that the polluter really pays, but without increasing overall tax levels. It suggests that one option would be to bring excise rates on energy products and electricity consumed in production activities closer together, but at the higher end of the scale, and introduce automatic indexing of all excise rates in order to avoid erosion by inflation.

### Road transport fuels

Absolute taxation levels for diesel increased by 27 % between 1991 and 2004 in the EU-15, and by 44 % between 1991 and 2004 for gasoline. This reflects the trend in Member States to increase taxes on transport fuels in order to limit emissions of CO<sub>2</sub> and other pollutants from transport, as well as for revenue raising purposes. When unleaded gasoline was first introduced widely in 1991, a relatively low tax rate was applied to encourage rapid market penetration and the replacement of leaded gasoline (which has largely been phased out). This tax break was progressively removed as gasoline consumption switched to unleaded gasoline.

Transport fuel tax rates vary considerably across the EU-15, with Germany having the highest rates and Greece the lowest rates on both diesel and gasoline. Between 1999 and 2005, taxes on petrol and diesel in Germany rose by around 27 % and 50% respectively, which was by far the largest increase in this period in any Member State and was the result of the environmental tax reform. It is interesting to note that between 1999 and 2003 (the latest year for which data is available) transport final energy consumption in Germany fell by 7 %, whereas, on average, transport energy consumption across the EU-15 rose by over 3 %.

Tax rates in the new Member States are typically lower, although some of the new EU Member States have significantly increased tax rates, particularly on transport fuels, during recent years (EEA, 2005). However, a number of these countries will have to increase taxes further to meet the minimum levels set in Directive 2003/96/EC, from which they have a temporary derogation.

### Industry

The absolute level of energy taxes, and the proportion of energy taxes in final energy prices, is generally low for industry compared with household users. This reflects concerns for industrial competitiveness. Voluntary agreements and the provision of tax reductions for energy intensive industries are common throughout all Member States. For example the Danish CO<sub>2</sub> tax system offers significantly reduced tax rates to firms that agree to energy conservation measures. The absolute level of industrial energy taxes showed different trends depending on the fuel. Taxes applied to natural gas prices increased steadily from the early 1990s onwards and by 2005 were more than double 1991 levels. In contrast electricity taxes saw a declining trend from 1991 to 1996, after which they started rising again and so by 2005 were 35 % above 1991 levels.

### Households

The absolute level of energy taxes for EU-15 households increased over the period 1991–2005. Taxes on natural gas increased by 24 % and electricity taxes rose by 34 %. In the case of electricity, these tax increases partly counteracted the decrease in electricity prices brought about by the liberalisation of energy markets. As a consequence, the proportion of tax in final electricity prices increased by half over this period. The highest recent tax increases on electricity have been seen in the Netherlands, where taxes have increased by more than 5-fold between 1996 and 2005. In contrast, taxes in the United Kingdom fell by over 40 % over the same period (due to a reduction in the rate of VAT rate and falling pre-tax prices). However, despite this difference, electricity consumption in the Netherlands actually increased more than in the UK between 1996 and 2003 (the last year for which data is available).

In the new Member States, significant rises in tax levels have been seen in the household sector largely as a result of increases in value added tax. The Czech Republic, Poland and Slovakia all saw increases in the rate of VAT on electricity between 1995 and 2001. In contrast, any tax increases on fuels used by industry have been more modest.

## 2. Indicator rationale

### 2.1 Environmental context

The indicator shows the absolute levels of tax paid per unit of energy in the European Union by final consumers (industry, household and transport sectors) on different types of fuel (gas, electricity, and oil products). The tax levels shown in the graph are expressed at constant 1995 prices in order to remove the effects of inflation.

Energy taxes are one of the ways in which external costs can be internalised into final energy prices (see EN35) and hence the level of energy taxes can be seen as a response indicator. An increase in the level of tax that raises the final energy price for a fuel may encourage lower use of that fuel. Changes in relative tax levels between substitutable products may also change relative prices and be used to encourage environmentally preferable fuel switching. The extent to which the tax level influences energy consumption is dependent on the base fuel price (the price without tax) and the price elasticity of fuel consumption.

Energy taxes are also used to raise revenue for national exchequers (traditionally their primary purpose) and to promote policy action to protect national energy interests. The objective behind fuel tax policies is not always clear and can be difficult to apportion between environmental, fiscal and other (e.g. social) concerns. The way in which governments spend the tax revenue can also influence the overall economic and environmental effect of a tax policy package. Some Member States have adopted a 'carrot and stick' approach, combining energy taxation with the option for significant rebates if energy efficiency targets are met (e.g. in the UK companies are eligible for a rebate on the Climate Change Levy if they meet their energy efficiency targets under the Climate Change Agreements). According to the latest report looking at environmental taxation by the European Commission (European Commission 2005) in all countries in the EU-25 except Malta, energy taxes represent more than 50 % of environmental tax revenues.

## 2.2 Policy context

The European Commission has a long-term objective to further harmonise minimum levels of tax rates, including those for energy products, across the EU. This is seen as an important step in ensuring full competition and fair trade within the EU. The sixth Environmental Action Plan (Decision No 1600/2002/EC) has the aim of promoting and encouraging the use of fiscal measures such as environmentally related taxes and incentives, at the appropriate national or Community level. A Commission study on the impact of harmonising energy tax rates across the EU suggests that a combination of increased energy taxes and reduced employment taxes might yield the 'double dividends' of reduced pollution and increased employment (i.e. if tax receipts were used to cut taxes on labour, it could boost employment by 120,000 jobs by 2010 and cut carbon emissions by 2 % (European Commission, 2000)).

The latest move in this direction is Directive (2003/96/EC) on restructuring the Community framework for the taxation of energy products and electricity, which increased existing minimum tax rates on energy products and extends minimum tax rates to all energy products Member States may apply partial or total exemption to certain products, for example certain types of renewables. It also aims to make it possible to restructure national taxation systems and achieve objectives in the environment, transport and energy fields while complying with the rules governing the single market. The 2003 Treaty of Accession provided for transitional arrangements and specific measures for Cyprus and Poland. In addition, Directive 2004/74/EC amends the energy Directive as regards the possibility for the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia to apply temporary exemptions or reductions in the levels of taxation. Directive 2004/75/EC amends the energy Directive as regards the possibility for Cyprus to apply temporary exemptions or reductions in the levels of taxation.

In addition to this EU-wide initiative, many Member States have set higher national taxes on energy products than the ones prescribed by the European Community in the Directive, including (EEA, 2005):

- CO<sub>2</sub> or energy taxes have been introduced by Estonia, Denmark, Finland, Germany, Ireland, Italy, the Netherlands, Poland, Slovenia, Sweden, the United Kingdom and Norway.
- A sulphur tax on motor fuels is being levied by Belgium, Denmark, Finland, Germany, Netherlands, Sweden, the United Kingdom, Bulgaria, Romania and Norway.

## References

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- EEA (2005), European Environment Agency - The European environment - State and outlook 2005, State of Environment report No 1/2005.
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- European Commission (2004) Excise Duty Tables: part II energy products and electricity, DG Taxation and customs union tax policy, May 2004.
- European Commission (2000) report to DG Environment. Recent trends in the application of economic instruments in EU Member States plus Norway and Switzerland and an overview of economic instruments in Central and Eastern Europe. Update of database on environmental taxes and charges. Prepared by Stefan Speck and Paul Ekins, Forum for the Future, London.
- European Commission (1997) Proposal for a Council Directive restructuring the Community framework for the taxation of energy products, COM(97) 30 Final. Commission of the European Communities, Brussels.
- European Commission (2005) Structures of the tax systems in the European Union, data 1995-2003.
- Eurostat (2004) Energy, transport and environment indicators, data 1991-2001.
- Green Paper, Towards a European strategy for the security of energy supply, COM (2000) 768 final.

## Meta data

### Technical information

1. Data source (incl. data of most recent update)  
Electricity and gas taxes: Eurostat data for structural indicator <http://europa.eu.int/comm/eurostat/>  
Transport fuel taxes: DG TREN (Oil bulletin) [http://europa.eu.int/comm/energy/oil/bulletin/2003\\_en.htm](http://europa.eu.int/comm/energy/oil/bulletin/2003_en.htm)
2. Description of data/Indicator definition  
Eurostat collects price data on gas and electricity for different consumer categories and presents these in three forms: 1) prices without taxes, 2) prices without VAT and 3) prices with all taxes included (see 6.). Fuel taxes in constant 1995 Euros per GJ, per kWh or per 1000 litres applicable in January each year. The data on the taxes for electricity and natural gas for industry and households are for reference (or standard) consumers. The reference consumers are defined in the Council Directive 90/377/EEC of 29 June 1990 concerning a Community procedure to improve the transparency of gas and electricity taxes charged to industrial end-users and on a gentleman's agreement for households. The reference consumers used in the fact sheet are those used in the European Commission's structural indicators and are characterised by a selected annual consumption, maximum demand and annual utilisation, as follows:  
Electricity for households: Households - Dc (Annual consumption: 3 500 kWh of which night 1 300)  
Electricity for industry: Industry - Ie (Annual consumption: 2 000 MWh; maximum demand: 500 kW; annual load: 4 000 hours) (for Luxembourg: 50 % power reduction during hours of heavy loading)  
Gas for households: Households - D3 (Annual consumption: 83.70 GJ)  
Gas for industry: Industry - I3-1 (Annual consumption: 41 860 GJ; load factor: 200 days, 1 600 hours) (for Belgium: fixed supply (non-erasable) for non-specific applications that can easily be substituted by residual fuel oils (CNE 1 P 1))  
Information on gasoline and diesel fuel prices (with and without taxes) are available from DG TREN (Oil bulletin), European Commission [http://www.eu.int/comm/energy/oil/bulletin/index\\_en.htm](http://www.eu.int/comm/energy/oil/bulletin/index_en.htm)
3. Geographical coverage: EU-15, with some data for the new Member States
4. Temporal coverage: 1991 – 2005 (1991- 2004 for transport fuels)
5. Methodology and frequency of data collection:  
Data is collected by Eurostat. Some countries provide national prices, either as an arithmetical average from the regional prices, or weighted average using the annual consumption as a weight-factor. Price changes are, among other things, compared with the previous period. No price estimations are done. The prices are not seasonally adjusted.  
Gas and electricity prices correspond to prices applicable on 1st January each year. Prices are originally collected in national currencies per kWh (electricity) and per GigaJoule (natural gas). For countries outside the euro-zone, they are converted into EUR per kWh and GJ using the monthly average exchange rates (for January)  
Eurostat Metadata for prices/taxes in the network industries (electricity and gas) can be found at:  
[http://europa.eu.int/estatref/info/sdds/en/strind/ecoref\\_pni\\_sm.htm](http://europa.eu.int/estatref/info/sdds/en/strind/ecoref_pni_sm.htm)  
Price data for gasoline and diesel fuel (with and without taxes) can be obtained from DG TREN (Oil bulletin), European Commission [http://www.eu.int/comm/energy/oil/bulletin/index\\_en.htm](http://www.eu.int/comm/energy/oil/bulletin/index_en.htm)
6. Methodology of data manipulation:  
Eurostat collects price data on gas and electricity for different consumer categories as described above and presents these in three forms: 1) prices without taxes, 2) prices without VAT and 3) prices with all taxes included. The tax component of energy prices for households is calculated by subtracting prices without taxes from prices including all taxes. For industry, it is calculated by subtracting prices without taxes from prices without VAT. For the transport fuels data is provided by DG Tren (European Commission) in a similar form and the same calculations as for households are applied. All prices and taxes are then deflated to constant 1995 prices using the GDP deflator.

### Qualitative information

7. Strengths and weaknesses (at data level)  
According to Eurostat, the main reference is the Council Directive of 29 June 1990 concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users.
8. Reliability, accuracy, robustness, uncertainty (at data level):  
The main document is Council Directive of 29 June 1990 concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users.  
Quality profiles are produced by Eurostat in close co-operation with the National Statistical Institutes of the EU-Member States covering, so far, the structural indicators that have been added to the database in 2004 and the structural indicators on the short list.



9. Overall scoring – historical data (1 = no major problems, 3 = major reservations):  
Relevance: 1  
Accuracy: 1  
Comparability over time: 2 (New Member States 3)  
Comparability over space: 1.5 (New Member States 3)