ENERGY PRICES AND TAXES
3rd Quarter 2018

DATABASE
DOCUMENTATION

This documentation provides information referring to the IEA *Energy Prices and Taxes* publication and databases. It is available online at: http://www.iea.org/statistics/topics/pricesandtaxes/.

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The International Energy Agency released the first edition of *World Energy Prices*, containing end-use prices for gasoline, diesel, electricity and other selected energy products, for over 100 countries. With its global coverage, the new database complements the OECD *Energy Prices and Taxes*, filling a gap not currently covered by other international data sources.

With this release, the share of global energy consumption covered by IEA information on prices significantly increased – to 96% of global consumption for gasoline, 94% for automotive diesel, 90% for electricity in households, and 54% for electricity in industry. Further efforts will look at filling remaining gaps, such as those for Africa, and expanding the products covered.

All enquiries relating to methodology or coverage should be addressed to prices@iea.org.

1. Changes from previous editions

This edition of Energy Prices and Taxes features new methodological notes for Part II: Energy end-use prices in OECD countries.

New data

➢ Annual and quarterly prices and taxes for oil products from 2Q2004 and 2005 onwards, annual and quarterly prices and taxes for natural gas and electricity from 3Q2007 and 2008 onwards and consumer price indices from 1Q1996 and 1996 onwards in **Lithuania**. This affects data in the Beyond 2020 files END_NC.IVT, END_TOE.IVT, END_US.IVT, INDEX.IVT, INDICATORS.IVT and WHOLE_RE.IVT.

Revisions

➢ Quarterly and annual prices and taxes for light fuel oil for industry in **Sweden** from 1Q2016 and 2016 onwards. This affects data in the Beyond 2020 files END_NC.IVT, END_TOE.IVT, END_US.IVT and INDEX.IVT.

➢ Quarterly and annual prices and taxes for coking coal and steam coal for industry in **Portugal** from 1Q2017 and 2017 onwards. This affects data in the Beyond 2020 files END_NC.IVT, END_TOE.IVT, END_US.IVT and INDEX.IVT.

Indices

➢ Revised consumer price indices for the **United Kingdom** from 1978 onwards as sourced from the OECD *Main Economic Indicators*. This affects data in the Beyond 2020 file INDICATORS.IVT and INDEX.IVT.

Non-OECD data

In September 2013, the IEA decided to issue, on a one-off basis, a Beyond 2020 file (END_NMC.IVT) containing price data for selected non-OECD countries, for which updates had been suspended after the 1st Quarter 2012 edition of *Energy Prices and Taxes* due to budget constraints. With the May 2018 release of the new database *World Energy Prices,* the Beyond 2020 file END_NMC.IVT will no longer be available from 2Q2018 onwards. The *World Energy Prices* database is now available for purchase from the IEA's online data services at http://data.iea.org/ or by contacting prices@iea.org.

2. Database description

The database *Energy Prices and Taxes* includes annual, quarterly and (for crude oil spot prices and import costs only) monthly data for 36 OECD countries and regional aggregates. This edition includes data up to September 2018.

The database includes the following ten files:

CRD_CTY.IVT **Crude oil import costs and index by country**
Average costs of crude oil imports, cif; by geographic origin
(2 measures).
Unit: USD/bbl; index, national currency based 2010=100.
Time: annual 1980-2017; quarterly 1Q1980-2Q2018; monthly Jan 1980-Jun 2018.

CRD_TYP.IVT **Crude oil import costs by type of crude**
Average costs of OECD crude oil imports, cif; by type of crude
(116 crude types maximum).
Unit: USD/bbl.
Time: annual 1980-2017; quarterly 1Q1980-2Q2018; monthly Jan 1980-Jun 2018.

SPOT_CR.IVT **Crude oil spot prices**
Average crude oil spot market prices, fob; by crude product / geographic origin
(11 grades or benchmarks).
Unit: USD/bbl.
Time: annual 1960-2017; quarterly 1Q1985-3Q2018; monthly Jan 1985-September 2018.

SPOT_PR.IVT **Oil product spot prices**
Average oil product spot market prices; by crude product and geographic market
(6 products and 3 markets).
Unit: USD/bbl.
Time: annual 1974-2017; quarterly 1Q1985-3Q2018; monthly Jan 1985-September 2018.

INDEX.IVT **Indices of real and nominal end-use energy prices**
Indices of real and nominal prices, by country; by sector (industry, households and both combined), by oil product (2 prices, 3 sectors, 9 oil product categories).
Unit: Index, 2010=100.
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

END_NC.IVT **End-use energy prices and taxes in national currencies**
Energy end-use ex-tax prices, excise taxes, value added rates and taxes, total taxes and total prices including taxes; by sector (industry, households and electricity generation), by energy product (6 price measures, 3 sectors, 14 energy product categories).
Unit: National currency / energy unit.
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

INTERNATIONAL ENERGY AGENCY

END_TOE.IVT **End-use energy prices and taxes in national currencies per toe**
Energy end-use ex-tax and total prices; by sector (industry, households and electricity generation), by energy product (2 price measures, 3 sectors, 14 energy product categories).
Unit: National currency / toe.
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

END_US.IVT **End-use energy prices and taxes in US dollars**
Energy end-use ex-tax and total prices; by sector (industry, households and electricity generation), by energy product, expressed in US dollars converted using average exchange rates per energy unit and tonnes of oil equivalent – and in US dollars, converted using annual purchasing power parities (PPPs) per energy unit (6 price measures, 3 sectors, 14 energy product categories).
Unit: US dollars / energy unit.
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

INDICATORS.IVT **Consumer and producer price indices, exchange rates and purchasing power parities**
Consumer price indices – total; consumer price indices – energy; exchange rates to the US dollar; OECD purchasing power parities (PPPs) to the US dollar (5 indicators).
Unit: indices, 2010=100; exchange rates and PPPs, USD=1
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

WHOLE_RE.IVT **Wholesale and retail price indices for energy products**
Wholesale and retail prices indices for Oil products, Electricity, Natural Gas and Coal (2 measures for 4 energy categories).
Unit: Index, latest national base year = 100.
Time: annual 1978-2017; quarterly 1Q1978-3Q2018.

Detailed definitions for each product as well as calculation methodologies are presented in sections 3 to 5 below.

3. Product definitions for end-use prices

Products		
Product	**Short name(s)**	**Definition**
Heavy fuel oils	HSFO LSFO	Heavy fuel oils comprise all residual fuel oils, including those obtained by blending. The kinematic viscosity is above 10 cSt (centistokes) at 80°C. The flash point is always above 50°C and the density is always more than 0.90 kg/l. The Energy Prices and Taxes dataset distinguishes between two types of heavy fuel oils: • HIGH SULPHUR Fuel Oil (sulphur content 1% and above); • LOW SULPHUR Fuel Oil (sulphur content less than 1%).
Light fuel oil	LFO	Light Fuel Oil comprises light distillate fuel oils. Light fuel oil can be used for heating purposes (heating oil).
Automotive diesel	DIESEL	Automotive Diesel comprises distillate fuel oils used for diesel compression ignition engines for motor vehicles. It may include additives.
Gasolines	UNPREM98 UNPREM95 UNREG LEADPREM LEADREG	Gasoline (or motor gasoline) comprises all light hydrocarbons used in internal combustion engines (spark ignition engines) such as motor vehicles, excluding aircrafts. Motor gasolines may include additives, oxygenates and octane enhancers including lead compounds. Data are presented for up to three different grades of unleaded gasoline and two grades of leaded gasoline: • PREMIUM UNLEADED GASOLINE 98 RON (high grade gasoline); • PREMIUM UNLEADED GASOLINE 95 RON (medium grade gasoline); • REGULAR UNLEADED GASOLINE; • PREMIUM LEADED GASOLINE; • REGULAR LEADED GASOLINE. *Note:* RON grades for premium unleaded gasolines should be taken as indicative only. The specifications for the rating systems used vary by reporting country. Please see the country notes for details. The most common original measurement systems used are: • RON = Research Octane Number; • MON = Motor Octane Number; • PON = Pump Octane Number. Approximate equivalents: 92 RON = 84 MON, 95 RON = 87 MON, 98 RON = 90 MON. PON is the simple arithmetic average between RON and MON.

Products		
Product	**Short name(s)**	**Definition**
Automotive LPG (Liquid petroleum gas)	LPG	LPG (Liquefied Petroleum Gas) is a light saturated paraffinic hydrocarbon derived from refinery processes, crude oil stabilisation and natural gas processing plants. It consists mainly of propane and butane. LPG is normally liquefied under pressure for transportation and storage. In Energy Prices and Taxes, LPG prices cover LPG used as engine fuel only (in cars, trucks, buses, etc.) – LPG used for heating or other purposes is excluded.
Natural gas	NATGAS	Natural gas prices and taxes are, in principle, on a Gross Calorific Value basis and should be based on average prices for industry and/or households, not average tariffs. Tariffs are only used when average prices are not available (they are also sometimes used to estimate data for the most recent periods). They are shown per MWh. Note: In editions prior to the 2nd Quarter 2012, the unit was 10^7 kcal (GCV).
Steam coal	BITCOAL	Steam coal is primary coal used for steam rising and space heating purposes (i.e., excluding Coking Coal).
Coking coal	COKCOAL	Coking coal refers to coals with quality that allows the production of coke suitable to support a blast furnace charge. The gross calorific value is greater than 23.8 MJ/tonne (5 700 kcal/kg) on an ash-free but moist basis.
Electricity	ELECTR	Natural gas prices and taxes are, in principle, on a Gross Calorific Value basis and should be based on average prices for industry and/or households, not average tariffs. Tariffs are only used when average prices are not available (they are also sometimes used to estimate data for the most recent periods). They are shown per MWh. Note: In editions prior to the 2nd Quarter 2012, the unit was kWh.

4. Crude oil import costs and spot market prices

The following definitions apply to these four variables:

1) Crude Oil Import Costs (USD/bbl) and Index (Nat. Cur., 2010=100) by Country
2) IEA Crude Oil Import Costs by Type of Crude (USD/bbl)
3) Crude Oil Spot Prices (USD/bbl)
4) Oil Product Spot Prices (USD/bbl)

shown in the files:

1) CRD_CTY.IVT
2) CRD_TYP.IVT
3) SPOT_CR.IVT
4) SPOT_PR.IVT

Please consult the individual files for exact data coverage.

Spot prices are the main references used to set a price to an economic transaction involving the purchase of a commodity, such as crude oil or oil products. It is defined as the selling price for immediate rather than forward delivery in a given location.

Spot prices are the underlying variable in most pricing arrangements for crude oil trade. However, the actual prices paid for imports differ from spot prices due to crude quality considerations, transport and economies of scale, among other factors. The crude oil import costs presented in Part I are the effective import cost paid in a country per barrel of oil imported.

Crude oil import costs

Costs shown for crude oil imports into IEA countries are obtained by dividing value by volume recorded by customs administrations for each tariff position. Values recorded at the import stage include cost, insurance and freight (CIF) but exclude import duties.

Notes on definitions and regulations for oil imports

Crude Oil

Import costs of crude oil have been obtained from the monthly Crude Oil Import Register submitted to the IEA Secretariat.

Details on national duties and regulations for crude oil imports are given below. In general, imported products are subject to the same domestic taxes as domestically refined products (exception: Japan) or to import duties which are equivalent to these taxes (Australia, Switzerland).

Following are the typical product quality specifications of the 32 most imported crude oils into IEA countries.

Source: *International Crude Oil Market Handbook 2010*, Energy Intelligence Group).

	API gravity (°)	Sulphur (%)
Abu Dhabi Murban	39.6	0.79
Abu Dhabi Upper Zakum	34.0	1.89
Abu Dhabi Zakum	40.9	1.03
Algeria Saharan Blend	45.7	0.10
Azeri BTC	36.6	0.16
Brazil Marlim	19.2	0.78
Canada Heavy	20.9	3.05
Canada Light Sweet	34.3	0.28
Danish Blend	33.6	0.26
Iran Heavy	29.5	1.99
Iran Light	33.4	1.36

	API gravity (°)	Sulphur (%)
Iraq Basrah Light	30.2	2.52
Iraq Kirkuk	34.3	2.28
Kazakhstan	44.8	0.57
Kuwait Blend	30.5	2.60
Libya Light	42.1	0.15
Libya Medium	36.9	0.34
Mexico Maya	21.8	3.33
Nigeria Light	38.9	0.12
Nigeria Medium	30.9	0.21
Norway Ekofisk	38.0	0.21
Norway Troll	33.4	0.18
Norway Oseberg	37.8	0.27
Qatar Marine	32.7	1.85
Saudi Arabia Heavy	27.6	2.94
Saudi Arabia Medium	30.5	2.56
Saudi Arabia Light	33.0	1.83
Saudi Arabia Berri	39.5	1.07
UK Forties	40.3	0.56
Urals	31.8	1.35
Venezuela Extra Heavy	15.0	3.07
Venezuela Medium	27.0	1.54

Following are the typical specifications of other crude oils previously imported in significant quantities.

	API gravity (°)	Sulphur (%)
Mexico Olmeca	38-39	0.79
Norway Gullfaks	37.5	0.23
Norway Statfjord	39.5	0.22
Oman	33.3	1.14
Syria Light	38.2	0.72
UK Brent blend	38.5	0.41
Venezuela Light	31.5	0.73

Oil Products

European Union

The European Union applies no quantitative restrictions (quotas) to crude and product imports. Crude oil imports are duty free, as are feedstocks for refining and petrochemical processing. Finished products are subject to duties. For HFO and gasoil (with a sulphur content greater than 0.2% by weight) it is 3.5%. For lighter products it is 4.7%, which is applied or not depending upon their origin.

Customs duty is not applied on imports from the EU, EFTA and ACP countries nor from Israel.

Under the General System of Preferences 2002-2004, (GSP) products from over 150 non-OECD countries, including the GCC, Venezuela and the ex-USSR Republics can be imported free of duty. The exceptions are Libya, Russia and Saudi Arabia whose finished products exports to the European Union are now subject to a full tariff.

Therefore, duty is applied on those products destined for consumption in the European Union and most imports from Saudi Arabia, Libya, Russia and some OECD countries (including the United States and Canada). The exception is gasoil (sulphur content not exceeding 0.2% by weight), for which the duty rate of 3.5% is reduced to zero for an indefinite period regardless of the origin of the product.

Austria

Tariffs (ad valorem duty)

Gasolines:	6%
Kerosenes:	6%
Gasoils:	0 - 3.5%
Fuel oils:	≥ 3.5%

Imports from EFTA and EU countries are duty free. Other GATT countries are subject to a preferential treatment. There are no quantitative restrictions on imports.

Source: Ministry of Economic Affairs.

France

France applies no restriction to crude or oil products imports. Nevertheless, certain oil products are subject to an import licence, except those coming from countries with preferential treatment or from the European Union.

Ireland

From July 2001 onwards, oil companies are no longer obliged to purchase 20% of their gasoline and middle distillate requirements from the domestic refinery.

Spain

Imports of oil products are subject to state trading but customs duties have been established recently. The right to import products is reserved to the company operator of the Oil Distribution Monopoly and to other firms if these have a delegated authority and necessary licences.

Australia

Importers of oil products pay customs duty at a rate equal to the excise duty levied on domestically refined products.

There are no quantitative restrictions on imports.

Canada

No duties are payable on petroleum product imports and there are no quantified restrictions.

Japan

Updated using Facts Energy Insights, Issue 68, December 2005.

Crude Oil: The existing customs duties on crude oil (170 JPY/kilolitre) were abolished as of 1 April, 2006.

Oil Products: The rates as of December 2005 are listed in the table below. The government is expected to eventually abolish all the customs duties on oil products, as they are by definition a temporary measure.

Tariffs

Product	JPY/kl
Fuel oil A (< 0.3% sulphur)	2 593
Fuel oil A (> 0.3%)	3 306
Fuel oil C (< 0.3%)	2 376
Fuel oil C (> 0.3%)	3 202
Kerosene	564
Gas oil	1 257
Gasoline	1 386

Switzerland

Importers of oil products have to pay duties equivalent to the excise tax charged to domestic refiners when they deliver products to the domestic market.

Products are not eligible for preferential tariff treatment. Refineries are treated as "before tax zones". Refined products are taxed as soon as they leave refinery areas.

Turkey

There is no restriction on crude oil or oil product imports and no custom duty for crude oil. The tax and fund rates on imported petroleum products and also products which are produced by using imported crude oil are given below. The excise tax and Fuel Price Stabilising Fund are fixed. In January 1996, Turkey signed the Customs Union Agreement with the European Union. Therefore, customs duty is not applied on imports from the European Union, EFTA countries or Israel.

	Customs duties (%)	VAT (%)	Excise tax	Fuel price stabilising fund
LPG	0.7	18	363 808	9 000
Unleaded gas.	4.7	18	780 908	-
Other gasoline	4.7	18	793 124	-
Kerosene	4.7	18	491 700	10 600
Jet fuel	4.7	18	-	-
Diesel fuel	3.5	18	525 673	-
Heating fuel	3.5	18	222 475	500
Fuel oil	3.5	18	75 250	-

United States

The main oil products do not fall under the US preferential system from which most OPEC countries are, inter alia, excluded.

	Crude oil import duties		Oil product tariffs	
	cents/bbl	cents/gal	cents/bbl	cents/gal
> 25 API	10.5	0.25	x	x
< 25 API	5.25	1.25	x	x
Naphtha	x	x	10.5	0.25
Gasoline	x	x	52.5	1.25
Diesel oils	x	x	10.5	0.25
Heavy fuel	x	x	10.5	0.25
Lubricants	x	x	84.0	2.00

x = not applicable.

Crude oil spot prices[1]

The monthly, quarterly and yearly average crude oil spot prices are calculated from daily quotations from *Argus Crude*.

Argus Crude provides prices that are used in third-party contracts, risk management contracts (such as swaps), underlying futures settlement prices, internal price transfer, internal benchmarking, mark-to-market assessment and market analysis.

The assessed crude prices are based on prices from the open spot market whenever possible. Argus publishes prices that report and reflect prevailing levels for open-market arm's length transactions.

Product quality specifications given below are based on *Argus Crude Methodology and Specifications Guide*, October 2015 and *Argus Americas Crude Methodology and Specifications Guide*, September 2015, http://www.argusmedia.com. The API density and sulphur content figures are typical values.

North Sea

Set by the lowest of the Brent, Forties, Oseberg and Ekofisk components. Consequently it is not the price of a grade of crude but a benchmark established through a methodology. It therefore has no API density or sulphur specification: the lowest and highest values across the components are given for indicative purposes.

Specification:	North Sea Dated, London close, midpoint, fob
Basis/Location:	Sullom Voe, Hound Point, Teeside, UK or Sture terminal
API Gravity:	37.5º – 40.3º
Sulphur Content:	0.23 – 0.56

West Texas Intermediate (WTI)

Specification:	WTI Formula Basis month 1, No time stamp, midpoint, fip
Basis/Location:	Cushing, Midland
API Gravity:	40.0º
Sulphur Content:	0.37

West Texas Sour (WTS)

Specification:	WTS weighted average month 1, Houston close, index, fip
Basis/Location:	Midland
API Gravity:	38.0º
Sulphur Content:	0.50

Light Louisiana Sweet (LLS)

Specification:	LLS weighted average month 1, Houston close, index, fob
Basis/Location:	Capline St. James
API Gravity:	38.5º
Sulphur Content:	0.39

Arab Light

Product quality specifications based on *International Crude Oil Market Handbook 2010*, Energy Intelligence Group. Prices are as published in the IEA *Oil Market Report* prior to 2002.

Specification:	Dated
Basis/Location:	Ras Tanura, King Fahd, Juaymah
API Gravity:	33.0º
Sulphur Content:	1.83

Dubai

Specification:	Dubai month 1, Singapore close, midpoint, fob
Basis/Location:	Dubai
API Gravity:	31.0º
Sulphur Content:	2.04

Iran Light

Specification:	Iranian Light dated, London close, midpoint, fob
Basis/Location:	Sidi Kerir
API Gravity:	33.7º
Sulphur Content:	1.50

Iran Heavy

Price:	Iranian Heavy dated, London close, midpoint, fob
Basis/Location:	Sidi Kerir
API Gravity:	30.7º
Sulphur Content:	1.80

Urals

Specification:	Urals Med 80kt dated, London close, midpoint, cif
Basis/Location:	Augusta, Italy
API Gravity:	30.9º
Sulphur Content:	1.33

Minas

Specification:	Minas prompt, Singapore close, midpoint, fob
Basis/Location:	Indonesia
API Gravity:	35.0º
Sulphur Content:	0.08

Tapis

Specification:	Tapis prompt, London close, midpoint, fob
Basis/Location:	Malaysia
API Gravity:	46.0º
Sulphur Content:	0.02

Oil product spot prices[1]

Oil product spot prices are calculated from daily quotations from *Argus*.

Product	Market	Specifications
Gasoline	NW Europe	Gasoline Euro-bob oxy NWE prompt, London close, midpoint, barge, fob
	United States	Gasoline 93 V conv Colonial cycle 1, Houston close, midpoint, pipeline, fip
	Singapore	Gasoline 95r Singapore prompt, Singapore close, midpoint, fob
Gasoil	NW Europe	Gasoil heating oil German NWE prompt, London close, midpoint, barge, fob
	United States	Diesel 61 10ppm (ULS) Colonial pipeline cycle 1, Houston close, midpoint, pipeline, fip
	Singapore	0.05% Singapore prompt, Singapore close, midpoint, fob

Product	Market	Specifications
Jet/Kero	NW Europe	Jet/kerosene NWE prompt, London close, midpoint, fob
	United States	Jet/kerosene 54 Colonial cycle 1, Houston close, midpoint, pipeline, fip
	Singapore	Jet/kerosene Singapore prompt, Singapore close, midpoint, fob
Naphtha	NW Europe	Naphtha 65 para NWE prompt, London close, midpoint, barge, fob
	Singapore	Naphtha Singapore prompt, Singapore close, midpoint, fob
LSFO	NW Europe	Fuel oil 1% NWE prompt, London close, midpoint, fob
	Singapore	Fuel oil LSWR V-500 Indonesia prompt, Singapore close, midpoint, fob
HSFO	NW Europe	Fuel oil 3.5% NWE prompt, London close, midpoint, fob
	United States	Fuel oil No 6, 3% USGC prompt, Houston close, midpoint, fob
	Singapore	Fuel Oil HS 380 cst cargo Singapore prompt, Singapore close, midpoint, fob

Conversion Factors

Product	Product	Bbl/tonne
NW Europe	Gasoline	8.35
	Gasoil	7.46
	Jet/Kero	7.88
	Naphtha	8.82
	LSFO	6.49
	HSFO	6.31
Singapore	HSFO	6.46

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1. Source: Based on Argus unless otherwise specified.

5. End-use prices

The following definitions apply to these six variables:

1) Indices of Energy End-Use Prices
2) Energy End-Use Prices (Nat. Cur./unit)
3) Energy End-Use Prices (Nat. Cur./toe NCV)
4) Energy End-Use Prices (USD/unit, USD/toe, USD PPP/unit)
5) Indicators of Consumer and Producer Prices (2010=100) and Exchange Rates and Purchasing Power Parities (USD=1)
6) Wholesale/Retail Indices of Energy Prices shown in the files:

    1) INDEX.IVT
    2) END_NC.IVT
    3) END_TOE.IVT
    4) END_US.IVT
    5) INDICATORS.IVT
    6) WHOLE_RE.IVT

    Please consult the individual files for exact data coverage.

General notes

Energy represents a major expenditure for individual consumers, companies and the economy at large. Energy prices provide an indication of the economic significance of the different commercial transactions associated with energy use.

Energy commodity prices are notoriously volatile in the spot market, and this volatility is significantly reflected in the prices paid by consumers. End-use prices also vary greatly across countries due to differences in sources of supply and in taxation policy.

Given the importance of energy in our daily lives, governments can intervene in the price formation process through several mechanisms, including subsidies, fixed tariffs and differential taxation.

Governments can pursue several objectives when designing their taxation policy for energy products. Taxes on energy are a major source of revenue for several OECD countries. Energy consumption is relatively price-inelastic in the short-term, making energy products an interesting target for taxation, as the resulting tax revenue is stable and predictable.

However, energy taxation often pursues objectives that go beyond revenue-raising. Taxes can be designed to internalise the social cost and compensate for negative externalities associated with energy use, such as the public health impact of local air pollution resulting from combustion processes. Moreover, taxes on energy products can be used by governments to send price signals aimed at changing consumption patterns, in both composition and volume, making them a powerful tool for increasing sustainability in energy production and consumption.

Given their relevance, volatility and country-specificity, accurate data on energy prices, including taxes, at a national level are an essential tool for policy makers, researchers, market analysts and, more broadly, all economic actors.

Energy end-use prices: key concepts

Representativeness is a key challenge that has to be addressed in order to ensure the quality of data presented in this publication.

End-use prices are defined as the average unit price effectively paid by a consumer category over a period of time.

End-use prices are therefore equal to the ratio of the total amount of money spent on purchasing a given product and the total sales volume of the same product over a period of time:

$$Average\ end\ use\ price = \frac{Total\ sales\ revenue}{Total\ volume\ sold}$$

End-use prices vary in time, across countries and across consumer categories. For example, industrial consumers tend to consume large amounts of energy products, resulting in lower unit prices through economies of scale.

When relevant, end-use prices include all the various forms of taxation that affect the final amount spent by end-users.

Taxes levied on energy consumption can differ in the way they are calculated. The two most distinct categories are *per unit* taxes, calculated as a fixed rate per volume or unit purchased, and *ad valorem* taxes, calculated as a percentage of the value of a good.

The Value Added Tax (VAT) and equivalent taxes are the most common *ad valorem* taxes levied on energy products. Usually, VAT is levied on all consumable goods at the same rate. However, governments can set differential VAT rates on certain energy products to encourage or discourage their consumption. Although the VAT is levied on all transactions at different stages of a finished product's manufacturing process, it is effectively charged on final consumption only, as most intermediate consumers are refunded for their VAT expenditures.

It is worth noting that the Sales tax in place in most of the United States is similar, but not fully equivalent, to the VAT. Sales tax is levied on the total price of a finished product at the retail level, whereas VAT is levied and refunded on every step of the manufacturing process, effectively taxing added value only.

In many countries, subnational administrations can impose additional taxes to those levied at a national level, creating variations in taxation levels and, ultimately, to end-use prices within a country. This poses a challenge for the calculation of national average prices and taxes, as detailed information on consumption and prices for each administrative unit is required in order to compute a representative average.

The IEA energy prices methodology

General definitions of prices

End-use prices presented in this publication reflect, as accurately as possible, the unit price effectively paid by consumers over a period of time in a given country.

In addition to the total end-use prices, this publication presents data on energy taxation at two levels of disaggregation. At a first level, end-use prices are disaggregated into ex-tax prices and total tax:

$$[End\ use\ price] = [Ex\ tax\ price] + [Total\ tax]$$

The **ex-tax price** is defined as the price component corresponding to all non-tax expenses, including manufacturing costs, distribution and network charges as well as the profit margins for the companies involved in the manufacturing chain.

The **total tax** is defined as the total tax expenditure per sales unit effectively paid by consumers, including national and subnational level taxes, and taking into consideration tax exemptions and returns.

The total tax component is further disaggregated into excise taxes and VAT (or equivalent):

$$[Total\ tax] = [Excise\ tax] + [VAT]$$

In this publication, **excise taxes** are defined as all non-VAT or VAT-equivalent components levied on energy consumption. The vast majority of these taxes are calculated on a *per unit* basis. In practice, excise tax rates shown in this publication are the sum of a variety of taxes serving different purposes levied on an energy product. For a list of taxes included in the excise tax figures in this publication, please refer to the country-specific notes presented in Part II.B. The **VAT**, on the other hand, is made up of a single tax charge calculated on an *ad valorem* basis, corresponding or equivalent to the Value Added Tax system in place in most OECD countries.

VAT rates applicable to each product are used to calculate the VAT amount payable in each purchase. In general, the basis used for calculating the VAT amount includes both the ex-tax price and all non-VAT taxes:

$$[VAT] = VAT\ (\%) \times ([Ex\ tax\ price] + [Excise\ tax])$$

General definitions of products

Precise definitions for energy products vary across countries but are relatively uniform for oil products, as these products have to comply with a set of quality specifications. For country-specific information, please refer to the country notes in Part II.B.

Oil products

Heavy fuel oil comprises all residual fuel oil, including those obtained by blending. Its kinematic viscosity is above 10 cSt at 80°C. The flash point is always above 50°C and the density is always more than 0.90 kg/l.

In this publication, an additional distinction is made between **low sulphur fuel oil**, with sulphur content below 1%, and **heavy sulphur fuel oil**, with sulphur content equal to or higher than 1%.

Light fuel oil comprises light distillate fuel oils and is mainly used for heating purposes.

Automotive diesel comprises distillate fuel oils used for diesel compression ignition engines for motor vehicles. Automotive diesel may include additives.

Gasoline comprises all light hydrocarbons used in internal combustion engines (spark ignition engines) for motor vehicles, excluding aircrafts. Gasoline may include additives, oxygenates and octane enhancers including lead compounds. Given the relevance of gasoline and the price differences between gasoline grades in a country, an additional distinction is in this publication made between **regular** and **premium** gasoline, characterized mainly by their octane numbers, which can vary across countries. For country-specific gasoline specifications, please refer to the country notes in Part II.B.

Automotive LPG is a light saturated paraffinic hydrocarbon derived from refinery processes, crude oil stabilisation and natural gas processing plants. It consists mainly of propane and butane. LPG is normally liquefied under pressure for transportation and storage. Prices shown in this publication refer to LPG used as engine fuel only.

Natural gas

The prices for **natural gas** refer to MWh and are calculated by the data sources on a gross calorific value basis. Prices on a net calorific value basis would be approximately 11 per cent higher. Prices per volume unit can be calculated using the gross calorific values presented in the Conversion factors section in this document.

Coal

Coking coal refers to a coal with quality that allows the production of coke suitable to support a blast furnace charge. Its gross calorific value is greater than 23.8 MJ/tonne (5700 kcal/kg) on an ash free but moist basis.

Given the great variety of coal qualities in domestic and international coal trade, a selection of a standard coal quality for international comparisons of end-use prices is not possible. Therefore, in this publication, **steam coal** prices refer to the most common qualities for each country and are not necessarily comparable between countries. This is especially true for prices shown under the heading "Steam Coal for Households", where prices shown may refer to bituminous steam coal, anthracite, lignite or even coke.

In Austria, the United Kingdom and the United States, coal prices are available as average unit values (average expenditure per metric ton of coal by industry, power plants and households). These average unit values are the weighted average of all qualities and delivery sizes for which transactions have taken place. They are particularly useful for price comparisons between the four major energy sources when converted to a common heat unit and for price comparisons between countries on the basis of a single monetary unit.

General definitions of consumer categories

End-use prices and effective taxation rates for energy products vary significantly between retail and wholesale consumers. In order to reflect this difference of prices, a distinction is made in this publication between different consumer groupings, also depending on the types of energy commodity.

For **road fuels**, commercial use refers to purchases by companies while non-commercial use refers to purchases made by individual consumers. In most countries, commercial purchases are considered to be intermediate consumption and are therefore VAT-exempt. In some cases, economies of scale can also lead to reduced ex-tax prices.

For **other oil products** and **coal**, industry refers to large consumers in the industrial or manufacturing sectors purchasing these fuels in the wholesale market, often benefiting from economies of scale and VAT exemptions. The household category, in this case, groups all individual consumers purchasing these products in the retail market for space heating, cooking, or other domestic applications.

For **natural gas** and **electricity**, in general, large consumers included in the highest consumption bands correspond to the industry category, whereas households correspond to the lowest end of the consumption band spectrum.

For **natural gas**, **steam coal** and **heavy fuel oil**, electricity generation refers to the prices paid by power generation companies to purchase fuels for electricity production for sale.

Sources and collection methodology

Quarterly and annual energy prices and taxes data are collected each quarter by the IEA from relevant official agencies in each country, or from trusted secondary sources.

National sources include, but are not limited to, national energy ministries, central banks, ministries of economy, industry and finance, national competition authorities and national statistics agencies. Secondary sources include Eurostat and the European Commission for European countries, as well as country-specific sources detailed in the country notes in Part II.B.

At the national level, each agency collects primary energy prices and tax data according to its own methodology. These methodologies include, but are not limited to, pump surveys and company surveys.

Pump surveys are one of the most widely used methodologies for estimating average road fuel prices and is based on a survey of a limited amount of petrol stations spread throughout a country, constituting a representative sample for the territory covered. For each petrol station surveyed, posted end-use prices are collected and then used to compute an average value. Depending on the availability of consumption data, prices can be calculated a simple arithmetical average or a consumption-weighted average of the surveyed prices. Pump surveys provide a good estimation of the average end-use prices, but do not provide information regarding the average ex-tax price. When pump surveys are used, ex-tax prices are calculated by the relevant sources by subtracting the different tax components as listed in the official tax schedules. This is a source of minor errors, as the effective tax burden is often different than the legally defined values that do not consider tax rebates, exemptions and refunds.

Company surveys can often produce more representative figures than pump surveys, as there is normally a limited amount of companies commercialising fuels in a given country and information can usually be collected from all of them. In these surveys, companies report their sales volume and their revenues from fuel sales. The average prices obtained, by simply dividing total revenue from all companies by the total volume sold, manage to take into consideration regional variations as well as rebates affecting end-use prices that are not factored into the posted fuel price at a petrol station. Often, companies supply both ex-tax and total revenues, allowing the relevant data sources to obtain representative average end-use and ex-tax prices. By simply subtracting these values, the effective unit taxes paid by consumers can be calculated.

Natural gas and electricity prices are often collected through utility company surveys. Fuel prices for the electricity generation sector are often obtained by conducting a survey of all power generation companies.

Natural gas and electricity pose a specific challenge, as their end-use prices are often regulated through multiple tariffs which include fixed and variable components, as well as distinctions in pricing for different consumption categories (consumption bands). Most countries are able to supply average end-use prices through utility surveys. However, in some countries, average unit values do not exist and therefore selected tariff rates have been used. The weighted average of the tariffs approximates an average value per MWh.

In several countries, industrial consumers can purchase natural gas and electricity through private contracts instead of via the regulated market, with variable and often confidential pricing arrangements. This makes the calculation of average end-use prices for industrial consumers particularly challenging.

For country-specific exceptions and additional methodological information, please refer to the detailed country notes following each set of country tables in Part II.B. These notes may also refer to earlier periods than those shown in this publication, as corresponding data can be consulted in the online data service.

Energy prices and taxes layout

Part II.A: Energy end-use price indices

The indices published in this section have been derived from the nominal end-use prices (including taxes) shown in Part II.B of this publication. The methodology for calculating the real and nominal indices of energy end-use prices is as follows:

For products where more than one price is available, a representative series is created for each country. The

representative heavy fuel oil price is a combination of high sulphur fuel oil and low sulphur fuel oil. The representative motor gasoline price is a combination of the most consumed unleaded gasoline for recent time periods and leaded gasoline for earlier time periods.

For oil, the industry index includes representative heavy fuel oil, light fuel oil and automotive diesel but not fuels used for electricity generation. The household index includes representative gasoline and light fuel oil.

For coal, the industry index includes representative steam coal and coking coal. The household index can also include steam coal.

Indices with the base year 2010=100 were computed for each price series from prices in national currencies and then aggregated over product groups, sectors and countries. The Paasche formula is used for index computation. The weights used are the physical quantities consumed, as published in the OECD/IEA *World Energy Statistics*. To calculate the real price index, the nominal prices are deflated with country-specific producer price indices (2010=100) for the industry sector and with country-specific consumer price indices (2010=100) for the household sector. The regional aggregates were calculated as the weighted averages of country specific indices, using consumption quantities as the weights.

Missing data for prices in national currencies in Part II.B tables were estimated for the index calculations. Certain series with data missing for approximately 10 years or more have been omitted.

The **consumer price index** (CPI), the **producer price index** (PPI) and the **consumer price index for energy** (CPI energy) shown in this section were taken from the OECD *Main Economic Indicators*.

In 2Q2009 the OECD revised their methodology for the PPI, with the aim of improving the quality and comparability of PPIs.

For Australia, Belgium, Denmark, Hungary, Ireland, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Sweden and Switzerland, the series refer to the countries' total market.

For Austria, Canada, the Czech Republic, the European Union, France, Germany, Greece, Iceland, Italy, Japan, Korea, Mexico, Poland, Portugal, the Slovak Republic, Spain, Turkey, the United Kingdom and the United States, the series now refer to the countries' domestic markets. This series is also used for the OECD total.

Where new series begin more recently than series previously used, the historical data has been estimated using the growth rates of the old series. The estimated data (from 1978 onwards) are as follows: Austria until 1999; Belgium, Canada until 2000; the Czech Republic, New Zealand, Norway, the United Kingdom, the United States, OECD Europe, OECD Total, the European Union 27, the Euro area until 1989; Denmark until 1984; Finland, France, Japan, Korea, Poland until 1994; Greece until 1980; Hungary, Ireland until 1997; Italy until 1990; Luxembourg until 1979; Mexico and the Slovak Republic until 1993; the Netherlands, Portugal and Sweden until 1989; Switzerland until 2002; Turkey until 1981.In addition to this, certain missing historical series have been estimated using *International Financial Statistics* from the International Monetary Fund. These are as follows: Belgium and Luxembourg for 1978-79; the Czech Republic and Portugal and the Slovak Republic for 1978-89; Greece, Italy and the Netherlands for 1978-80; Hungary and Poland for 1978-94; Sweden and Turkey for 1978-81.

Part II.B: Energy end-use prices, taxes and price indices in national currencies

The data shown in this section are supplied directly by national sources or collected from trusted secondary sources, as described in the country-specific notes.

The prices and taxes data in this section are presented by country and product in national currency per sales unit.

All prices, taxes and indices for the most recent quarter are preliminary (e.g. the third quarter in the third quarter edition). Also, in the case of the fourth quarter edition, the most recent year is preliminary (e.g. year 2015 for the 4th Quarter 2015 edition). These prices, taxes and indices are revised and updated in the subsequent edition.

Wholesale and retail price indices

The producer price indices (PPI) and the consumer price indices (CPI) compiled by national statistical services often contain sub-indices for energy products. Where possible the sub-indices for oil products, electricity, natural gas and coal are shown in Table 4, Part II.B. Wholesale indices refer to industry (PPI) and retail indices refer to households (CPI). Growth rates of wholesale and retail price indices are usually close but not identical to those of similar indices which could be constructed from the absolute prices. Any differences in growth rates are due to differences in price surveys and weighting schemes used for the

construction of the wholesale and retail price indices from indices of nominal energy end-use prices.

In the context of this publication, energy sub-indices of PPI and CPI are important instruments for cross-checking growth rates of absolute prices and for estimating the absolute prices, notably for electricity and natural gas prices for periods with missing price data. Wholesale and retail indices are presented in the base year of the original source.

Conversion to euros

Prices and taxes data prior to the date of entry into the Economic and Monetary Union (EMU) have been converted from the former national currency using the appropriate irrevocable conversion rate. The irrevocable conversion rate at 1 January 1999 was used for all countries, except Greece (fixed rate as of 1 January 2001), Slovenia (fixed rate as of 1 January 2007), the Slovak Republic (fixed rate as of 1 January 2009) and Estonia (fixed rate as of 1 January 2011).

Country	Rate	Country	Rate
Austria	13.7603	Lithuania	3.45280
Belgium	40.3399	Latvia	0.702804
Estonia	15.6466	Luxembourg	40.3399
Finland	5.94573	Netherlands	2.20371
France	6.55957	Portugal	200.482
Germany	1.95583	Slovak Republic	30.126
Greece	340.750	Slovenia	239.64
Ireland	0.787564	Spain	166.386
Italy	1 936.27		

This methodology facilitates comparisons within a country over time and ensures that the historical evolution (i.e. growth rate) is preserved. However, pre-EMU euros are a notional unit and are not normally suitable to form area aggregates or to carry out cross-country comparisons.

The national currency prices have been converted to euros and rounded using IEA Secretariat rounding conventions depending on the product and flow (see below). The total prices have not, however, been re-calculated and therefore small rounding errors may result.

Product	Decimals	Product	Decimals
HFSO	2	Natural gas	2
LSFO	2	Steam coal	2
LFO	2	Coking coal	2
Diesel	3	Electricity	4
Gasoline	3		

For time periods prior to a country's adoption of the euro, the prices in USD (Parts II.D, II.E and II.F) have been obtained by applying notional euro to USD exchange rates. These notional rates were calculated by applying the irrevocable fixed euro rates to the former national currency exchange rates. Regional totals for all time periods have been calculated after all series were converted to USD.

To facilitate calculations from data in national currencies, the exchange rates shown for pre-EMU periods also incorporate the notional exchange rates.

Part II.C: Taxation in energy prices

This section focuses on energy taxation, its relative weight on energy end-use prices and evolution over time.

Tables 1 to 17 show percentages of taxes in prices per energy product and consumer sector in OECD countries.

Tables 18 to 22 show indices of real tax components per energy product and consumer sector in OECD countries. These indices are based on the total tax component shown in Part II.B deflated using the relevant sectoral price index. The reference year for these indices is 2010 (2010 = 100).

Part II.D: Energy end-use prices in USD/unit

In general, country differentials between national end-use prices expressed in USD are heavily influenced by exchange rate differentials. However, world market prices of primary fuels in USD are an important parameter for the pricing of final energy consumption, particularly for countries which rely heavily on energy imports. The difference between world market prices and national end-use prices in USD correspond to the remaining pricing parameters, i.e. transformation and distribution costs, non-internationally tradable energy sources (mainly hydro-power, but also natural gas), market structures (e.g. mix of large- and small- purchase lots), and the pricing policies of central or local authorities, which naturally include the national tax policies.

Part II.E: Energy end-use prices in USD/toe

This section refers to prices expressed in terms of the heat content of the fuel rather than price per (e.g. tonne, litre) physical unit. They have been calculated using the country specific calorific value (heat content). The net calorific value of a fuel (NCV) is the

calorific value gross (GCV), less the heat content of the water formed during the combustion of the fuel. For coal and oil the net calorific values are some 5 per cent lower than the gross values; for natural gas they are 10 per cent lower.

For commercial purposes, specific varieties of a given fuel are usually characterised by the gross calorific value (GCV). For inter-fuel analysis the use of a net calorific value (NCV) is more appropriate. Prices on natural gas used in different sectors in the following tables are based on the gross heat value. Prices of Part II Sections covering different fuels refer to a net heat value. The tables in the Conversion factors section at the end of this document show the conversion factors for each country that are used to convert the prices in Tables 1 to 3 (per original physical units) to the prices in Part II. E heat equivalent. For electricity and natural gas, however, this is not necessary. For all countries, a factor of 0.086 is used to convert electricity from MWh to 10^7 kcal, and a factor of 0.0774 is used to convert natural gas from MWh gross to 10^7 kcal net heat equivalents. Please note that 10^7 kcal equals to 1 toe (tonne of oil equivalent).

Detailed information on country-specific calorific values and densities used for conversions can be found in the Conversion factors section in this document.

Part II.F: Energy prices in USD (PPP)

The prices shown in Section F are the result of converting the national currency prices in Section B using average purchasing power parities (PPP) for GDP in national currency per USD from OECD *National Accounts of OECD countries.*

Due to wide fluctuations in exchange rates, there has been some concern regarding international price comparisons based on these exchange rates, which may not reflect the *relative purchasing power* in each currency. In other words, a given amount of money,

when converted into different currencies at the PPP rates, buys the same basket of goods and services in all countries compared. This includes consumer goods and services, government services, equipment goods and construction projects. Consumer items include food, beverages, tobacco, clothing, footwear, rents, water supply, gas, electricity, medical goods and services, furniture and furnishings, household appliances, personal transport equipment, fuel, transport services, recreational equipment, recreational and cultural services, telephone services, education services, goods and services for personal care and household operation, repair and maintenance services.

The prices shown in Sections D and E are the result of converting those of Section B to USD using quarterly and yearly averages of exchange rates as published by the OECD *Main Economic Indicators.* Missing historical series have been estimated according to *International Financial Statistics* from the International Monetary Fund.

The PPP are triennial benchmark results developed jointly by the Statistics Directorate of the OECD and the Statistical Office of the European Communities (Eurostat). For more information on methodology, see *www.oecd.org/std/ppp.*

Conversion factors

The following densities and calorific values are used to convert from prices and taxes tables in national currencies per unit to prices in national currency per tonne of oil equivalent, on a net calorific value basis. Where country-specific information is not available, an "s" has been used to denote standard calorific values from IEA energy balances methodology, and an "e" has been used to denote an IEA Secretariat estimate.

Heavy fuel oil*

	Density	Net calorific values	
	(t/kl)	(kcal/kg)	(107 kcal/kl)
Australia	0.950s	9 600s	0.9120
Austria	1.000	9 600s	0.9600
Belgium	0.930	9 750	0.9068
Canada	0.950	9 600s	0.9120
Chile	..	9 600s	..
Czech Republic	0.990	9 532	0.9437
Denmark	0.975	9 650	0.9409
Estonia	..	9 600s	..
Finland	..	9 600s	..
France	..	9 750	..
Germany	0.990	9 800	0.9702
Greece	..	9 600s	..
Hungary (industry)	..	9 500	..
Hungary (electricity generation)	..	9 700	..
Ireland	0.970	9 480	0.9196
Israel	..	9 600s	..
Italy	0.940-0.970	9 600	0.9024-0.9312
Japan	0.950	9 600s	0.9120
Korea	0.944	9 203	0.8688
Latvia	..	9 600s	..
Lithuania	..	9 600s	..
Luxembourg	0.950	9 650	0.9168
Mexico	0.982	10 139	0.9956
Netherlands	0.940	9 760	0.9174
New Zealand	0.945	10 129	0.9572
Norway	0.820-0.860	9 974	0.8179-0.8578
Poland	0.965	9 723	0.9383
Portugal	0.980	9 554	0.9363
Slovak Republic	0.990	9 699	0.9602
Slovenia	..	9 600s	..
Spain	..	9 400	..
Sweden	0.965	9 600s	0.9264
Switzerland	..	9 600s	..
Turkey	0.970	9 600	0.9312
United Kingdom	0.980	9 870	0.9673
United States	0.944	9 988	0.9429

* Fuel oil with sulphur content greater than 1%.

"s" denotes standard calorific values from IEA energy balances methodology.

INTERNATIONAL ENERGY AGENCY

Light fuel oil

	Density	Net calorific values	
	(t/kl)	(kcal/kg)	(10⁷ kcal/kl)
Austria	0.840	10 350s	0.8694
Belgium	0.840	10 250	0.8610
Canada	0.830	10 350s	0.8591
Czech Republic	0.860	10 263	0.8826
Denmark	0.859	10 175	0.8744
Finland	0.840	10 350s	0.8694
France	0.845	10 100	0.8535
Germany	0.870	10 200	0.8874
Greece	0.830	10 350s	0.8591
Ireland	0.838	10 170	0.8522
Italy	0.820-0.840	10 210	0.8474
Japan	0.800	10 350s	0.8280
Korea	0.870	8 117	0.7062
Luxembourg	0.840	10 250	0.8610
Mexico	0.852	10 849	0.9243
Netherlands	0.840	10 100	0.8484
New Zealand	0.824	10 366	0.8542
Norway (industry)	0.850	10 350s	0.8798
Norway (households)	0.830	10 350s	0.8591
Poland	0.845	9 791	0.8273
Slovak Republic	0.910	10 101	0.9192
Spain	0.855	10 350s	0.8849
Sweden	0.845	10 350s	0.8746
Switzerland	0.845	10 350s	0.8746
Turkey	0.800	10 450	0.8360
United Kingdom	0.847	10 260	0.8690
United States	0.830e	10 760	0.8931
All other countries	0.830e	10 350s	0.8591

"s" denotes standard calorific values from IEA energy balances methodology.

"e" denotes IEA Secretariat estimate.

Automotive diesel

	Density	Net calorific values	
	(t/kl)	(kcal/kg)	(10^7 kcal/kl)
Australia	0.820	10 350s	0.8487
Austria	0.840	10 350s	0.8694
Czech Republic	0.843	10 177	0.8579
Denmark	0.845	10 175	0.8598
France	0.845	10 350s	0.8746
Germany	0.820-0.8450	10 350s	0.8622
Hungary	0.830	10 221	0.8483
Italy	0.820-0.840	10 350s	0.8591
Korea	0.840	10 090	0.8476
Mexico	0.852	10 849	0.9243
Netherlands	0.840	10 350s	0.8694
New Zealand	0.822	10 297	0.8464
Poland	0.845	10 203	0.8622
Portugal	0.837	10 350s	0.8663
Slovak Republic	0.835	10 474	0.8746
Slovenia	0.870	10 175	0.8852
Switzerland	0.835	10 350s	0.8642
Turkey	0.850	10 350s	0.8798
United Kingdom	0.845	10 350s	0.8746
United States	0.820	10 350s	0.8487
All other countries	0.860e	10 350s	0.8901

"s" denotes standard calorific values from IEA energy balances methodology.

"e" denotes IEA Secretariat estimate.

Gasoline*

	Density	Net calorific values	
	(t/kl)	(kcal/kg)	(10^7 kcal/kl)
Austria	0.750	10 700s	0.8025
Belgium	0.740	10 700s	0.7918
Chile	0.730	11 200	0.8176
Czech Republic	0.760	10 412	0.7913
France	0.755	10 700s	0.8079
Germany	0.735-0.785	10 700s	0.8350
Hungary	0.735	10 700s	0.7865
Italy	0.720-0.760	10 700s	0.7918
Korea	0.740	9 681	0.7164
Mexico	0.729	10 700s	0.7800
Netherlands	0.745	10 700s	0.7972
New Zealand	0.739	10 296	0.7609
Poland	0.755	10 342	0.7808
Portugal	0.748	10 700s	0.8004
Slovak Republic	0.747	10 700s	0.8079
Slovenia	0.740	10 473	0.7750
Switzerland	0.744	10 700s	0.7961
Turkey	0.775	10 700s	0.8293
United Kingdom	0.738	10 700s	
All other countries	0.780e	10 700s	0.8346

*All values refer to premium unleaded 95 RON gasoline, except for Korea, Mexico and New Zealand (unleaded regular).

"s" denotes standard calorific values from IEA energy balances methodology.

"e" denotes IEA Secretariat estimate.

Coal

	Net calorific values 10^7 kcal/tonne			
	Steam coal industry	**Steam coal elect. generation**	**Steam coal households**	**Coking coal industry**
Australia	0.6600	0.6600	..	0.6807e
Austria	0.6890e	0.6609e	0.6720e	0.6943e
Belgium	0.5550e	0.5338e	0.6158e	0.7000e
Canada	0.7127	0.6094e	..	0.7164
Chile	0.7000	0.7000	..	..
Czech Republic[1]	0.3750	0.2550	0.3750	0.6500
Denmark	0.7000	0.5831e	0.7000	..
Estonia	..	..	..	..
Finland	0.6091e	0.6091e	..	0.6998e
France	0.6210	0.6210	0.8800	0.7285
Germany	0.7000	0.6914	0.5995e	0.6950
Greece[2]	0.6120e	0.1252e	..	..
Hungary[3]	0.4912	0.1994	0.4119	..
Iceland	..	..	..	..
Ireland	0.6650e	0.6194	0.6650e	..
Israel	..	0.5200	..	..
Italy	0.6162	0.5900	0.6350e	0.6650
Japan	0.5571	0.5571	..	0.6928
Korea	0.6600	0.6600	0.6600	0.6600e
Latvia	..	..	..	..
Lithuania	..	..	..	..
Luxembourg	..	..	0.6998e	..
Mexico[4]	..	0.4575	..	..
Netherlands[5]	0.7000	0.7000	0.5989e	0.6800
New Zealand	0.6836	..	0.6836	..
Norway	0.6712e	..	0.6712e	0.6712e
Poland	0.5387	0.5126	0.6210	0.7060
Portugal[6]	0.8562	0.6105e	..	0.7123
Slovak Republic[7]	0.6110e	0.2567e	0.2938e	0.7018e
Slovenia	..	..	..	..
Spain	..	0.5500	..	0.7170e
Sweden	0.6415e	0.6664e	0.6544e	0.6454
Switzerland[8]	0.6000	..	0.4801e	0.7200
Turkey[9]	0.4250	0.2000	0.4250	0.6100
United Kingdom	0.6275	0.5653	0.5653e	..
United States	0.648e	0.6101e	..	0.7090

"e" denotes IEA Secretariat estimate.

1. Czech Republic: brown coal.
2. Greece: brown coal for electricity generation.
3. Hungary: brown coal for household and electricity generation from 2007 onwards.
4. Mexico: sub-bituminous coal for electricity generation.
5. Netherlands: steam coal for industry and electricity generation refers to quality hard coal.
6. Portugal: steam coal for industry refers to anthracite.
7. Slovak Republic: brown coal for household and electricity generation from 2002 onwards.
8. Switzerland: steam coal for household refers to quality lignite.
9. Turkey: steam coal refers to quality lignite.

Natural gas

	Gross calorific values		
	kcal/m³	kJ/m³	kWh/m³
Australia	9 506	39 800	11.055
Austria	9 510	39 816	11.060
Belgium	8 400	35 169	9.769
Canada	8 892	37 229	10.341
Chile	9 341	39 109	10.864
Czech Republic	9 030	37 807	10.502
Denmark	10 509	43 999	12.222
Estonia	..	..	..
Finland	10 476	43 861	12.184
France	8 400	35 169	9.769
Germany	8 400	35 169	9.769
Greece	9 650	40 403	11.223
Hungary	8 500	35 588	9.886
Iceland	..	..	..
Ireland	9 444	39 540	10.983
Israel	..	..	..
Italy	9 100	38 100	10.583
Japan	11 000	46 055	12.793
Korea	10 400	43 543	12.095
Latvia	..	..	..
Lithuania	..	..	..
Luxembourg	8 700	36 425	10.118
Mexico	9 400	39 356	10.932
Netherlands	8 406	35 194	9.776
New Zealand	9 004	37 698	10.472
Norway	9 560s	40 026s	11.118s
Poland	9 436	39 500	10.974
Portugal	10 214	42 873	11.879
Slovak Republic	8 972	37 564	10.434
Slovenia	..	..	..
Spain	10 204	42 764	11.867
Sweden	..	..	..
Switzerland	9 560	40 026	11.118
Turkey	9 155	38 330	10.647
United Kingdom	8 400	35 169	9.769
United States	9 139	38 263	10.629

"s" denotes standard calorific values from IEA energy balances methodology.

INTERNATIONAL ENERGY AGENCY

6. Abbreviations and conventions

bbl: barrel
Btu: British thermal unit
CHP: combined heat and power
CIF: Cost insurance freight
cst: centistokes
FIP: Free into Pipeline
FOB: Free on Board
FSU: Former Soviet Union
GCV: gross calorific value
GJ: gigajoule
GST: goods and services tax
HFO: heavy fuel oil
HSFO: high sulphur fuel oil
ISO: International Organisation for Standardisation
kcal: kilocalorie
kg: kilogramme
kl: kilolitre (= 1 m^3)
kV: kilovolt
kVA: kilovolt-ampere
kW: kilowatt
kWh: kilowatt hour

LFO: light fuel oil
LSFO: low sulphur fuel oil
m^3:   cubic metre (= 1 kl = 1000 litres)
MON: motor octane number
Mt: million tonnes
MWh: megawatt hour
NCV: net calorific value
PON: pump octane number (= arithmetic average of RON and MON)
RdON: road octane number (equivalent to PON)
RON: research octane number
st: short tonne
t: tonne = metric ton
tce: tonne of coal equivalent
toe: tonne of oil equivalent = 10^7 kcal
VAT: value added tax
..   not available, i.e. consumption and/or taxes usually exist but data are not available
-   nil
x   not applicable
c   confidential

Geographical groupings

EU Member States: EU-28 starting in July 2013; EU-27 from January 2007 to June 2013; EU-25 from May 2004 to December 2006; EU-15 prior to May 2004. Regional averages include only those countries where information is available for that quarter and year.

EU28: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

EMU: Economic and Monetary Union: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, the Slovak Republic, Slovenia and Spain.

IEA: Includes IEA Europe, IEA Asia and Oceania, and IEA North America.

IEA Europe: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

IEA Asia and Oceania: Australia, Japan, Korea and New Zealand.

IEA North America: Canada, Mexico and the United States.

OECD: OECD Europe, OECD Asia and Oceania, and OECD Americas.

OECD Americas: Canada, Chile, Mexico and the United States.

OECD Asia and Oceania: Australia, Israel[1], Japan, Korea and New Zealand.

OECD Europe: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD and/or the IEA is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

List of currencies by country

Country	Currency	ISO Currency Code
Australia	Australian dollars	AUD
Austria	euros	EUR
Belgium	euros	EUR
Canada	Canadian dollars	CAD
Chile	Chilean pesos	CLP
Czech Republic	Czech koruny	CZK
Denmark	Danish kroner	DKK
Estonia	euros	EUR
Finland	euros	EUR
France	euros	EUR
Germany	euros	EUR
Greece	euros	EUR
Hungary	forints	HUF
Iceland	Icelandic krona	ISK
Ireland	euros	EUR
Israel	new Israeli sheqels	ILS
Italy	euros	EUR
Japan	yen	JPY
Korea	wons	KRW
Latvia	euros	EUR
Lithuania	euros	EUR
Luxembourg	euros	EUR
Mexico	Mexican pesos	MXN
Netherlands	euros	EUR
New Zealand	NZ dollars	NZD
Norway	Norwegian kroner	NOK
Poland	zlotys	PLN
Portugal	euros	EUR
Slovak Republic	euros	EUR
Slovenia	euros	EUR
Spain	euros	EUR
Sweden	Swedish kronor	SEK
Switzerland	Swiss francs	CHF
Turkey	Turkish liras	TRY
United Kingdom	UK pounds	GBP
United States	US dollars	USD